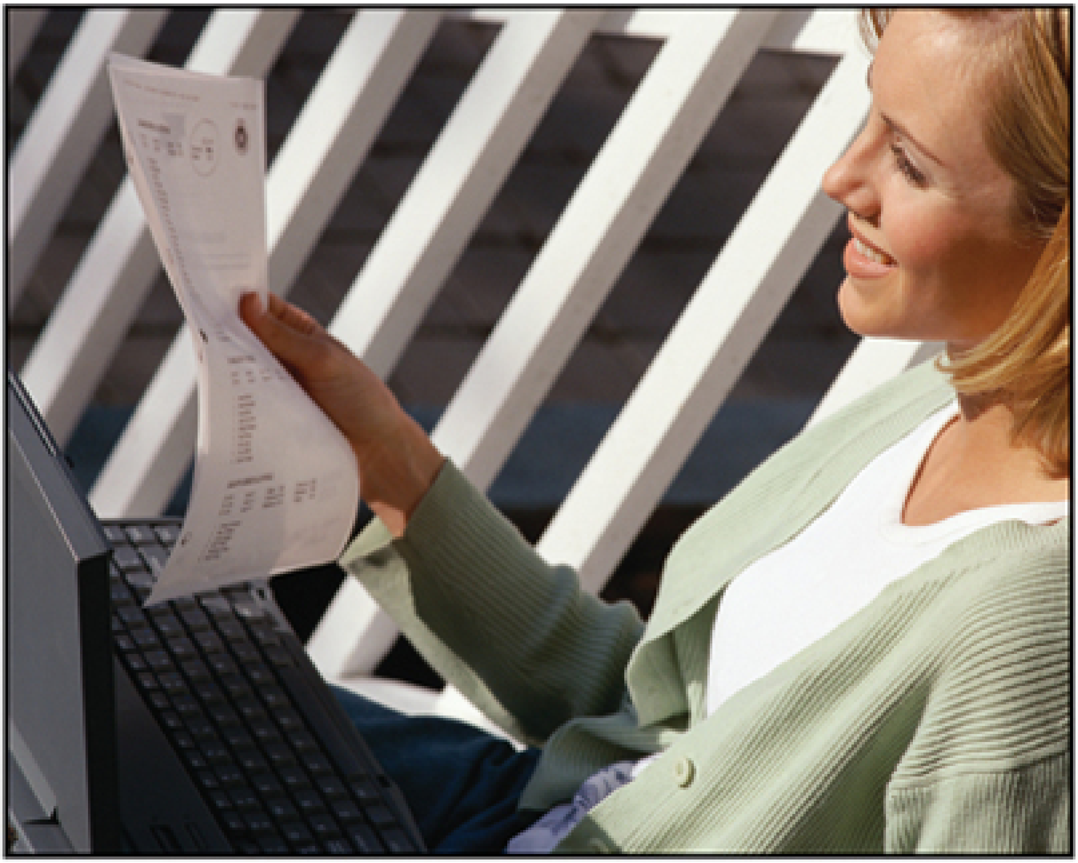
PREMIER REFERENCE SOURCE

Designing Instruction for the Traditional, Adult, and Distance Learner

A New Engine for Technology-Based Teaching



LAWRENCE A. TOMEI

Designing Instruction for the Traditional, Adult, and Distance Learner:
A New Engine for Technology-Based Teaching

Lawrence A. Tomei
Robert Morris University, USA

Information Science REFERENCE
INFORMATION SCIENCE REFERENCE
Hershey · New York

Director of Editorial Content: Kristin Klinger
Senior Managing Editor: Jamie Snavely
Assistant Managing Editor: Michael Brehm
Publishing Assistant: Sean Woznicki
Typesetter: Jamie Snavely, Sean Woznicki
Cover Design: Lisa Tosheff
Printed at: Yurchak Printing Inc.

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com/reference

Library of Congress Cataloging-in-Publication Data

Tomei, Lawrence A.
Designing instruction for the traditional, adult, and distance learner : a new engine for technology-based teaching / by Lawrence A. Tomei.
p. cm.
Includes bibliographical references and index.
Summary: "This book explores how technology impacts the process of devising instructional plans for adult students"--Provided by publisher.

ISBN 978-1-60566-824-6 (hardcover) -- ISBN 978-1-60566-825-3 (ebook) 1. Educational technology. 2. Instructional systems--Design. I. Title.
LB1028.3.T63 2010
371.33'4--dc22
2009014483

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Advances in Information and Communication Technology Education Series (AICTE)

ISBN: 1935-3340

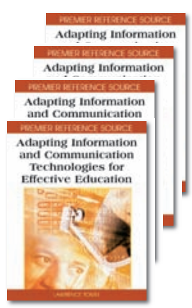
Editor-in-Chief: Lawrence Tomei, Robert Morris University, USA
&
Mary Hricko, Kent State University, USA

Integrating Information & Communications Technologies into the Classroom

Lawrence A. Tomei; Robert Morris University, USA

Information Science Publishing ♦ copyright 2007 ♦ 360 pp ♦ H/C (ISBN: 1-59904-258-4) ♦ E-Book (ISBN: 1-59904-260-6)

Integrating Information & Communications Technologies Into the Classroom examines topics critical to business, computer science, and information technology education, such as: school improvement and reform, standards-based technology education programs, data-driven decision making, and strategic technology education planning. This book also includes subjects, such as: the effects of human factors on Web-based instruction; the impact of gender, politics, culture, and economics on instructional technology; the effects of technology on socialization and group processes; and, the barriers, challenges, and successes of technology integration into the classroom. Integrating Information & Communications Technologies Into the Classroom considers the effects of technology in society, equity issues, technology education and copyright laws, censorship, acceptable use and fair use laws, community education, and public outreach, using technology.



Adapting Information and Communication Technologies for Effective Education

Edited By: Lawrence A. Tomei, Robert Morris University, USA

Information Science Reference ♦ copyright 2007 ♦ 300pp ♦ H/C (ISBN: 978-1-59904-922-9)

Educational initiatives attempt to introduce or promote a culture of quality within education by raising concerns related to student learning, providing services related to assessment, professional development of teachers, curriculum and pedagogy, and influencing educational policy, in the realm of technology. Adapting Information and Communication Technologies for Effective Education addresses ICT assessment in universities, student satisfaction in management information system programs, factors that impact the successful implementation of a laptop program, student learning and electronic portfolios, and strategic planning for e-learning. Providing innovative research on several fundamental technology-based initiatives, this book will make a valuable addition to every reference library.

The Advances in Information and Communication Technology Education (AICTE) Book Series serves as a medium for introducing, collaborating, analyzing, synthesizing, and evaluating new and innovative contributions to the theory, practice, and research of technology education applicable to K-12 education, higher education, and corporate and proprietary education. The series aims to provide cross-disciplinary findings and studies that emphasize the engagement of technology and its influence on bettering the learning process. Technology has proven to be the most critical teaching strategy of modern times, and consistently influencing teaching style and concept acquisition. This series seeks to address the pitfalls of the discipline in its inadequate quantifiable and qualitative validation of successful learning outcomes. Learners with basic skills in reading, writing, and arithmetic master those skills better and faster with technology; yet the research is not there to defend how much better or how much faster these skills are acquired. Technology offers educators a way to adapt instruction to the needs of more diverse learners; still, such successes are not generalized across populations or content areas. Learners use technology to acquire and organize information evidence a higher level of comprehension; but we are not sure why. The purpose of the AICTE is to grow this body of research, propose new applications of technology for teaching and learning, and document those practices that contribute irrefutable verification of information technology education as a discipline.

IGI GLOBAL
DISSEMINATOR OF KNOWLEDGE

Hershey • New York
Order online at www.igi-global.com or call 717-533-8845 x100 –
Mon-Fri 8:30 am - 5:00 pm (est) or fax 24 hours a day 717-533-8661

Table of Contents

Section 2
Focus on Learning

Section 3
Focus on Resources

Preface

This text proposes a new paradigm for designing, developing, implementing, and assessed technology-based instruction. It addresses three target populations of today's learner: traditional, adult, and distance education. The text proposes a new model of instructional system design (ISD) for developing effective technology-based education that involves a five-step process focusing on the learner, learning theories, resources, delivery modalities, and outcomes.

The model began as an idea for designing online instruction (Tomei, 2007). In a *Theoretical Model for Designing Online Education in Support of Lifelong Learning*, the author suggested an engine for designing education concentrating on the critical elements of delivering instruction online. As the theoretical underpinnings of the engine came into sharper focus, it was apparent that the author had actually developed a new prototype paradigm for designing instruction using the ISD process.

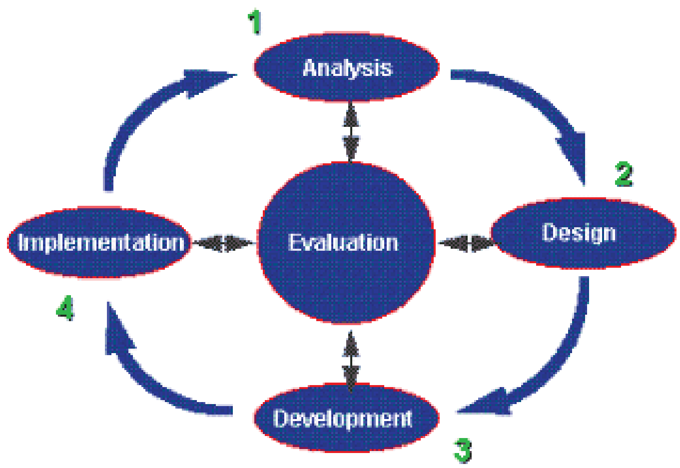
The concept of a systems approach to instructional design is based on a "30,000-foot" view of the teaching and learning process. It is characterized by an orderly gathering and analysis of collective and individual student outcomes and by the ability to respond to identified revisions to established learning goals. The application of a systems approach to instruction insures that academic programs and required support materials are continually developed in an effective and efficient manner to match the variety of needs in a rapidly changing environment. Surely, nothing is changing faster than the infusion of technology-based resources into the classroom: traditional, adult, or virtual.

INSTRUCTIONAL SYSTEM DESIGN (ISD)

ISD models enable educators to tackle the design of new lessons or curriculum in a systematic, methodical, organized manner. They help visualize the inter-related tasks associated with the sequencing of discrete, manageable instructional units. Most educational psychologists would ascribe behavioral learning styles to the ISD approach; that is, designers who prefer sequential, logical, hierarchical, and chronological instruction tend to steer towards using this paradigm. However, for many other educators who prefer the cognitive or humanistic bent to teaching, ISD still has much to offer. Three ISD models, in particular, form the basis for the new *Engine for Designing Technology-Based Instruction*.

The ADDIE Model (Figure 1) represents five phases found in many, if not all, ISD models although the labels may differ. Most ISD models propose an analysis phase followed by design, development, implementation, and evaluation. They begin with the analysis of tasks to be performed, content area learning objectives, timelines, priorities and constraints. Designing lessons via ISD demands an understanding of the target learner and a hierarchy of instruction from simple to complex, least to most important, or past to present – basically, the behavioral approach to learning. As such, the ADDIE Model is most commonly associated with teaching the traditional learner.

Figure 1. ADDIE instructional systems design model



The Backward Design Model (BDM) begins with desired student learning outcomes in mind (Figure 2). As the authors, Wiggins and McTighe, relate the concept, *"One starts with the end - the desired results (goals or standards) - and then derives the curriculum from the evidence of learning (performances) called for by the standard and the teaching needed to equip students to perform (Wiggins and McTighe, 2000, p8)"*

The BDM design process involves three stages each with a focusing concept, making BDM a perfect vehicle for designing instructional content targeting the adult learner. First, what is worthy and requiring of understanding? In this first stage, instructors focus on the learning goals and "enduring understandings" that adults must develop before completing the lesson. Guiding questions are formulated and universal skills focusing on larger concepts, principles or processes are devised. Stage 2 examines the requisite evidence of understanding, deciding ultimately how learners will demonstrate their understanding. The assessment tasks created in this step ensure that adults develop an understanding of the content presented and demonstrate that understanding throughout the learning process (formative assessment) as well as at its conclusion (summative assessment). The final stage of the BDM develops the learning experiences, sequence of the instruction, and the actual subject area content to be taught.

The final instructional system design model to be considered in this text is the Kemp Model that describes an approach that considers a cycle for designing online instruction. Figure 3 illustrates the iterative process that addresses nine independent elements. Although the creator of the model claims that the elements need not be attacked in any particular order, it seems logical to begin with the definition of the instructional problem and move clockwise around the model, ending with the evaluation of teaching. The model encourages the designer to pay particular attention to content sequencing (Step 5), integrating resources (Step 7), and instructional delivery (Step 8). These critical elements should be of particular concern when designing technology-based lessons.

This introduction to instructional design serves as an underlying foundation for the new *Engine for Designing Technology-Based Instruction* proposed in this text. Each of the five critical focus areas is discussed next.

Figure 2. Backward design model

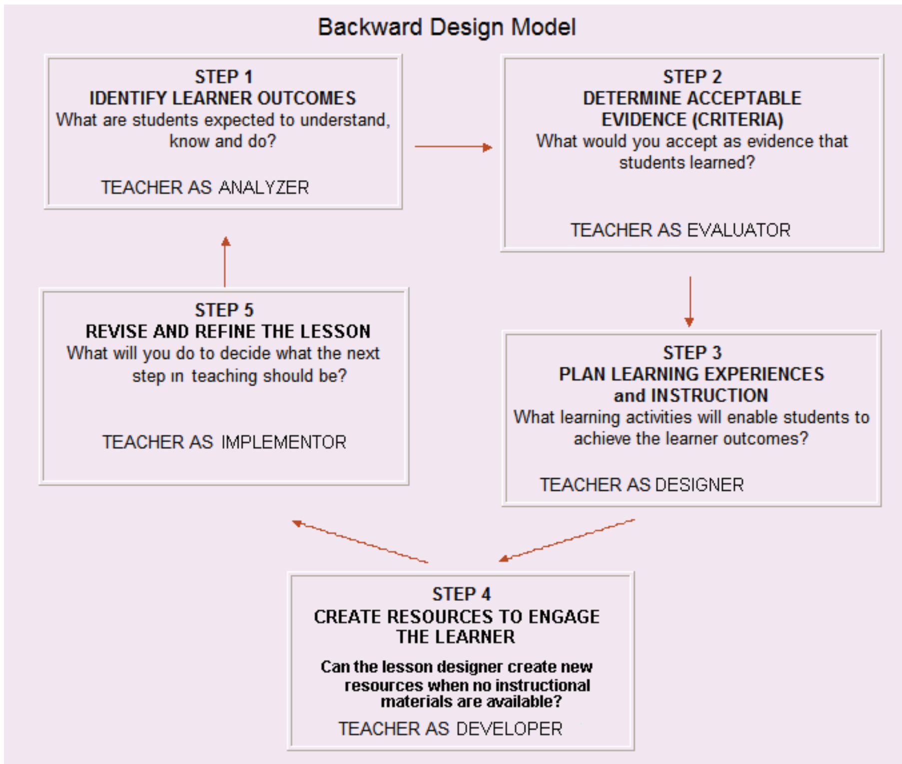
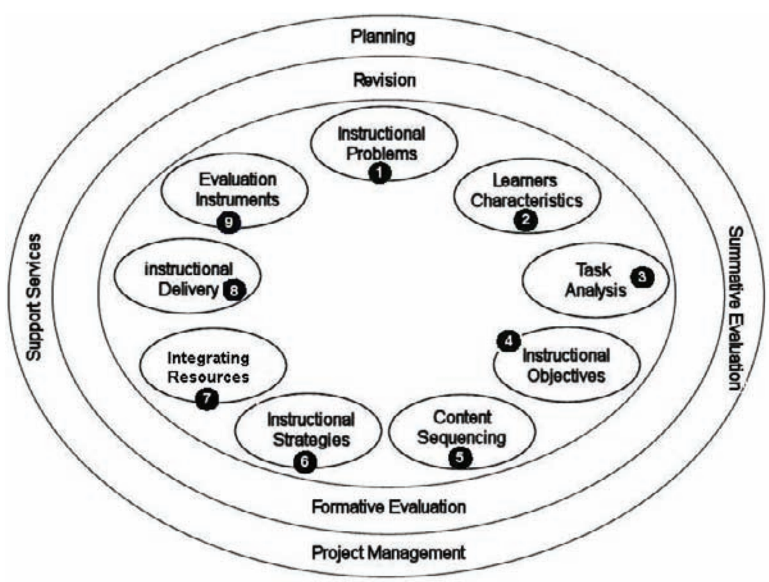


Figure 3. Kemp model of instructional design



FOCUS ON THE LEARNER

Historically, learning theory has advanced through three evolutionary phases. The three schools of educational psychology commonly accepted for teaching are behaviorism, cognitivism, and humanism. Years ago, teachers believed that the best way to learn was through repetition, a principle from behavioral learning theory that dominated educational thinking since the time of Ivan Pavlov and his experiment with animals. Contemporary behaviorists view the environment in terms of stimuli and its resultant behavior or response. Simply put, learning is a response to the environment. Teachers who accept the behavioral perspective assume that the behavior of their students is a response to their past and present experiences and that all behavior is learned.

Cognitive teachers, on the other hand, focus more on the learner as an active participant in the teaching-learning process. Those who adhere to this psychology of learning believe that teachers can be more effective if they know what prior knowledge the student already possesses and how information is processed and structured in an individual’s memory. Cognitive-based teachers instruct students by using teaching strategies to help the learner acquire knowledge more effectively.

Humanists believe that how a person feels about learning is as important as how he or she thinks or even behaves. They describe behavior not from the viewpoint of the teacher as do behaviorists but rather from the vantage point of the student who is performing the activity. Teachers create an educational environment that fosters self-development, cooperation, positive communications, and personalization of information.

Each school of educational psychology serves as a primary focus in one of the three target learners explored in this book: the <u>traditional learner</u>, the <u>adult learner</u>, and the <u>distance learner</u>.

Learning Theory for the Traditional Learner. Pedagogy has matured into the time-honored learning theory of the traditional learner.

There is little doubt that the most dominant form of instruction is pedagogy manifested by a didactic, teacher-directed approach to delivering instruction. Pedagogy is derived from the Greek word “paid,” meaning child plus “agogos,” meaning leading. Thus, pedagogy has been defined as the art and science of teaching children. In the pedagogical model, the teacher possesses unequivocal responsibility for deciding what will be learned, how it will be learned, when it will be learned, and whether the content has been mastered. Pedagogy, or teacher-directed instruction as it is commonly known, places the student in a submissive role requiring obedience to the teacher’s instructions. It is based on the assumption that the instructor knows best what learners need to know. The result is a teaching and learning situation that actively promotes dependency on the teacher.

More recent thinkers in the field of education have attempted to assuage some of the original shortfalls of pedagogy with a focus on critical thinking; specifically, critical pedagogy. Replacing the authoritarian view of the “sage on the stage,” critical pedagogy seeks to use instructional group activities in which students and teacher work together to create a product or idea; apply strategies and develop interdisciplinary competencies; identify teaching and curriculum within the students’ experiences in home, society, and school; establish challenging standards for student performance above and beyond traditional classroom interaction; and, push teachers to expand their lectures with academic, goal-directed, small-group interaction.

Still, behaviorism remains the archetypal manifestation of the historical perspective of pedagogy. From its roots in the late 19th and early 20th centuries, behaviorism has attempted to explain human behavior entirely in terms of reflexes, stimulus-response associations, and the effects of reinforcers. Behaviorism moved quickly through four main theories and three key traditional classroom applications. Classical conditioning was the domain of Ivan Pavlov who viewed all learning as the interaction of stimuli and responses (S $\rightarrow$ R). Thorndike propelled the theory of learning ahead with his premise on connectionism and his laws of exercise and effect. Still further, B.F. Skinner produced the popular theory of operant conditioning, adding reinforcement to the classical equation (S $\rightarrow$ R $\rightarrow$ R) and thereby explaining more complex learning patterns.

Traditional learners have benefitted from a host of behavioral applications including programmed instruction, computer-assisted instruction, and mastery learning.

Learning Theory for the Adult Learner. Knowles' (1984) theory of andragogy redefined the previously child-only perception of learning. Adult learning is typically characterized as: experiential, problem-based, immediate, and self-directed.

Unlike children, adults learn experientially using their considerable practice, knowledge base, and problem-solving skills. They must know why they need to learn something and they learn best when that topic is of immediate use. For the most part, adults approach learning as self-directed and expect to take at least some responsibility for their own learning. Adults expect that the learning environments fashioned for them accommodate these fundamental aspects of adult learning.

In practical terms, andragogy focuses more on process (how we learn) and less on content (what we learn). Strategies include case studies, role playing, simulations, and self-evaluation and are often enhanced with the infusion of the right blend of technologies. Instructors adopt the role of facilitator rather than lecturer**.**

Learning Theory for the Distance Learner. From these early beginnings came a growing research base that continues to identify qualities inherent to successful distance learners. Campbell (1990) examined the success rates of distance students and discovered that certain common characteristics seem to lend themselves to success at a distance. Others, typified by Holmberg (1995) discovered a non-homogeneous population with respect to demographics of distance students. Regardless, research does contribute some broad demographic and situational parallels that help educators profile the 'typically successful' distance learner. Characteristics vary but in general reflect a combination of demographic variables such as age, gender, and ethnic background as well as situational variables including disability, location, and life roles.

In addition, characteristics inherent to allagegogy include the ability to work independently or in a group, complete assignments and readings with minimal supervision, write in a clear and articulate manner, manage time, learn using different delivery formats, and work with technology tools (Lehigh Carbon Community College, 2006).

Summary. As the first component of the *Engine for Designing Technology-Based Instruction*, learning theories encourage designers to develop instruction that combines principles from pedagogical, andragogical, and allagegogical learning theory to produce a lesson that truly targets the traditional, adult, and distance learner, respectively. Lessons designed for a technology-based environment should take into account that some of their target learners anticipate content that must be mastered (behavioral) as well as those who expect exposure to problem-based, real-world experiences. Successful lessons consider these initial traditional competencies while moving towards true online education designed with a set of pre-judged skills; namely, the ability to learn either independently or in a cohort, writing and time management skills, and technology literate. **Learn more in Section 1, Focus on Learners.**

FOCUS ON LEARNING

Learning domains, sometimes referred to as classes of learning, are critical to any model for designing instruction. By considering the various learning domains, the instructor seeks to determine appropriate activities, assessments, and presentation modalities (traditional, adult, or distance) based on the learning outcomes desired.

With access to learning technologies more available than ever to faculty and with greater numbers of students with technologies available at home and work, it is imperative that educators consider multiple presentation modalities to increase the probability that their instruction will correspond with the multiple learning styles of as many students as possible and, as a result, produce even higher levels of learning outcomes.

Traditional learning found in the literature includes the cognitive, affective, psychomotor, and interpersonal domains. Coupled with highly engineered classification systems called taxonomies, these tools lead to more effective instruction.

A taxonomy is a classification system that establishes and exploits an innate relationship or order among elements. A vocabulary is considered the simplest form of a taxonomy with only one level of terms, common expressions, and established lexis. More complex taxonomies form a hierarchical structure. At the highest level, terms and descriptive phrases are general in nature, followed by an increasingly more refined set of terminology at progressively more specific levels of articulation (Tomei, 2007).

Taxonomies are typically categorized by domain. Historically, the more popular taxonomies have addressed a broad representation of educational objectives (cognitive, affective, and psycho-motor); service-learning outcomes (academic, career, civic, ethical, personal and social); developmental skills (cognitive, social/emotional, language/ linguistic, and fine/ gross motor abilities); lifelong learning skills (knowledge, application, and research/ practice/ and evaluation); or, more recently, instructional technology (literacy, communications, decision-making, learning, teaching, and tech-ology) (Krathwohl, Bloom, and Masia, 1964; National Center For Infants, Toddlers and Families, 2002; Furco & Billig, 2002; and Tomei, 2005). The taxonomies most appropriate for the traditional, adult, and distance learner follow.

Taxonomy for the Traditional Learner. The most famous classification is Bloom's exposition for the cognitive domain. In his Taxonomy of Educational Objectives (Bloom & Krathwohl, 1956), Bloom developed six progressively complex steps of cognitive development (Figure 4) that include: knowledge, comprehension, application, analysis, synthesis, and evaluation. Further investigation and exploration of his premise over the past 50 years has produced a plethora of rubrics for designing and implementing instructional objectives at increasingly advanced levels of higher order thinking. Krathwohl and Kibler

Figure 4. Taxonomy for the cognitive domain

would complete the trilogy of domains with similar classifications for the affective and psychomotor learner, respectively (Krathwohl et al., 1964). Howard Garner, Jean Piaget, and Jerome Bruner would further expand on Bloom's effort with their own contributions in the areas of multiple intelligences, the age-stage theories of cognitive development, and a major new theme in theoretical framework called constructivism. With all these simultaneous efforts in the cognitive domain, the traditional learner would continue to benefit from learning objectives created to advance higher order cognitive thinking skills.

Taxonomy for the Adult Learner. The higher order learning (HOL) domain offers a schema for adult education, corporate training, and professional development. Designing instructional learning objectives at the knowledge, application, and research, practice and evaluation HOL levels applies to all learners in all disciplines but most specifically adult learners; develops the adult learner in progressive, sequential steps beginning with the basics; and, assumes mastery and competency at previous levels before advancing up the hierarchy as do most classification systems (Tomei, 2005). Using the KAR-P-E taxonomy (Figure 5) answers the perennial question from adult learners who seek a distinction among undergraduate, graduate and post graduate courses. Many of these courses use the same course titles; some use many of the same learning objectives. The KAR-P-E taxonomy (and the research that supports it) addresses the demands of teaching adults by proposing undergraduate courses constructed with a focus on knowledge. Graduate courses present learning on an application level. Advanced programs (e.g., doctoral studies) should concentrate on research, practice, and evaluation.

Taxonomy for the Distance Learner. The final classification system for educational learning objectives is the Taxonomy for the Technology Domain (Figure 6). A 21st century classification system, the technology domain includes a similarly progressive level of higher order thinking skills complete with action verbs and intellectual activities on each of its six hierarchal levels of literacy, communication, decision-making, technology for learning, technology for teaching, and tech-ology. Distance learners begin with the pursuit of primary technologies (literacy) and move upward on the taxonomy to communications (email, word processing) and decision-making skills (spreadsheets, decision-making software, etc.).

True distance leaning design begins with the infusion of existing and available technology-based resources (e.g., files, audio and video, web-based learning environments, etc.) for learning (usually self-learning) and advances to the integration of new technologies and new technology-based learning

Figure 5. K-A-RPE Taxonomy for the higher order learning domain

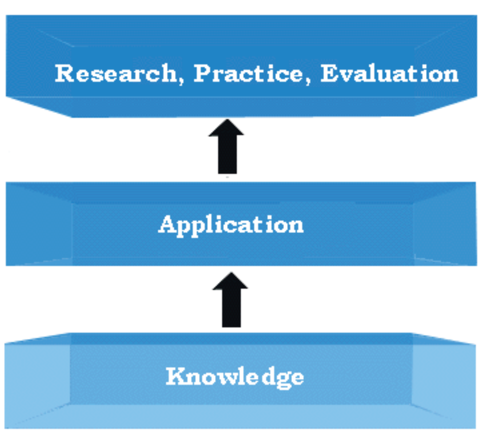
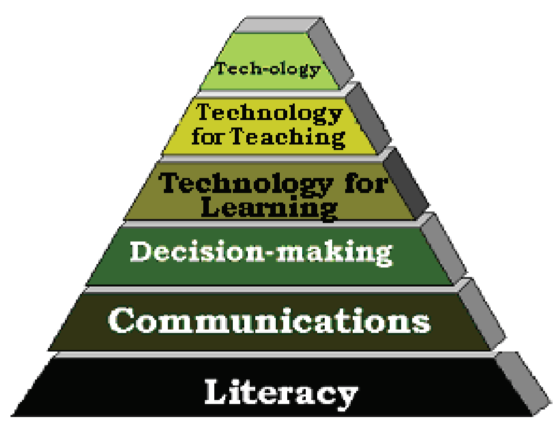


Figure 6. Taxonomy for the technology domain



materials created by a highly motivated and technologically-prepared instructor who tops the lesson by placing technology in its rightful place and priority in the learning equation (tech-ology).

Summary. As the second component of the *Engine for Designing Technology-Based Instruction***,** learning domains and taxonomies offer the designer a focus on learning and classification schemata that aids in the development of student learning objectives. Use of an appropriate educational taxonomy for the traditional, adult, and the distance learner establishes a consistent set of terms defined by a common rubric that accepts a common body of knowledge. Especially useful for conceiving the new model offered in this text is the adherence of a classification system to the rigors of the instructional system design process (and discussed later). Using the correct taxonomy, a lesson designer can develop exceedingly successful learning objectives at increasingly higher stages of abstraction by following the levels of the cognitive, HOL, or technology taxonomy. **Learn more in Section 2, Focus on Learning**.

FOCUS ON RESOURCES

Resources for teaching the traditional, adult, and distance learner are not terribly different among the three categories of learners. Text, visual, and web-materials have come to form the triad of technology-based content materials that most instructors master when designing new instruction. For example, the basic features of word processing are sufficient to develop text-based handouts and study guides for students. A few simple techniques result in professional classroom products. Graphics packages such as Power Point have become essential tools for designing student-centered, content-specific visual-based resources. Using the capabilities of full-featured presentation software, educators tailor course content, classroom delivery, and learning applications to meet the needs of even their most challenged student. The World Wide Web, and its power to teach at a distance, has literally revolutionized learning. Volumes of the Library of Congress are now literally at the fingertips of the student, conversations with the most important people of the twentieth century are as close as a desktop camera, and the instructional materials of the world's most prominent educators are no further than the memory of a personal computer.

Selecting Learning Materials for the Traditional Learner. Teachers of traditional learners (and sometimes adults and online learners as well) still find that concrete, hard copy resources make very effective learning tools for learning. Student handouts serve as assessment instruments, remedial content material, and enrichment activities. Study guides offer target instruction in the form of guiding questions for discovery learning and additional reading material for test preparation. No matter how much technology becomes available to the classroom instructor, sometimes text-based material is still the best way to teach a lesson objective.

Prototypically, traditional learners are provided with textual materials that offer significant learning opportunities coupled with the advantages of portability and low-price cost. The ability to use these materials in any instructional environment, plus the inherent utility that these materials already have with a majority of students, ensures that most learners are comfortable using these materials. Add to these advantages the cost-effectiveness and availability of these low-tech resources and it becomes immediately evident why text-based textbooks, handouts, worksheets and workbooks, manipulatives, encyclopedias, and lesson kits remain the instructional materials of choice for the traditional learner. Other learning materials, technology-rich but traditionally delivered, include CD-ROMs, videotapes, and 35 mm slides.

The hyper book offers learners the opportunity to work individually or together in groups and encourages teachers to create their own materials targeting specific peculiarities of their own traditional class. Text-based materials are very effective in helping students, using technology to open the door for individualized discovery and inquiry learning opportunities and encouraging students to make intuitive guesses using guided questions to keep them on task.

Selecting Learning Materials for the Adult Learner. Adult learners demand a broader range of learning materials. Visual-based materials are especially important, including classroom presentations, video and audio reproductions, and interactive lessons.

Self-directed materials encourage the adult learner to take responsibility for growth by diagnosing their own learning needs, setting individual goals, identifying appropriate resources, implementing successful strategies and assessing the personal worth of learning outcomes. Typical resources brought to bear to promote self-directed adult learning include audiovisual materials; first- or second-hand experts; education-focused institutions such as museums; and involvement with professional associations.

The interactive lesson is a particularly valuable resource for teaching adults since it integrates self-paced content with specific, logical, systematic instruction that places a good deal of the responsibility for mastering the material directly in the hands of the learner. It embraces mastery learning techniques and suggests alternatives for presenting learning objectives, corrective instruction, and enrichment activities.

Selecting Learning Materials for the Distance Learner. Distance learners command the widest assortment of learning materials in terms of quantity, format, and form. Web-based materials are the particular forte of the distance learner, roughly divided across print, audio (voice) and video, and computer (data) objects. Several subdivisions and widely diverse applications of the same many of the technologies extend this grouping into multiple categories. Particular attention will be paid in this text to the advantages of web-based lessons to especially focus on the distance learner.

Web technologies comprise the broadest and fastest growing dimension of distance learning materials. The primary web technologies used for distance education include both asynchronous and synchronous environments that host a wealth of materials for the distance learner. Most state-of -the-art online courses host digital content, audiovisual presentations, and links to related web content. They offer chat rooms with online logs, threaded discussion groups with multiple levels, online quiz editing and grading, whiteboards, grade books, calendars, drop boxes, and webliographies. Instructors of distance learners have come to reply heavily on popular learning management systems such as Blackboard, WebCT, e-College, Moodle, Angel, and others.

In addition, the virtual tour is a web-based teaching strategy that presents multi-sensory, multimedia instruction appropriate for individual student exploration and group learning experiences. The virtual tour is appropriate for students who learn best when instruction is offered in a student-controlled learning environment embracing discovery and cooperative learning techniques. It represents a natural extension of sequential learning with content presented from first to last, simple to complex, general to specific. The distance teacher offers content in progressive steps until a schema, or pattern, emerges to aid the learner in the construction of new knowledge. The virtual tour supports each of these major psychologies perhaps better than any previous teaching strategy ever devised. With the advent of the World Wide Web, responsibility for creating student-centered, age-appropriate material rests in the hands of the distance teacher. The design of the virtual tour is the newest strategy for linking literally millions of content specific sites that add images, sounds, and video media to an instructional lesson.

Summary. The focus on resources accounts for the third rung on the *Engine for Designing Technology-Based Instruction*. With this step comes a shift from the predominantly theoretical considerations of the previous two stages of instructional design to the more practical focus on the methodologies of teaching the traditional, adult, and distance learner. **Learn more in Section 3, Focus on Resources**.

FOCUS ON DELIVERY

The research and literature was examined to generate a list of the most well-known teaching and learning strategies for the traditional, adult, and distance learner. The fourth stage of the *Engine for Designing Technology-Based Instruction* identifies which strategies are best for which learner and describes how some of the strategies work, how they can apply to the delivery of instruction, and what results can be expected from their application.

Selecting Appropriate Delivery Strategies for the Traditional Learner. Historically, instructors of traditional learners have opted for classroom-centered presentations. In many respects, classroom lectures represent the "but we've always done it this way" approach to teaching. Such emphasis on the lecture-rich "sage on the stage" has rapidly diminished as research and technology combined to offer new and exciting venues for delivering instruction to contemporary students. Direct instruction, often in the form of lectures, seminars, and demonstrations are arguably the easiest mode for both the sender (teacher) and receiver (learner) requiring less student preparation and groundwork than more complicated modes of presentations. As educational psychology matured over the years since the 1940's emphasis on behavior, research and the literature have combined to uncover many of the major shortcomings of the direct instruction-based lesson. Equally important, the growing sophistication of learners (even at the K-12 level) has moved many traditional educators towards thinking skills strategies that are discernible in such instructional styles as differentiated instruction, graphic organizers, and manipulatives.

Selecting Appropriate Delivery Strategies for the Adult Learner. Teaching adults demands the incorporation of a different suite of instructional strategies, expanding an already complex inventory of diverse teaching tools. Andragogy places instructional emphasis on activities as well as individual and group work, suggesting several new modes of participative, self-directed instruction, the most widely known being cooperative and discovery learning. The use of independent learning strategies as an adult mode of presentation encourages a manner of interaction similar to how successful adults master many real-world experiences. A solid learning experience using this tactic incorporates realistic tasks, shared leadership, predefined responsibilities, and often ill-defined outcomes to trigger the desired learning outcomes. Presentation modes for the adult learner are characterized by collaborative projects and shared endeavors and other self-governing efforts such as problem-based learning, reflection, and service learning.

Selecting Appropriate Delivery Strategies for the Distance Learner. Distance learning adds still other strategies while expanding on previous approaches to provide a wealth of communications-intensive presentation modes including: asynchronous and synchronous communication, immersion/ hybrid/ repository online courses, and online learning management systems.

Independent learning strategies provide the majority of delivery strategies to the distance learner followed closely by a host of thinking skills and cooperative strategies.

Summary. This focus on delivery comprises a review of appropriate instructional categories for the traditional, adult, and distance learner and covers a classification of teaching tools from the more straight-forward direct instruction to the more virtual independent strategies. **Learn more in Section 4, Focus on Delivery**. Next, a discussion of assessment methodologies and their importance in measuring learning outcomes completes the introduction of a new model for designing technology-based education.

FOCUS ON OUTCOMES

Assessment takes many forms and typically extends over a protracted period of time (class periods semesters, entire programs of study) to serve multiple purposes. Principally, assessment measures the quality of a student's work and attainment of mastery. In its more robust roles, it is the stimulus for continuous course improvements, faculty development, and lifelong learning.

Rubrics and checklists are suitable for evaluating traditional learning. Portfolios and rating scales are proper instruments for measuring adult learning outcomes. Virtual assessment tools are necessary for examining such distance-based assessment as online examinations, electronic portfolios, online surveys, conferencing, and games and simulations.

Selecting Assessment Methodology for the Traditional Learner. For the traditional learner, conventional assessment often takes the form of a single dimension, timed exercise characteristically objective in its measurement, summative in its scope, and often limited to rote memorization, a rehash of definitions, or a reiteration of terms. Traditional assessments are commonly multiple-choice, true-false, or short-answer instruments and have garnered considerable criticism over the years from teachers, students, and administrators.

Even its staunchest critics will concede that conventional assessments do have their advantages. They are less time consuming to construct, easier to grade, and much more straightforward to administer. They are also less problematic to validate for internal consistency and reliability. Past studies by Gaynor and Millham (1976) found that students who were given weekly quizzes earned higher scores on final examinations when instruction was modified based on class results; a powerful testimony to more frequent student-centered feedback. The use of rubrics and checklists can add a new dimension of measurement to the assessment of the traditional learner.

Selecting Assessment Methodology for the Adult Learner. Adult learners expect real-world challenges that oblige them to apply their personal skills and experiences to the knowledge base under consideration. Proponents of andragogy have come to find that experience, communications, and interpersonal skills define the unique characteristics that form the successful adult learner. For the adult learner, such expectations have come to mean authentic assessment.

Authentic assessment requires learners to build responses rather than choose from pre-selected options, thereby eliciting higher order thinking and a return to the educational learning objectives of Bloom. Authentic assessment focuses on students' analytical skills; abilities to integrate what they learn; creativity; capacities to work collaboratively; and written and oral expression skills. Portfolios and rating scales are manifestations of viable assessment instruments for measuring authentic learning outcomes.

Assessing authentically values the learning process as well as the finished product and includes an inventory of tools such as portfolios, performance tasks, demonstration presentations, observations (formal and informal), discussions, and learner self-reflection and self-assessment.

Selecting Assessment Methodology for the Distance Learner. As a group, distance learners are probably more anxious about how they are performing. As with the delivery modalities discussed earlier, the use of online examinations, electronic portfolios, online surveys, conferencing, and games and simulations results in a more complex use of virtual assessment tools to provide the frequent feedback needed to track their learners' individual and collective efforts to complete assignments, master objectives, and gauge progress. Because distance learners are forced to read directions online, detailed information on how assessment will be conducted is highly recommended. Basic information such as the specific form(s) that assessment will take is paramount. For example, synchronous participation using chat rooms, videoconferencing, and web conferencing is an excellent option when teaching at a distance. Distance learners should be pre-warned that, even though a course may labeled as online, participation during scheduled synchronous discussions may comprise a significant percentage of the final course grade. Likewise, timely submission of asynchronous contributions is important to keep most online courses within semester timelines. Strict adherence to issues of APA style, copyright infringements, and academic integrity often contribute to final grades while email, bulletin board posts, discussion forums, and listservs are integrated into formative and summative course assessment. Finally, the online versions of the more traditional evaluator instruments remain viable assessment tools and include digital documents (e.g., essays), other electronic files (e.g., spreadsheets), as well as online exams in the form of multiple choice, true/ false, or short answer completion graded electronically online as soon as responses are submitted.

Summary. Any focus on outcomes is fraught with challenges as well as opportunities. For many learners, technology already places them in isolation from both their instructor and their peers. Even though technology has invaded every aspect of twenty-first century living, there remains uneven access to some resources necessary to learn at a distance. Finally, technical problems are common, variations in learner (and instructor) skills are endemic, and learner anxiety must all be factored into every consideration when selecting appropriate assessment methods for distance learning. **Learn more in Section 5, Focus on Outcomes**.

USING THE ENGINE FOR DESIGNING TECHNOLOGY-BASED INSTRUCTION

Each of the previous elements of lesson design offers a unique perspective for developing successful lessons. Each of the notable models presented also focuses on many of the same key elements: the different types of learners (traditional, adult, and distance), the learning domains (cognitive, higher order learning, and technology), instructional resources (text, visual, and multimedia), possible delivery methods (direct instruction, thinking skills, cooperative learning and group projects, or independent activities), and assessment of learning outcomes. In graphical depiction, Figure 7 illustrates the new model for designing technology-based instruction.

The remainder of this text considers each component independently and presents a schemata for moving from the perspective of the traditional learner to one that considers the peculiarities of the adult, and finally, to a unique perspective of the demands of distance education. The new *Engine for Designing Technology-Based Instruction* examines the various "gears" that must be turned by the instructor to design, develop, implement, and assess technology-based lessons in the emerging virtual world of learning.

Using the new engine, designing technology-based education embraces the structured approach of a sequential, step-by-step process that begins by identifying the learner, flows through a considered examination of learning domains, resources, presentation modes, and ends with appropriate assessment. Let's turn the gears and follow the development of a typical lesson before pursuing the specifics of each component.

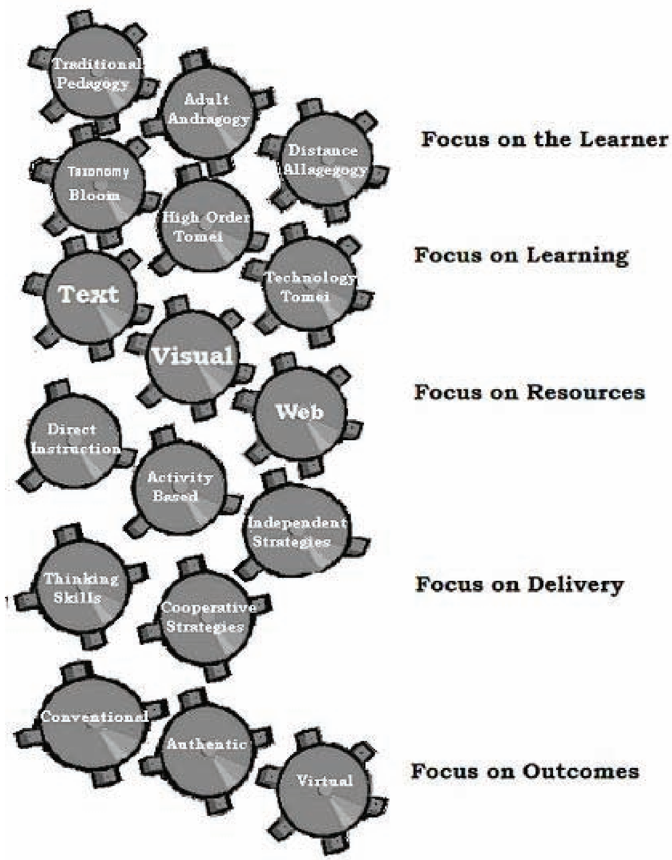
Using the Engine for Designing Instruction – A Practical Example for the Traditional Learner. For purposes of example, assume a teacher has been asked to design a lesson for a traditional classroom lesson on the generals of the Civil War.

First, identify the target learner: traditional, adult, or distance learner, by opting to design a lesson using pedagogical, andragogical, or allagegogical principles of teaching. The target audience in this example will be traditional learners, so the lesson will be designed using principles of pedagogy (**Section 1 – Chapter One**).

Second, focus on learning. Select from among the taxonomies for the cognitive, high order learning, or technology domains to prepare lesson objectives. Since a lesson for traditional learners is under design in this example, the taxonomy for the cognitive domain is the logical candidate. Use Bloom's Taxonomy and the cognitive domain (**Section 2 – Chapter Four**) to design successful learning objectives for Civil War education.

Third, a focus on resources flows from the learning objectives developed in the previous step. Text, visual, and web-based materials are equally acceptable for a distance lesson. Considering the learner

Figure 7. The engine for designing technology-based instruction



and the domain, chances are just as good that any modality would be effective. For illustrative purposes here, assume that the traditional learner has access to a computer lab and prefers web-based materials. A solidly built home page highlighted the most important leaders and battles of the Civil War would be an ideal use of technology resources. **(Section 3 – Chapter Nine)**

The fourth set of gears considers a focus on delivery from among five instructional strategies: direct instruction, thinking skills, activity-based, independent, and cooperative strategies. The merits and shortcomings of each strategy are discussed later in **Section 4 – Chapter 10**. Direct instruction and a focus on thinking skills are logical teaching strategies for the traditional learner. These delivery modalities should be considered by the designer of a traditional lesson such as the Civil War.

Finally, with the increased emphasis on learning outcomes from among various concerned entities, the final gears of the *Engine for Designing Technology-Based Instruction* suggest to the designer that conventional, authentic, or virtual assessment tools are available for the choosing. For traditional learners, conventional instruments are the tools of choice. Since this example is considering traditional learners, the designer should concentrate on one of many conventional assessment tools to be discussed in **Section 5 – Chapter 13.**

Using the Engine for Designing Instruction – A Practical Example for the Adult Learner. For purposes of this next example, assume that a teacher was requested to design a lesson for an adult lesson addressing the Israeli-Palestinian Conflict.

First, for the adult learner, the lesson will be designed using principles of andragogy. (**Section 1 – Chapter Two**).

Second, with a focus on adult learning, a lesson on a geo-political topic such as the Israeli-Palestinian conflict would move quickly from the knowledge level to the research and evaluation level. Using the higher order learning domain to develop learning objectives makes perfect sense for this lesson. **(Section 2 – Chapter Five)**

Third, adult learners, especially those who work for a living, prefer accessibility to text-based materials over Power Point presentations or even the Internet. The text-based hyper book is a logical choice for infusing technology resources into this illustrative geo-political lesson. **(Section 3 - Chapter Seven)**

The fourth step of the ***Engine for Designing Technology-based Instruction*** suggests that designers consider activity-based and independent learning opportunities to deliver a lesson to adults. The use of such activities to support adult learning as well as their ability to pursue independent learning is discussed further in **Section 4 – Chapter 11.**

The final step for designing instruction for the adult learner recommends using authentic assessment tools to ensure that student learning outcomes have been met. An example of a sensible authentic assessment for a topic such as the Israeli-Palestinian conflict might be to have students create a portfolio of newspaper articles, video clips from the web, or digital images of reports of the conflict in the news, television, or the Internet. Specific tools for assessing adult learning are discussed in more detail in **Section 5 – Chapter 14.**

Using the Engine for Designing Instruction – A Practical Example for the Distance Learner. For a final example, assume the instructor is designing a lesson for a distance learning course in educational psychology and learning theories.

First, for the distance learners, the lesson will be designed using principles of allagegogy. (**Section 1 – Chapter Three**).

Second, preparing lesson objectives for the distance learner assumed a technology-based lesson. The technology taxonomy is the logical focus for learning in this domain. In general, it is wise to use the Taxonomy for the Technology domain to formulate successful learning objectives for online education. **(Section 2 – Chapter Six)**

A focus on resources flows from the learning objectives developed in the previous step. Text, visual, and web-based materials are equally acceptable for distance lessons. Considering the learner and the domain, chances are just as good that either modality would be effective. For illustrative purposes here, assume that the distance learners in this course prefer visual materials: classroom presentations and interactive lessons. **(Section 3 – Chapter Eight)**

For the distance learner, independent activities such as online research, web-based virtual tours, and inquiry learning as well as cooperative strategies such as collaborative teaching and online mentoring would be at the top of a short list of prospective teaching strategies for distance learners. It might be wise to consider each of these practices. **(Section 4 – Chapter 12)**

For distance learners, this final step in the ***Engine for Designing Technology-based Instruction*** embraces the many virtual assessment tools to be discussed in **Section 5 – Chapter 15**.

CONCLUSION

The search for an ISD-based methodology for designing effective technology-based instruction boils down to a simple, five-step process. Whether the target student is a traditional, adult or distance learner, a successful lesson is constructed by following an orderly, sequential process that considers the learner, the learning process, technology-based resources, delivery methodologies, and outcomes.

A new model, the ***Engine for Designing Technology-based Instruction***, is offered to assist the educator in developing traditional, adult, and distance instruction. As readers continue through this text, they should gather a working knowledge of how each element of the model interacts with all other elements. Apply the constructs discussed in each part and each chapter of the book to determine how best to design a successful lesson. Use the research base contained in this book to evaluate and revise individualized lesson development efforts. In the end, the ***Engine for Designing Technology-based Instruction*** can help any educator design a lesson that is sure to improve teaching and learning.

An anonymous educator expressed it best, "Learning is difficult. To better learn a subject, try teaching it. To truly master content, try teaching it using different technologies." The application of technology has moved learning past the conventional models of instructional design to a new paradigm for lesson development. The consequences of teaching with technology force educators (classroom teachers, cyber instructors, corporate trainers, etc.) to simultaneously consider multiple instructional foci. At the same time, they must recognize their own style and how technologies help or hinder their ambitions to learn.

Turn all the gears. Follow the concepts and tools presented in the following chapters. Infuse the wealth of information provided elsewhere in this text. And, develop successful instructional lessons in support of learners – whoever they might be.

Lawrence A. Tomei
Author

REFERENCES

Bloom, B. S. & Krathwohl, D. R. (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals, by a committee of college and university examiners. Handbook I: Cognitive Domain. Longmans Publishing, New York.

Campbell, G. C. (1990). Learners and learning: A discussion of selected research. In Moore, M. (Ed.), Contemporary Issues in American Distance Education. Oxford: Pergamon Press, 121-135.

Furco, A., & Billig, S. (2002). Service-learning : the essence of the pedagogy. Information Age Publishing, Greenwich CT.

Gaynor, J., and Millham, J. (1976). Student performance and evaluation under variant teaching and testing methods in a large college course. Journal of Educational Psychology. 68 312-317.

Holmberg, B. (1995). Theory and Practice in Distance Education. Routledge Publishers, New York.

Knowles, M. (1984). The Adult Learner: A Neglected Species (3rd Ed.). Gulf Publishing, Houston, TX.

Krathwohl, D. R., Bloom, B. S., and Masia, B. B. (1964). Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook II: Affective Domain. David McKay Co. Inc., New York.

Tomei, L. A. (2004). Learning Theories -- A primer exercise: an examination of behaviorism, cognitivism, and humanism. Available online at: http://academics.rmu.edu/%7Etomei/ed711psy/1lngtheo.htm

Tomei, L. A. (2005). Taxonomy for the Technology Domain: A Classification of Educational Objectives for the Technology Domain. Idea Group Publishers, Inc., Hershey PA, 90-108.

Tomei, Lawrence A. (2007). A Theoretical Model for Designing Online Education in Support of Lifelong Learning, in Online Education for Lifelong Learning (Yukiko Inoue), Idea Group Inc., Hershey PA.

Wiggins & McTighe (2000). Understanding by Design, Prentice Hall Inc., New York.

Section 1
Focus on the Learner

The primary responsibility of teachers is to ensure student learning. A teacher's selection of educational goals, instructional strategies, and classroom organization and behavior are based in part on a view of their own specific view of the nature and character of learning. Under direct purview of the instructor are key factors such as academic content, learner behaviors, and instructional objectives. Also under control of the instructor are the various methods of instruction, resources for teaching, methods for teaching, and learning outcomes. Finally, a few important factors of teaching and learning are beyond the jurisdiction of the instructor but bear on the ultimate success or failure of the lesson; factors such as the individual differences of the learners (Dembo, 1991).

Although many factors contribute to student learning, it is the study of learning theories that contributes most to teaching strategies. Traditional learners prefer certain modalities of instruction over others, as do adult learners and distance learners.

By observing teachers in the classroom, their basic assumptions about the teaching-learning process oftentimes surfaces even though some of those teachers may be unable to articulate their beliefs or unaware which set of beliefs they may hold. For example, a teacher who directs and controls all student activity operates under a set of beliefs different from one who defines the conditions under which students will make some of their own decisions about how they will learn.

Check the statements in the table on the following page as either "agree" or "disagree." One box must be checked for each numbered descriptor.

Behaviorism. Statements 1, 4, and 6 would be supported most strongly by behavioral educators. Years ago, teachers believed that the best way to learn was through repetition, a principle from behavioral learning theory that dominated educational thinking since the late 1890's. Students would spend their time copying spelling words, historical information, and mathematical formulas over and over again until they 'learned' the information.

Contemporary behaviorists (often called S-R psychologists) view the environment as key to learning. Environment factors are seen in terms of stimuli and its resultant behavior or response. They attempt to demonstrate that behavior is controlled by environmental contingencies of external reward or reinforcement which links the stimuli and response. Teachers who accept the behavioral perspective of pioneers like B. F. Skinner assume that the behavior of their students is a response to their past and present environment and that all behavior is learned. For example, classroom troublemakers "learn" to be disruptive because they seek attention (reinforcement) from their teachers

Beliefs About Teaching and Learning (Adapted from Dembo, 1991)

Agree	Disagree	I Believe that...
☐	☐	1. Learners need grades or gold stars (for children) or pay increases and promotions (for adults) and other incentives as motivation to learn and to successfully meet established learning objectives.
☐	☐	2. Learners can be trusted to determine their own learning goals and should contribute to the process of choosing what they learn.
☐	☐	3. Teachers should ask students to show their work so that they can understand what students are thinking about while solving problems.
☐	☐	4. Students should be graded according to uniform standards of achievement which the teacher sets for the class.
☐	☐	5. Students should set their own individual standards and should evaluate their own work.
☐	☐	6. Curriculum should be organized along subject matter lines that are carefully sequenced.
☐	☐	7. The teacher should help students to monitor, control, and understand their own classroom behavior and learning strategies.
☐	☐	8. The school experience should address basic student needs including food, safety, and the development of positive relationships with peers.
☐	☐	9. The best learning occurs when the teacher has considered prior student knowledge and teaches new material in light of this previous learning.

and peers. Withdrawn students learn that their particular environment does not reinforce social interaction; they become reserved and silent. As a result, any behavior can (and should) be analyzed in terms of its reinforcement history. The next logical step for the teacher is to learn the Behavioral processes to change or modify undesirable behavior in their students. The ultimate teacher responsibility, according to the behaviorist, is to construct an environment in which the probability of reinforcing “correct” or proper student behavior is maximized. This goal is best attained by careful organization and presentation of information in a designed sequence.

In ***Chapter One: Learning Theories and Pedagogy: Teaching the Traditional Learner***, the reader will be exposed to the principles of pedagogy and the educational psychology of behaviorism. Pedagogy has been defined as the art and science of teaching children which will be used interchangeably with the term traditional learner. Chapter One will look at the nature of the traditional learner and the implication of behaviorism for teaching. Major behaviorists to be examined will include Ivan Pavlov, E. L. Thorndike, B. F. Skinner, and Albert Bandura. Finally, traditional applications such as programmed instruction, computer-assisted instruction, and mastery learning will be explored.

Cognitivism. Statements 3, 7, and 9 would be adopted by cognitive educators. Cognitive psychologists focus on the learner as an active participant in the teaching-learning process. They believe that teachers are more effective when they consider what prior knowledge the student already possesses and how that information is processed and structured in an individual’s memory. Cognitive-based teachers instruct students by using teaching strategies to help the learner acquire knowledge more effectively. Effective instruction for these teachers includes teaching students how to learn, remember, think, and motivate themselves. They attribute growth to stages and teaching to a reiterative process of assimilation and accommodation. Knowledge is a series of building blocks which the teacher can place one on top of the other to build upon a student’s understanding.

Chapter Two: Learning Theories and Andragogy: Teaching the Adult Learner, discusses the concept of schemata, a process of organizing concepts and information into a cognitive structure that sustains in its subsequent use and retrieval. The chapter focuses on andragogy and cognitivism and distinguishes the important differences among the developmental stages of cognitive development, the zone of proximal development, and psychosocial development. It recognized the major cognitive theorists Jean Piaget, Lev Vygotsky, and Erik Erikson and applies the major instructional applications of discovery learning, reception learning, and the information processing model.

Humanism. Statements 2, 5, and 8 would be on the ledger of the humanistic educator. Humanists believe that how a person feels about learning is as important as how the person thinks or even behaves. They describe from the viewpoint of the learner who is performing the activity. The concept of self-actualization, self-development, cooperation, positive communications, and personalization of information are of paramount importance.

Instructional learning theories are centered on the major schools of educational psychology. From these so-called schools have evolved modern thinking and practice about how learning occurs and how instruction in the classroom ultimately affects that learning. Each has its own merits and each has shortcomings that may make them inappropriate in certain learning situations. An understanding of the basic principles and assumptions of behaviorism, cognitivism, and humanism is critical to a practical application of instructional design to classroom teaching.

Chapter Three: Learning Theories and Allagegogy: Teaching the Distance Learner examines the nature of the distance learner and characteristics inherent to allagegogy that focuses on learner independence and the inherent changes that define lifelong learning. Various delivery formats and a plethora of technology tools are discussed that, combined with humanism, recognizes the importance of human feelings, values, and perceptions in the educational process. The theories of Abraham Maslow, Lawrence Kohlberg, and Carl Rogers are presented along with the major instructional applications of moral character education, open education, and cooperative learning.

Summary. One of the most important objectives of any book on designing instruction is to help teachers become aware of the interaction between beliefs and practices, between theory and the classroom, and between success and failure. We begin by examining some personal beliefs about learning.

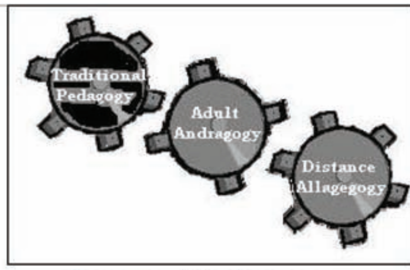
Chapter 1
Learning Theories and Pedagogy:
Teaching the Traditional Learner

Learning Objectives. In this chapter, the reader will learn about Behaviorism – one of the earliest schools of educational psychology. Behaviorism is a theory of animal and human behavior that basically defines learning as an observable and measurable action in response to the environment. Specifically, the reader will understand:

- The nature of the traditional learner and definition of pedagogy.
- Important differences among classical and operant conditioning, connectionism, and social learning theory.
- Major theorists of behaviorism to include: Ivan Pavlov, E. L. Thorndike, B. F. Skinner, and Albert Bandura.
- Major instructional applications of behavioristic psychology to include: programmed instruction, computer-assisted instruction, and mastery learning
- Key criticisms of behaviorism and the traditional learner
- Behaviorism and the Engine for Designing Online Education.

DOI: 10.4018/978-1-60566-824-6.ch001

Figure 1. Traditional Lesson Plan Template (Focus on the Learner)



Focus on the Learner

Grade Level:

Psychology of the Lesson: Behavioral

Major **instructional application:**

- ☐ Programmed instruction
- ☐ Computer-assisted instruction
- ☐ Mastery learning
- ☐ Other ____________

Traditional student characteristics targeted by this lesson plan:

- ☐ Subject-oriented; seek to successfully complete each course, regardless of how course relates to their own goals
- ☐ Future-oriented; youth education is often a mandatory or an expected activity in a youth's life and designed for the youth's future
- ☐ Often depend on adults for direction
- ☐ Likely to accept new information without trying it out or seriously questioning it
- ☐ Seek education that prepares them for an often unclear future; accept postponed application of what is being learned
- ☐ Depend on others to design their learning; reluctant to accept responsibility for their own learning

Lesson Plan Template. Lesson plan templates are provided as tools for exploring the development of lessons throughout the text. As each chapter is introduced, the reader will be encouraged to refer to the appropriate appendix and consider how each component of ***The Engine for Designing Technology-Based Instruction*** contributes to the development of an overall effective lesson for the traditional, adult, and distance learner.

In this chapter, please refer to **Appendix A, Traditional Learner Lesson Plan Template**; specifically, the **Focus on the Learner** portion of the template depicted in Figure 1.

INTRODUCTION

There is little doubt that the most dominant form of instruction is pedagogy, also referred to as didactic, traditional, or teacher-guided instruction. The pedagogical model of instruction has been around for centuries. Young boys were received into schools (most often schools with religious purposes) that required them to be obedient, faithful, and efficient servants of the church (Knowles, 1984). From these beginning developed the practice of pedagogy which remains the dominant form of instruction for the traditional learner.

Pedagogy is derived from the Greek word "peda," meaning child and "agogos," meaning "the study of." Thus, pedagogy has been defined as the art and science of teaching children. In a pedagogical model, the teacher has responsibility for making decisions about the content to be learned, the methodology for delivering the instruction, the sequencing and presentation (i.e., when it will be learned), and ultimately, an assessment of whether or not the material has been learned. Pedagogy, by its definition and nature, places the student in a submissive/ receptive role rather than an active learning position, requiring unswerving compliance to the teacher's directions. It is based on the assumption that the teacher knows best what the student should learn; the teacher assumes the position of "sage on the stage" and the result often is a teaching and learning environment that promotes dependency on the instructor.

For the earliest years of educational psychology, teachers believed that the best way for their students to master content was through repetition, a principle derived from behavioral learning theory; a notion that dominated educational thinking since the time of Ivan Pavlov and his experiment with animals. Students should spend their time copying spelling words, reiterating historical dates and places, and proving and re-proving mathematical formulas until they 'learned' the information.

Contemporary behaviorists viewed the environment as the single most important key to successful learning. Environmental factors provided the external stimuli to learning and the consequential behavior that resulted was deemed the response. Stimulus → response (S → R) became the formula for teaching in these early years of educational practice that found its place in educational practices up through the 1950's.

Attempts to prove that behavior was controlled by environmental contingencies of external reward or reinforcement linking the stimuli to a response became the focus of considerable research during most of the second half of the 20th century. Teachers who acknowledge the behavioral perspective of pioneers like B. F. Skinner assume that student performance is a response to past and present environment and that all behavior is learned. For example, classroom troublemakers "learn" to be disruptive because they seek attention (reinforcement) from their teachers and peers. Withdrawn students learn that their particular environment does not reinforce social interaction, so they become reserved and silent. As a result, any behavior can (and should) be analyzed in terms of its reinforcement accounts. The next logical step for the teacher is to adapt the behavioral processes to change or modify undesirable behavior in their students. The ultimate teacher responsibility, according to the behaviorist, is to construct an environment in which the probability of reinforcing "correct" or proper student behavior is maximized. This goal is best attained by careful organization and presentation of information in a designed sequence. Together, the foundations of learned behavior, environmental stimuli, organization and sequencing of instruction present the basic concepts that apply to teaching the traditional learner.

Orientation to Behaviorism. This first school of educational psychology focused on the observable aspects of the environment instead of mental or cognitive processes. According to the behaviorist viewpoint, it is the environment that provides stimulation - the learner responds to that stimulation. The response changes the environment in ways that increase or decrease the likelihood of the same response in the future. The behaviorist view offers hypotheses for classroom management and suggests ways to prevent and resolve discipline problems. It involves managing the learning activities of students. It represents the psychology of education that most clearly defines, for educators, several critical concepts of learning:

- *Reinforcement* refers to consequences of responses that establish and maintain desirable behavior.
- *Behavior* comprises a considerable body of activities; for the behaviorist, the term includes only observable behaviors.
- *Environment* and environmental conditions produce behavioral outcomes. By applying this view to learning, learners determine whether a particular behavior in a particular situation is appropriate or inappropriate.
- *Interaction* is the key; the interaction of the environment and behavior is a strong determinant of the appropriateness of a behavior.

Summary of Behavioral Theorists. For the traditional learner, an important question for any teacher to ask is, "How do I establish and maintain control of my students' behavior?" Behaviorism provides answers to that question offering key concepts and principles. To grasp the potential of this school of educational psychology, and how it plays into the ***Engine for Designing Online Education***, additional examination of the most familiar and important behavioral theorists and theories that have contributed to the field of education is in order.

THE MAJOR THEORISTS OF BEHAVIORISM

Ivan Pavlov and Classical Conditioning

A Russian psychologist, Ivan Pavlov, accidentally came upon an interesting learning phenomenon while working with dogs in his laboratory. If a bell was sounded a few seconds before a hungry dog was presented with food, after several trials the dog would salivate simply at the sound of the bell. Pavlov identified food as an unconditioned stimulus (UC) and salivation as an unconditioned response (UR)— a stimulus that produces some observable response without prior learning. The bell, which originally had no particular meaning for the dog, took on meaning or became a conditioned stimulus (CS), because of its association, or pairing, with the food which elicited a conditioned response (CR) – salivation.

This manner of learning was given the name, classical conditioning, or stimulus substitution, because the conditioned stimulus, after being paired with the unconditioned stimulus often enough, can then be substituted for it.

Pavlov found that when a dog was conditioned to salivate at the sound of a bell, it would also salivate at other similar sounds such as that of a siren, even though the new stimuli were never used in training. He termed this new experience "stimulus generalization." The experiment placed the animal in a confined environment to control his access to food and to record the responses to the stimuli.

Implications for the Traditional Learner. Even in today's 21st century classroom, much is taught using classical conditioning. For example, traditional learners may learn to acquire negative reactions to learning a foreign language because they associate languages with the unpleasant experience of demonstrating their ability (or lack of it) to translate sentences aloud in class. Tackling difficult questions (an unconditioned stimulus) elicits a variety of reactions; most commonly anxiety (an unconditioned response). Over time, learners become conditioned to fear foreign languages and avoid classes in this important area of international globalization. Further, they may generalize this fear of one subject to other opportunities for public speaking and classroom interaction. This same process for dealing with classroom situations operates in other school-wide learning experiences as well and demonstrates the importance of recognizing, addressing, and hopefully changing the pattern of stimulus → response that impacts the behavior and attitudes of learners towards learning in general and school in particular.

E. L. Thorndike and Connectionism

One of the first Behaviorists to put theory into practice was E. L. Thorndike. His theory of "connectionism" dominated educational practice in the United States during the first part of the 20th century. His theory viewed learning as a process of "stamping in" or forming "connections" between a stimulus and response.

He also posited two other laws of learning from his extensive research on the effect of reward on the behavior of various animals. In particular, these two theories have much to contribute to the teaching of the traditional learner. Specifically, his most widely-known principles of learning include the Law of Effect and the Law of Exercise. The Law of Effect states (Thorndike, 1913):

"When a modifiable connection is made between a situation and a response and is accompanied or followed by a satisfying state of affairs, the strength of that connection is increased. When an annoying state of affairs goes with or follows a connection, the strength of that connection is decreased." (p.71)

For Thorndike, the main factor influencing all learning was reward, or a "satisfying state of affairs." The teacher of the traditional learner would do well to remember the importance and effectiveness of rewards as an impetus for learning.

His second most important learning principle was the law of exercise. In general, Thorndike posited that the more a stimulus → response (S → R) connection was practiced, the stronger the bond. Conversely, the less the connection is experienced, the weaker it becomes. The strongest connections were those strengthened by repeated, consistent, rewarded practice.

Implications for the Traditional Learner. The implications for the teacher of the traditional learner in the classroom are obvious. Thorndike's learning theories led to a number of well-known educational practices: flash cards, multiplication tables, and gold stars are just a few examples of his theories in practice. When computer-assisted instruction (CAI) and personal computers entered the educational scene in the late 1960s and 1980s respectively, the theme of connectionism again made its presence felt as a chief pedagogy for teaching with technology.

Finally, Thorndike had something to say about intelligence - one of the first theorists to consider "metacognition" – learning about knowledge. In his first simple manifestations of learning theory, intelligence was viewed in terms of the number of S → R bonds possessed by a learner. Simply stated, the more bonds, the greater the level of intelligence because more connections were at the disposal of the individual when solving problems.

B. F. Skinner and Operant Conditioning

An advocate of Pavlov, B. F. Skinner was also a critic of the limitations to classical conditioning as it applied to learning in general and the classroom in particular. He became interested in behaviors that could not be explained as simple elicited reflexes. His laboratory-based research witnessed learning that went well beyond stimulus → response, well beyond how the environment operated in a vacuum to produce the myriad of learning consequences. Skinner saw learning as the result of consequences earned during the stimulus-response process; a process he dubbed operant conditioning. The new formula for traditional learning added a third element to the equation: stimulus → response → reinforcement (S → R → R).

According to the new behavioral perspective, consequences (not just the environment) determined to a great extent whether a person repeated the behavior, desired or otherwise. Consequences that tend to strengthen the recurrence of a particular behavior were labeled as reinforcement. Actions that decrease the observed behavior were called punishment. Stimulus → response → reinforcement would go on to become the standard bearer for educational psychology for much of the 1950s and 1960s.

Reinforcement. The word "reinforcement" is most often used synonymously with "reward." This is not the case for the ardent behaviorist as reinforcement takes on a more exacting meaning. A reinforcer is anything that strengthens a behavior in either frequency or duration. For Skinner, there were two types of reinforcement. The first, called positive reinforcement, is defined as the presentation of a stimulus that, when added to a situation, increases the probability of a response. The subject of an experiment is hot and thirsty (stimulus). A soda machine receives the necessary number of quarters (response). The can of soda received in return for the money is an example of positive reinforcement.

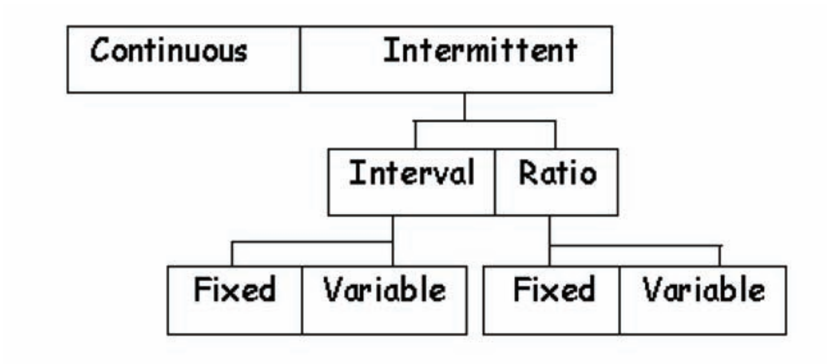
Negative Reinforcement occurs upon termination of an unpleasant stimulus; the stimulus, when removed, also increases the probability of a recurring response. As teachers, any time we try to motivate by threat, we are using negative reinforcement. A child refuses to clean up his bedroom (response) when repeatedly encouraged by the parent (stimulus). Finally, the parent grounds the child for a week, including all activities other than school. The response of grounding the child is followed by a final acquiescence to the task at hand and the room is cleaned; the result of a negative reinforcer. The parent might well expect the behavior to increase in frequency in similar future test situations.

Punishment. While the ultimate goal of reinforcers is to increase the behavior, the purpose of punishment is to decrease (or in some cases, eliminate) the probability of its recurrence. A behavior that is followed by punishment is less likely to be repeated. Similar to reinforcement, punishment may also take on two forms. The first has been called Type I punishment. Type I punishment occurs when the consequences following a stimulus suppresses or decreases the behavior. When teachers give out detention slips, they are using this type of punishment. The misbehavior is immediately reinforced with an undesirable action on the part of the teacher. Type II punishment is often called removal punishment because it involves removing a stimulus. A teenager whose driving privileges are suspending for breaking curfew is an example of applying this type of punishment. With both types of punishment, the effect is to decrease the behavior that led to the punishment.

Two final words concerning reinforcement and punishment. First, reinforcement must always be viewed from the perspective of the learner (or child or individual) and <u>not</u> from the viewpoint of the teacher. What may appear to be punishment from the teacher's desk may in effect be a reinforcer to the student. Second, negative reinforcement and punishment are often confused. It may help to remember that negative reinforcement is always associated with increases in behavior; punishment always involves decreasing or suppressing behavior.

Reinforcement Schedules (Figure 2). Skinner spent a considerable amount of time and effort exploring the processes of reinforcement and punishment. For example, when people are learning a new behavior, they will learn it faster if they are reinforced for every correct response. This process was given the term continuous reinforcement schedule. While continuous reinforcement is best for new learning, once the new behavior has been mastered, it is best maintained by an intermittent reinforcement schedule.

Figure 2. Schedule of Reinforcement



There are two types of intermittent reinforcement schedules: the interval schedule (based on the amount of time that passes between reinforces) and the ratio schedule (based on the number of responses given the learner between presentation of the reinforcer. Further, interval and ratio schedules may be either fixed (predictable) or variable (unpredictable). The following figure summarizes the possible reinforcement schedules:

A fixed interval schedule provides reinforcement for a correct response only after a specific period of time has passed. Classrooms are replete with examples of fixed interval schedules: the weekly spelling test on Friday, the semester unit test every nine weeks, a report card. The length of a fixed interval can be relatively brief or long and still yield the desired response rate.

A variable interval schedule yields a more uniform rate of response than the fixed schedule. If a weekly math quiz were changed to be given on a more unpredictable schedule (say Tuesdays one week and Thursdays the next), students would study more predictably every day rather than cramming the day before a known assessment. Pop quizzes offer a much more effective reinforcement schedule to foster classroom learning.

The fixed ratio schedule provides reinforcement for a consistent number of responses regardless of how long it takes to produce these responses. A student working on a computer-assisted instruction lesson knows that five correct responses are required before advancing to a new topic. However, this schedule often results in an uneven rate of response. As soon as the reinforcement is delivered, the learner takes a break because the next reinforcement is predictably several responses away.

Finally, a variable ratio schedule provides reinforcement after a changeable number of desired responses are elicited. The reinforcement is contingent on the number of responses rather than on the time period. The strongest of the reinforcement schedules, many games of chance are visible examples of variable ratio. The more times a slot machine is played, the more likely there will be a winner. As a result, the rate of response for casino players is the most consistent of the behavioral techniques.

Extinction. It is possible to weaken or totally eliminate a particular behavior. By removing the reinforcing events that maintain the behavior, a subject will tend to resist certain behavior. Removal of reinforcement altogether leads to extinction.

Implications for the Traditional Learner. Skinner became famous as the advocate of behaviorism in education; maybe "infamous" is more correct. His unsavory reputation began when the "baby tender" he invented to hold his infant daughter was publicized as the evil contrivance of a warped psychologist's mind. Years later, when asked about the consequences of his device on his daughter, he reassured his advocates by introducing a well-grounded, academically and professionally successful woman - who also chose psychology for her life's work.

Another of his famous contributions to behavioral psychology was the "Skinner Box," a device used to control the stimulus → response → reinforcement construction of operant conditioning experiments.

Finally, Skinner was one of the first psychologists who applied his theory of operant conditioning to the broader aspects of human learning. Skinner's "teaching machines" became the technological alternative delivery method of historically successful mail order courses and were the precursor to computer-assisted instruction.

Albert Bandura and Social Learning Theory

Since the early 1949s, behavioral psychologists have been interested in how children acquire social behaviors. Interest in this phenomenon moved the early school of behaviorism past the traditional precepts of Pavlov and Skinner and towards a more individualistic perspective of learning. Social responses, they found, are learned primarily from observing, then modeling, the behavior of others. Albert Bandura proposed the most comprehensive and widely accepted theory of modeling and called it social learning theory.

Elements of Social Learning. Bandura notes that there are four important elements to be considered in social learning.

- **Attention**. In order to learn through observation, the student must obviously be paying attention. Individuals typically attend to people who are attractive, popular, competent, or admired. For the teacher, either in a traditional classroom or online, student attention is critical to successful learning outcomes. When demonstrating a skill to be mastered in the classroom, the teacher may have students look over her shoulder to ensure their attention is directed to the proper features of the situation. When posing a similar skill online, the instructor may be inclined to integrate multimedia technologies to demonstrate the desired skills.
- **Retention**. Before students imitate the modeled behavior, they must remember it. Retention involves mentally representing the model's actions, most likely as verbal steps, visual clues, or both. Retention can be improved by mental rehearsal or by actual practice, actions that are often augmented by technology.
- **Production**. Practice, feedback, and coaching triggers the successful application of a model. Again, technology can serve as an impetus to apply social learning applications in the classroom, traditional or online.
- **Motivation and Reinforcement**. Students perform best when there is some incentive. Using the previously discussed concepts of behaviorism, reinforcement increases the chances that attention, retention, and production will produce the desired behavior.

Outcomes of Social Learning. There are five possible outcomes of social learning: teaching new behaviors; encouraging already-learned behaviors; strengthening or weakening inhibitions; directing attention; and, arousing emotion. Technology can be brought into play to produce successful outcomes in each of these areas of social learning.

Implications for the Traditional Learner. According to the theory, children learn social behaviors by observing the actions of people in their lives: parents, siblings, teachers, etc. The environment, personal differences, or the results of behavior alone are seldom the primary determinants of learning.

Summary. Pavlov, Thorndike, Skinner, and Bandura provide a living history of the fundamental theories of behaviorism. These theorists have contributed a chronicle of how behaviorism advanced the theories of learning from initial work with animals. Behaviorism still remains a viable explanation for how humans learn much of what they know – at least early in their lives. Too, the discussion so far has had little concern for the teaching and learning process itself; either in the traditional classroom or online. Theorists alone often contribute little to the study of successful applications of principles in the real world. A further review of instructional programs, built on the premises of behavioristic teaching, is next.

THE MAJOR INSTRUCTIONAL APPLICATIONS OF BEHAVIORISTIC PSYCHOLOGY

Programmed Instruction

In 1954, Skinner published a paper entitled *"The Science of Learning and the Art of Teaching."* In this document, he described methods for automating instruction to improve human learning in a traditional school setting. It served as the beginning for programmed instruction as an art and science of teaching.

Programmed Instruction works as a self-paced instructional package that presents a topic in a carefully planned sequence and requires the learner to respond to questions or statements by filling in blanks, selecting from a series of answers, or solving a problem. Immediate feedback occurs after each response and students work at their own pace. The program can be incorporated into books, teaching machines, or computers.

Those who support programmed instruction stress that it improves classroom learning, presenting even the most difficult subjects in small steps so that all students can succeed – one of the fundamental precepts of behavioristic teaching. Skinner took programmed instruction to the next level when he proposed the use of teaching machines designed specifically to automate what was previously a hard copy, manual process and he did it back in 1954 before computers (certainly personal computers) even entered the picture as an educational delivery system.

Implications for the Traditional Learner. Skinner encouraged the use of teaching machines and their obvious advantages in the classroom. The time that lapses between a response and its corresponding reinforcements is often too lengthy. The behaviorist understands that the immediacy of reinforcement is an important variable in learning. Returning test papers two weeks after an examination is a serious instructional impediment; the relative infrequency of reinforcement is another common misstep in many classrooms. Further, the lack of an organized instructional sequence when teaching complex skills contributes to less than successful learning outcomes. Skinner believed that teaching machines addressed each of these concerns and should be considered as a viable teaching strategy – at least in an behavioral-focused classroom.

Computer-Assisted Instruction

Computer-assisted instruction, or CAI, offers still greater use of technology as a primary instructional media. The rapid development of personal computers since the late 1970s has created opportunities for still more individualized instruction. CAI uses the features and strengths of the computer to present information, provide additional (and oftentimes more entertaining) occasions for drill and practice, and complete an instructional lesson with enrichment and remedial teaching opportunities, when required. CAI programs serve three basic functions in schools: drill and practice, simulations, and tutorials.

By far, the predominant use of CAI from the outset has been with drill and practice activities in basic skills areas designed to improve speed or accuracy. Drill and practice software has been on the market almost from the beginning to provide repeated exercise and individual feedback on a variety of designated learning objectives. By working with the computer, it is possible to tailor the type, speed, and amount of practice to a student's individual needs.

Simulation programs imitate actual real-world (or educationally fictitious) experiences that address specific high-level skills, improve decision-making abilities, or enhance problem-solving skills. They simulate activities that are often impossible, impractical, expensive, dangerous, or too time consuming. A good simulation program provides an accurate representation of the phenomenon being studied without introducing confounding inputs or otherwise distracting information.

The third category of CAI programs is tutorials. Designed to teach or re-teach new content materials, tutorials often consist of several screens of textual material followed by a formative assessment or exercise. Most tutorials adapt instruction by evaluating a student's prior performance using that information to determine what material to present next, at what level of difficulty it should be presented, and the rate at which the presentation should be delivered. The better tutorials allow students to work with information and self-evaluate their own performance and possible corrective actions.

Implications for the Traditional Learner. In addition to its positive effect on student motivation, technology often provides a welcomed change for traditional classroom students. Computer-assisted instruction has also been associated with a positive effect on student achievement and learning outcomes. CAI appears to be more successful when used to supplement regular classroom instruction rather than to replace it completely. The positive effects of CAI seem the greatest for elementary and secondary students and less effective for college learners. Finally, when using technology for instruction, the teacher must keep in mind that there is nothing magical about computers; both successes and failures should be expected.

Mastery Learning

Mastery learning, as a classroom application of behaviorism, emphasizes student grasp of specific learning objectives and uses a combination of corrective/ remedial instructional alternatives (many technology-based) to achieve that goal.

Mastery learning assumes that virtually all students can learn what is taught in school – if the instruction is approached systematically, if students are helped when they have difficulty, if they are given sufficient time to achieve the standards established, and if there is some clear criterion of what constitutes mastery in the first place. Benjamin Bloom is credited with designing one of the first instructional process models. He proposed a model for traditional learning based on the belief that if each student was allowed the time to learn the material and the time was appropriately spent the student would be able to achieve the specified learning objectives. Alternatively, if students were each given the same time to learn the material many would fall short and not attain the level of knowledge expected by the instructor. Bloom developed the following equation to express the degree of learning attained by a student:

Degree of Learning = *f(time spent/time needed)*

The degree of learning, according to Bloom, is a function of the amount of time spent learning relative to the amount of time the student actually needs to master the material. Bloom notes that in traditional learning environments, students who fail to master the material in an initial lesson were likely to have problems mastering the material in follow-on lessons. What was needed, he believed, was some type of feedback and corrective action that would simultaneously diagnose individual learning difficulties while prescribing specific remediation procedures to help students succeed. As such, Bloom outlined his strategies mastery learning as follows.

First, the content material to be mastered is divided into increasingly smaller learning units until they comprise material that can be completed in one to two weeks intervals. Second, after the material is completely presented, a formative test is administered to determine each student's progress toward the standards established by the teacher and to identify areas where more instruction is needed. A high level of performance is required (usually 85-90%) on the formative test before students move into enrichment activities. Third, students who do not master the material are presented with corrective or remedial instruction. Alternative learning methods must be engaged oftentimes using technology as a delivery media. Other more traditional instructional vehicles include additional lectures, group instruction, different textbooks, study guides, or worksheets. Students who master the content as evidenced by the formative test receive enrichment activities designed to further augment the instruction keeping the original learning objectives in mind as the supplementary content is presented.

At the end of the corrective units, the teacher again evaluates the final competency of students by giving a summative test covering the objectives of the unit. If mastery learning is successful, almost all students should attain a high score on the examination.

Implications for the Traditional Learner. In a mastery learning environment, faster students are sometimes covertly or overtly held back waiting for other students to catch up. To successfully apply mastery learning in the classroom, teachers must identify the prerequisite skills necessary to begin instruction at the proper level. Also, some students may actually experience a decline in their study habits, opting to choose the "principle of least effort" by risking initial failure in order to more easily discover the minimal knowledge that must be learned to pass the second and final assessment. Finally, research has found that students who are seldom placed in the more successful enrichment group may develop negative self-concept toward school and learning.

KEY CRITICISMS OF BEHAVIORISM AND THE TRADITIONAL LEARNER

Critics of the behavioral school of educational psychology point to two basic shortcomings of behaviorism in the traditional classroom. First, many educators fear that rewarding students causes them to lose interest in learning as its own intrinsic motivation. Studies have suggested that reward programs, applied to students who already evidence an interest in the subject matter at hand actually results in a loss of interest in the lesson. Second, any reward system in which students are grouped may create a detrimental

Figure 3. Available Behavioral Technologies for Instruction

A	B	C	D	E	F	G	H
	Behavioral	Cognitive	Humanistic		Behavioral	Cognitive	Humanistic
Audio Cassette Recorders				MIDI Interfaces			
Black & White Printer				Moodle			
Cable Television				Multimedia Carts			
Calculators/ Graphing Calculators	X			Multimedia Computers			
Camcorders				Music Synthesizers			
Cassette Player				Newsgroups			
CD Player				Office Productivity Software			
Chat Room				Overhead Projectors			
Classroom Carts				Personal Response Systems	X		
Color Printer				Podium			
Computer Assisted Instruction	X			Portable CD/Tape Players			
Computer classrooms	X			Portable Public Address Systems			
Computer Labs	X			Portable Screens			
Conference Phone				Power Point	X		
Copier				Probe	X		
Data projectors				Problem Solving Software			
Databases				Scanner			
Desktop Publishing				Simulation Software	X		
Digital Cameras				Slide Projector			
Digital Microscopes				SmartBoards			
Digitized Encyclopedias				Sounds			
Document Camera				Spreadsheet	X		
Drawing Tablets				Tablet PCs			
Drill and Practice Software	X			Transparency Projector			
DVD				Tutorial Software	X		
Electronic Mail				TV			
E-Mail Mailing Lists				USB "Key Chain" Flash Drives			
Excel	X			VCR			
Fax Machine				Video (Film, Videotape, Laser)			
Games	X			Video Projectors			
Geocaching				Videoconferencing			
Graphic Presentation				Virtual Tours			
Groupware				Voice recorders			
Handhelds				Web Cams			
Hypertext/Hypermedia/Hyperbook	X			Web Conferences			
Interactive Lesson				Web Site			
Interactive Whiteboard				Web Surveys			
Internet				Wired Microphone			
Keyboarding				Wireless Computing			
Laptops				Wireless Network Access			
LCD Projector				Word Processing			
Lecture recording system				World Wide Web			
List Servers							

effect on other students in the classroom. Research generally shows that tracking and between-class ability grouping benefit students who are placed in high-end tracks or groups while having a detrimental effect on students placed in low-end groups (Secada, 1992).

BEHAVIORISM AND THE ENGINE FOR DESIGNING TECHNOLOGY-BASED INSTRUCTION

Application. On the surface, the school of educational psychology known as behaviorism might not appear to have much application for the design of online education. After all, the World Wide Web has certainly shown itself to be the largest conglomeration of disorganized, illogical, unstructured, disparate information the world has ever accumulated. Yet, technology in all its forms has at its roots a behavioral bent that few would deny.

Effective learning utilizes behavioral psychology in order to create a learning environment that results in the mastery of basic concepts and facts. Behaviorism provides a strategy for learning that increases a student's ability to recall data or information; understand the meaning, translation, interpolation, and interpretation of instructions and problems; state problems more clearly and concisely; use concepts in a new situations; and, apply what was learned in the classroom in novel situations in the real world.

For the traditional learner, underlying attitudes and beliefs will manifest themselves as observable behaviors in the classroom. Behavior is determined by outcomes/ consequences. When designing technology-based education for the traditional learner, the behavior of the student is determined by what is perceived to be the consequences of actions. One positive consequence is the feedback. Instructors should be persuaded to use feedback often. For example, multiple-choice or true-false quizzes help learners identify concepts while evidencing abilities to organize facts and figures. Another example is a website organized in such a way that encourages the student to be able to classify and categorize knowledge, place that knowledge in a framework, and then make connections by comparing data.

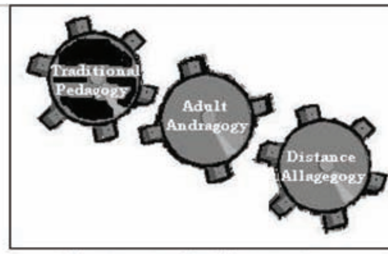
Technologies (SeeFigure 3, Behavioral Technologies for Instruction). Word processing presentation software is imminently suitable to deliver behavioral content. The Hyper Book Lesson, discussed in more detail in Chapter Eight, offers the behavioral instructor a sequential methodology for technology-based learning. Using the full suite of Microsoft Word features and capabilities, learner are provided with feedback that tells them whether their answers are right or wrong and, if they are wrong, the lesson provides additional content to re-teach the concept.

Personal (student) response systems provide in-class assessments "on the fly" taking the traditional classroom (especially larger classrooms) from a lecture-based, one-way delivery of instruction to a more interactive strategy for teaching and learning.

Calculators (graphic and numeric) provide positive reinforcements for right answers and reduce the dependence on rote memory and drill and practice to expand the horizons of mathematics content. Spreadsheets in general and Excel is particular broaden still the math-centered behavioral applications when its more advanced features (e.g., formulas, forms, auto-correct options, and error-checking) are used to help the learner develop their theoretical and practical mathematical base.

Of course, computer-assisted instruction is on the list of available technologies for the traditional learner. Often located in computer classrooms and computer laboratories, CAI, along with its manifestations of drill and practice, simulation, and tutorials, has already been discussed in detail as one of the most productive behavioral applications for the traditional classroom. Finally, of the most celebrated enhancements to technology in recent years, gaming has only begun to show promise as a tool for teaching the traditional student.

Figure 4. Traditional Learner Lesson Plan Template (cumulative)



Focus on the Learner

Grade Level: **9th Grade**

Psychology of the Lesson: Behavioral

Major **instructional application:**

- ☐ Programmed instruction
- ☐ Computer-assisted instruction
- ☑ Mastery learning
- ☐ Other ____________

Traditional student characteristics targeted by this lesson plan:

- ☑ Subject-oriented; seek to successfully complete each course, regardless of how course relates to their own goals
- ☐ Future-oriented; youth education is often a mandatory or an expected activity in a youth's life and designed for the youth's future
- ☑ Often depend on adults for direction
- ☑ Likely to accept new information without trying it out or seriously questioning it
- ☑ Seek education that prepares them for an often unclear future; accept postponed application of what is being learned
- ☐ Depend on others to design their learning; reluctant to accept responsibility for their own learning

CONCLUSION

Appendix A, Traditional Learner Lesson Plan Template can be completed to exhibit how to use the template for developing a traditional classroom lesson on the Planets of the Solar System, as shown in Figure 4.

REFERENCES

Knowles, M. (1984). *The adult learner: A neglected species*. Houston: Gulf Publishing.

Secada, W. (1992). Race, ethnicity, social class, language, and achievement in mathematics. In D. Grouws (Ed.), *Handbook of research on mathematics teaching and learning.* Reston, VA: National Council of Teachers of Mathematics, Inc.

Thorndike, E. L. (1913). *Educational psychology*. New York: Columbia University, Teachers College Press.

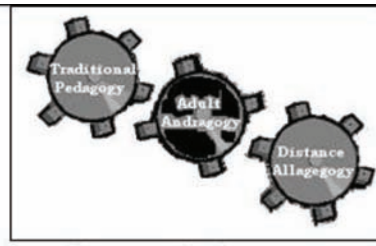
Chapter 2
Learning Theories and Andragogy:
Teaching the Adult Learner

Learning Objectives. The reader will become familiar with two key concepts related to teaching the adult learner: the concept of andragogy and the psychology of cognitivism. Andragogy is defined as the “art and science of helping adults learn” (Knowles, 1970). Cognitivism focuses on mental processes such as thinking, memory, knowing, and problem-solving that contributes to learning. Whereas, learning is defined as change in learner behavior by the behaviorist (see Chapter 2), learning is defined as a change (i.e., growth) in a learner’s schemata (or models for addressing and solving problems). At the conclusion of this chapter, the reader will be able to:

- Define the nature of the adult learner and definition of andragogy.
- Identify the characteristics that distinguish how a child learns and how an adult learns.
- Define cognitivism and distinguish the important differences among the developmental stages of cognitive development, the zone of proximal development, and psychosocial development
- Recognize the major theorists of cognitivism to include: Jean Piaget, Lev Vygotsky, and Erik Erikson.
- Apply the major instructional applications of cognitive psychology to include: Discovery Learning, Reception Learning, and the Information Processing Model

DOI: 10.4018/978-1-60566-824-6.ch002

Figure 1. Adult Lesson Plan Template (Focus on the Learner)



Focus on the Learner

Grade Level: 200-level Science Elective

Psychology of the Lesson: Cognitive

Major **instructional application:**

☐ Discovery learning ☐ Reception learning ☐ Other ____________

Adult student characteristics targeted by this lesson plan:

☐ Problem-centered; seek educational solutions to where they are compared to where they want to be in life

☐ Results-oriented; have specific results in mind for education - will drop out if education does not lead to those results because their participation is usually voluntary

☐ Self-directed; typically not dependent on others for direction

☐ Often skeptical about new information; prefer to try it out before accepting it

☐ Seek education that relates or applies directly to their perceived needs, that is timely and appropriate for their current lives

☐ Accept responsibility for their own learning if learning is perceived as timely and appropriate

- Discuss the key criticism of cognitivism and the adult learner
- Cognitivism and the Engine for Designing Technology-based Instruction

Lesson Plan Template. Refer to **Appendix B, Adult Learner Lesson Plan Template** as the chapter discusses **Focus on the Learner** as depicted in Figure 1.

INTRODUCTION

The adult learner is a relatively new phenomenon in the annals of educational practice. How can this be considering we have been teaching adults for almost as long as we have been teaching children? – longer if you believe in the Garden of Eden and Adam and Eve. Still, any review of the educational literature on teaching and learning will show a preponderance of research and investigation concerning children and comparatively little specifics regarding adults.

Andragogy. Until the 1960s, the models developed to teach children functioned equally for the teaching of adults. The first use of the term “andragogy” was attributed to Malcolm Knowles when, in 1968, he introduced the term androgogy (with an “o”) in the journal, *Adult Leadership.* His article was entitled “*Androgogy, not Pedagogy*!” and was followed promptly with a 1970 book in which he specifically defines the term as the “art and science of helping adults learn.”

By the 1980s, Knowles’ thinking had changed considerably. In his text, *Modern Practice of Adult Education: From Pedagogy to Andragogy,* he recognizes the considerable debate instigated by his 1970 thesis and begins to suggest andragogy as an alternative teaching and learning approach appropriate for adult learners.

Furthermore, he posits the following: “. . . andragogy is simply another model of assumptions about adult learners to be used alongside the pedagogical model of assumptions, thereby providing two alternative models for testing out the assumptions as to their ‘fit’ with particular situations., the models are probably most useful when seen not as dichotomous but rather as two ends of a spectrum, with a realistic assumption (about learners) in a given situation falling in between the two ends” (Knowles, 1980, p. 43).

He goes even further, defining the rationales that contribute to his theory. For example, as adults mature, they become increasingly independent and increasingly more responsible for their own actions. Adults are intrinsically motivated to learn by a desire to solve problems in their own daily lives. They evidence an increasing need to be self-directing. For the first time, an educator was able to posit, investigate, and report on the seemingly intuitive contention that the former pedagogical models did little to explain such complex developmental changes on the part of adults leaving pedagogy in the proverbial dust as a single explanation for all learning.

The contributions of andragogy as an alternative model of instruction have improved how we teach adults and certainly merit further study. Andragogy is predicated on four basic assumptions:

1. The adult learner possesses a self-concept that has been advanced from dependency and reliance on others to independency and self-reliance.
2. The adult learner, by the very nature of their experiences in the real world, has accumulated a cache of practice-based knowledge that can be used to build further learning (natural extension of cognitivism as we will see shortly)
3. Readiness to learn becomes increasingly linked to the developmental tasks and social roles of the adult learner.
4. The adult perspective, particularly with respect to the curriculum, changes from delayed gratification (children are often told that the value of what they are learning in the classroom will not be appreciated until they are much older) to one of immediate application (adults seek to use their learning immediately).
5. The adult learner has moved from subject-centeredness to performance-centeredness.

Implications for the Adult Learner. It is clear that andragogy and Malcolm Knowles have brought a considerable awareness to adult education as a separate field of teaching and learning during the past four decades. What will become readily apparent in the next section of this chapter is the psychology of cognitivism and how it has further expanded success with adult learners.

Orientation to Cognitivism. The cognitive perspective began in the 1960s as a direct challenger to the shortcomings of behaviorism. It has risen quickly to become the dominant paradigm of educational psychology, overshadowing both its predecessor and many challengers during the remainder of the 20th century.

A response to behaviorism's view of humans and learning as "programmed" responses to environmental stimuli, the cognitivist approach to teaching demands active participation on the part of the learner – a natural for adults. Changes in behavior are to be observed by the cognitive teacher, but only as evidence of the process that are occurring in the learner's mental schemata. Cognitivism uses the metaphor of the mind as computer, the information processing model where information is input to the brain, processed and stored in short or long-term memory, and is retrieved at the beck and call of the learner to effect some outcome.

The more traditional view of cognitive psychology emphasizes the *acquisition* of knowledge; newer approaches (dubbed "constructivism" stress learning as *construction*. Both views are evident in the following commonly accepted goals of cognitive education (International Association for Cognitive Education and Psychology, IACEP 2005):

- Help students process information in meaningful ways so that they can become independent learners.
- Teach less able learners to use appropriate learning strategies to become more successful in the classroom.
- Identify how the information processing system influences learning.
- Plan and implement lessons based on declarative and procedural learning tasks.

Implications for the Adult Learner. Cognitive theories emerged as a new perspective employing vastly different models to explain learning. The information processing schemata (the mind-computer analogies) replaced behavioristic assumptions that the learner is controlled by the environment and must passively adapts to the circumstances it presents.

THE MAJOR THEORISTS OF COGNITIVISM

Jean Piaget and Cognitive Developmental Stages

Certain key words and common phraseology appears throughout the literature on cognitive psychology. One of the most recurring characteristics is the developmental perspective of age-stage. Jean Piaget is arguably the most widely read and adopted proponent of this perspective of cognitivism. The distinctive aspect of Piaget's theory (1954) was one of the first attempts by psychologists to separate and label explicit stages of intellectual development.

The learner's stage of development sets limits on learning and influences the type of instruction that will ultimately be successful. Intellectual growth is not a quantitative process but rather a qualitative operation in which there are significant differences between the thinking of children, adolescents, and adults. Although most of Piaget's works centered on children, the applications of his theories have had an even greater impact on the discipline of adult learning Piaget, 1958).

In this text, and specifically in this chapter, we will focus on the concepts of Piaget's efforts most attuned to adult learners. Although we must consider the basics of Piaget before uncovering andragogi-

Stages of Cognitive Development *(See Table 1). Piaget believed that all people pass through the same four stages in exactly the same order and nearly the same time as the mature physically and mentally (Piaget 1941). Later, Piaget generalized these guideposts and acquiesced that his age parameters do not apply to all children at exactly the same age. According to his later research, individuals go through varied periods of transition between stages. In addition, they may also show characteristics of one stage in one situation and different characteristics of a higher or lower stage in others.*

cal impacts, we will leave the majority of the pedagogical underpinnings to other resources. And, these essential concepts rightly begin with an examination of the four stages of cognitive development.

The Sensorimotor Stage. The earliest period revolves around acquiring mastery of the five senses: seeing, hearing, moving, touching, and tasting. During this period, the child develops object permanence, the understanding that objects even if the infant is unable to perceive them. As the child matures through this stage, the older infant searches for the ball that has rolled behind the chair. Even though the object is out of sight, the infant demonstrates an understanding that the object still exists.

The Pre-operational Stage. Piaget coined the term "operations" for actions that can be performed (and reversed) mentally rather than physically. This stage is called preoperational because the child has not yet mastered the mental orientation of his actions. Mastery of this mental capacity to deal with the environment is forthcoming but still unrealized as the child matures between the ages of two and seven years old. As long as these representations remain tied to physical actions, they do not function in support of recalling information, tracking new problems, or planning future actions. Preoperational children, according to Piaget (1932), are egocentric; they tend to see the world and the experiences of others only from their own viewpoint. Egocentrism to most is a slight; to Piaget, it simply describes the inability of a child to see experiences from another's point of view. Combined with another characteristic common to preoperational children, conservation, or the inability of a child to understand that changing the form of a substance or object does not change its amount, overall volume, or mass. The lack of conservation is evident when a child is confronted with two glasses of liquid of different sizes. In the early stages of pre-operation, the child will select the glass that is the tallest because they perceive the taller glass as having more liquid inside (even though the tallest glass may also be the thinnest and the child watches the investigator pour the liquid from the shorter glass in to the taller). Both glasses have the same amount in them, but children who have not matured will perceive the tall glass as being most full.

Table 1. Stages of Cognitive Development

Stage	Approximate Age	Characteristics
SENSORIMOTOR	0 - 2 Years	Begins to make use of imitation, memory, and thought. Begins to recognize that objects do not cease to exist when they are hidden. Moves from reflex actions to goal-directed activity.
PREOPERATIONAL	2 - 7 Years	Gradually develops use of language and ability to think in symbolic form. Able to think operations through logically in one direction. Has difficulties seeing another person's point of view.
CONCRETE OPERATIONAL	7 - 11 Years	Able to solve concrete (hands-on) problems in logical fashion. Understands laws of conservation and is able to classify and sequence objects. Understands reversibility.
FORMAL OPERATIONS	11- Adult Years	Able to solve abstract problems in logical fashion. Becomes more scientific in thinking. Develops concerns about social issues, identity.

The Concrete Operational Stage. Manipulative thinking best describes this stage of development. Basic characteristics are the recognition of the logical constancy of the physical world, the realization that elements can be changed or transformed and still retain many of their original characteristics, and the understanding that these changes can be reversed. With an understanding of reversibility, the learner is able to mentally cancel any changes that have been made - in effect, mastering two-way thinking.

The Formal Operations Stage. The ability to think logically about concepts, both material and intangible, come into play as the learner considers problems, hypothesizes possible solutions, tests those solutions, and adopts new schemata for dealing with future similar events. Logical thinking operations can be performed apart from the presence of concrete objects. Some characteristics of formal operations include hypothetic-deductive reasoning (consideration of alternative hypotheses when dealing with problems that can defined, data measured, and decisions reached); propositional reasoning (ability to deal with statements that describe concrete data and even contrary-to-fact propositions); and, combinatorial reasoning (isolation of individual factors and possible re-combination of factors that may figure into new solutions).

Schemes. According to Piaget, people are born with an innate need to organize their thinking processes; he termed this structure "schemes" (Piaget, 1965). Schemes are the basic building blocks of thinking. They are organized models, actions or thoughts that allow the learner to mentally represent the real world. In adults, as well as children, learning is advanced when individuals encounter unfamiliar situations. How they choose to address these new situations is know as adaptation and is dealt with in one of two ways.

Assimilation. When a learner uses their existing schemes to make sense of a new event, assimilation occurs. For the adult, the process involves understanding new situations by attempting to fit it into what is already known. For example, a professional arrives at an unfamiliar airport and rents a vehicle to take him to the downtown hotel. Even though he may never have driven that particular model of car, assimilation allows him to operate the vehicle safely because certain assumptions regarding the location of instruments, in this case, have been long-established in his schemata for driving.

Accommodation occurs when an individual must change existing schemes to respond to an entirely new situation. If new information cannot fit (i.e. assimilate) into an existing scheme, a more appropriate structure must be developed. That same professional arriving from the United States to Northern Ireland will find accommodation the only alternative when forcing his vehicle into the left-hand lane of a busy Belfast street.

Neither Assimilation nor Accommodation. There are also times when neither means of adaptation works. If an individual encounters new information that is too unfamiliar, they may choose to ignore it. For example, a conversation in a foreign language will not make sense; without some background knowledge of the specific language, the exchange will probably go by unattended.

Implications for the Adult Learner. According to Piaget, adapting, assimilating, and accommodating represent a complex balancing act that is developed after years of learning and oftentimes trial and error. The enduring art of searching for that balance is called equilibration. In actuality, it is the state of disequilibrium that motivates the adult to search for a solution through assimilation or accommodation. Teachers should be able to assess the learner's present cognitive level; their strengths and weaknesses. Instruction should be individualized as much as possible and adults should have opportunities to communicate with one another, to argue and debate issues. Piaget sees teachers as facilitators of knowledge - there to guide, stimulate, and challenge their students. Teachers should present their students with materials, situations, and occasions that allow them to discover new learning schemes.

To recap, there is a fundamental need to acknowledge the differences between adult and child learners. First, adults differ from children in terms of the quality and quantity of life experience they possess; the wise teacher will make full use of the experiences of their adult learners. Secondly, children have not completed developing cognitively, emotionally or physically into mature human beings. Adults, for the most part, have arrived at their peak level of cognitive development; the successful teacher will seek out that level in each of her students and attempt to provide instruction directed at each individual and their most effective level of cognition. Thirdly, children are generally not motivated to learn by an immediate need for the instruction presented. Adults, however, prefer to use the information now to address the disequilibrium in their lives. Regardless, despite these obvious differences, educators of children and adults have a similar task. Both sets of learners benefit from some degree of facilitated self-directed learning and experiential techniques.

When teaching adult learners, and especially when using technology, a strict reliance on the age-stage application of Piaget's developmental stages is not that important. Nothing magical happens at age 11 that activates a switch in the adolescent brain somehow making them capable of abstract thought. Indeed, many adults remain at the concrete operations stage throughout their entire academic careers – and many even throughout the remainder of their lives. Rather, teachers of adults must keep in mind the characteristics of the reasoning patterns of the different cognitive levels at which adults may be functioning. While few adults remain forever in the early stages, insight into immature thinking patterns and information processing deficiencies may occur when the learner continues to operate from the concrete stage. A standard instructional approach that helps students advance past these earlier stages is to sequence instruction with the assumption that some students are still at the lower cognitive levels. As a general rule, even in adult courses, the instructional sequence should begin with more concrete examples and illustrations and move toward more abstract thinking and processing of information.

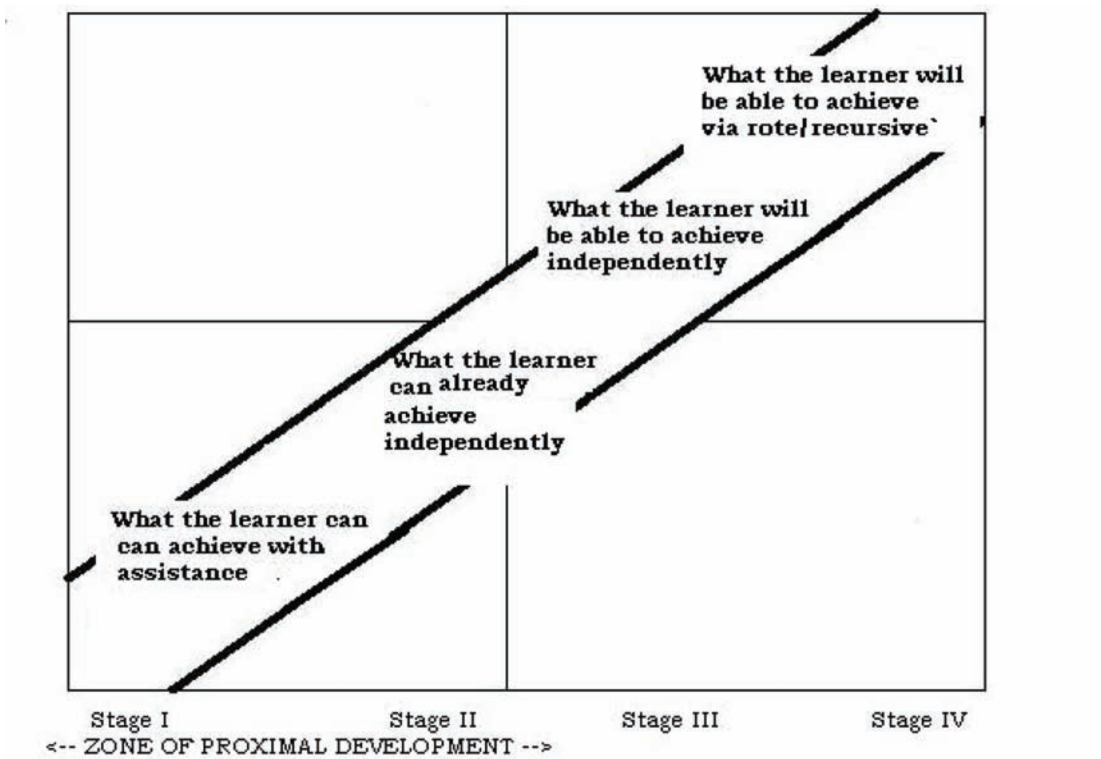
Lev Vygotsky and the Zone of Proximal Development (ZPD)

Piaget and Vygotsky differ on the relation between development and learning. Piaget believed that development precedes learning. Vygotsky believed the opposite—learning comes before development. Vygotsky advocated that developmental processes lag behind the learning processes, pointing out that the young learner often completes tasks with the help of others that they could not accomplish working independently. The abilities that adults demonstrate when given assistance are even more pronounced as they seek to internalize their knowledge. The well-known zone of proximal development represents the difference between an individual's current level of development and his or her potential for growth. For the adult learner, this makes an excellent case for building innovative (i.e., technology-based) instruction.

According to Vygotsky, at any given point in the instruction, there are certain problems that a learner is on the cusp of solving, regardless of their level of cognitive ability. Most learners need some structure, clues, reminders, encouragement, or help with remembering details. Examine this graphical representation of the Zone of Proximal Development (Figure 2) and the appended representation showing the evolution from a teacher-based to peer-based emphasis across the stages of development (Figure 3).

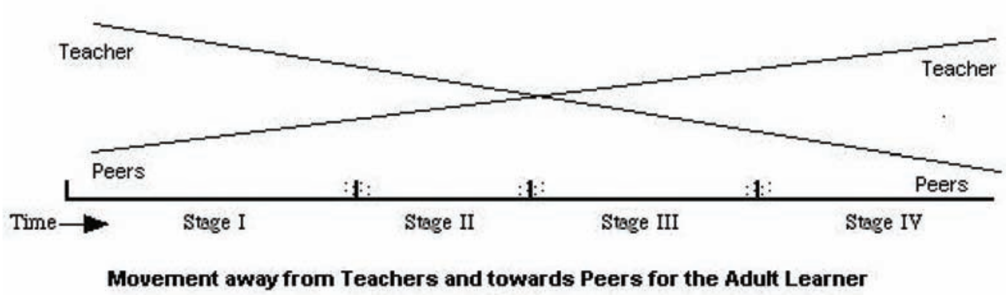
Implications for the Adult Learner. The implication of Vygotsky's zone is that learners should be placed in situations where they have to reach to understand, and where support is available either from other students or from the teacher. The more his theory attempts to address the learning styles adults, the more a shift from teacher to peers is anticipated. As shown in Figure 3, the tendency across

Figure 2. Vygotsky's Zone of Proximal Development (adapted from Vygotsky, 1978)



the four stages for adults is to decrease the reliance on the teacher and shift it towards the other adults who might be in class. Vygotsky's theory suggests that teachers need to do more than just arrange the environment so that the adult can discover on their own. They should also employ newly learned skills and with help begin to internalize other relevant skills and knowledge. Over time, the learner (and this especially true for the adult learner) assumes more and more responsibility for completing the task apart from the teacher.

Figure 3. Movement from Teacher to Peer- Reliance



Erik Erikson and Psychosocial Development

Implications for the Adult Learner. Understanding adult learners and the role of psychosocial development on the learning processes is critical to successful lesson design for adults. Beginning with Stage 6, Erikson posited that there is more diversity among adult learners than there is among children. Adult educators are well advised to consider a variety of different approaches when seeking successful outcomes with this group. Educators prone to using a cookie cutter approach to teaching may find wanton dissatisfaction with their instructional efforts. How to overcome these "dissatisfiers" for adults is the crux of the task at hand here.

Many educators find themselves disappointed to discover that the majority of adults do not learn for the sheer pleasure of learning. Adults in the more advanced stages are concerned with far different determinant events. Clearly, the main reason that adults are engaged in learning is because they want to be able to apply the knowledge to be gained in the classroom (or online) either in their current relationships or parenting demands. In fact, many adults are learning because of a short-term crisis that has interrupted their life; learning will bring about the equilibrium they once had and seek again. Instruction must be tailored to meet the needs of the adult students. Andragogy, along with Erikson's focus on psychosocial development, bring about the key elements of teaching adults:

- Adults are self-directed learners and are generally capable of monitoring their own progress. As a result, the adult learner works best when given choices regarding assignments, different assessment techniques, and a variety of conceptual frameworks.
- Motivation is generally not a problem for the mature adult learner. Most are ready to learn, motivated by life-changing events. As such, problem-centered assignments, group role-playing, case studies, and simulations are appropriate methods for engaging the adult learner.
- Lifelong learning makes considerable sense in the lives of older adults. While the speed of learning may degrade over time, older learners supplant speed with experience and practical knowledge and are usually able to mentally process at higher cognitive levels with respect to other important abilities including investigation, conceptualization, resourcefulness, and judgment. Overall, instructors need to implement only subtle modifications for their older learners. For example, limit rote memorization tasks, integrate coursework that requires critical thinking, promote discussion by breaking up into smaller groups first, and remain aware of physical surroundings that harbor

Another of the popular age-stage theories whose inputs have affected the evolution of andragogy is that of cognitive psychologist Erik Erikson. His contributions departed from our more traditional examination of how individuals develop and focused instead on the relationship of the learner to society. After studying child-rearing practices in several cultures, Erikson concluded that all humans have the same basic needs and that each society must provide for those needs in some way. Like Piaget, Erikson viewed development through a series of stages, each with its particular goals, concerns, accomplishments, and dangers. For Erikson, success at each subsequent stage depends on how key conflicts are resolved in earlier years. Each stage involves a conflict which must be experienced and overcome before progression to the next higher level is possible. Since the latter three stages are targeting specifically adults, Erikson's Eight Stages of Psychosocial Development (Table 2) have much to contribute to the science of teaching adults.

Table 2. Stages of Psychosocial Development

Stage	Approximate Age	Important Event	Descriptive Characteristics
BASIC TRUST vs. MISTRUST	Birth - 18 months	Feeding	Development of trust is based on the dependability and quality of the child's caregivers. Success at this stage results in feeling safe and secure. Failure produces rejection, mistrust, fear.
AUTONOMY vs. SHAME/DOUBT	18 months - 3 Years	Toilet Training	Focus on developing a sense of personal control over food choices, favorite toys, and clothing selection. Success engenders a sense of personal security and confidence. Failure establishes inadequacy and self-doubt.
INITIATIVE vs. GUILT	3 - 6 Years	Independence	Realization of power and control over the environment. Play and physical contact with others key. Success generates attribution of one's domination over people and things. Failure promotes guilt, self-doubt and lack of initiative.
INDUSTRY vs. INFERIORITY	6 - 12 Years	School	Developed sense of personal self through exploration and initiative. Success results in a personal awareness of strength, independence and control. Failure outcomes are insecurity and confusion.
IDENTITY vs. ROLE CONFUSION	Adolescence	Peers	Developing a sense of self and an awareness of personal independence is key at this stage. Success is defined as a strong sense of self and a feeling of independence and power. Failure is characterized as insecurity and confusion.
INTIMACY vs. ISOLATION	Young Adult	Relationships	Personal relationships explored in pursuit of close relationships with others. Success involves rewarding, committed and confident relationships. Failure produces a diminished sense of self tend and, as a result, emotional separation and depression.
GENERATIVITY vs. STAGNATION	Middle Adult	Parenting	Focus changes from internal to external; on careers and family. Success during this phase is realized by activity in the family and community. Failure is noted by those who feel unproductive and uninvolved.
EGO INTEGRITY vs. DESPAIR	Late Adult	Life Reflection	Focus on a life well spent. Success produces a sense of accomplishment, integrity and personal wisdom. Failure results in a feeling of a life wasted, bitterness and despair.

continued on following page

Table 2. continued

Stage	Approximate Age		Important Event	Descriptive Characteristics
BASIC TRUST vs. MISTRUST	Birth - 18 months	Feeding	Development of trust is based on the dependability and quality of the child's caregivers. Success at this stage results in feeling safe and secure. Failure produces rejection, mistrust, fear.	
AUTONOMY vs. SHAME/DOUBT	18 months - 3 Years	Toilet Training	Focus on developing a sense of personal control over food choices, favorite toys, and clothing selection. Success engenders a sense of personal security and confidence. Failure establishes inadequacy and self-doubt.	
INITIATIVE vs. GUILT	3 - 6 Years	Independence	Realization of power and control over the environment. Play and physical contact with others key. Success generates attribution of one's domination over people and things. Failure promotes guilt, self-doubt and lack of initiative.	
INDUSTRY vs. INFERIORITY	6 - 12 Years	School	Developed sense of personal self through exploration and initiative. Success results in a personal awareness of strength, independence and control. Failure outcomes are insecurity and confusion.	
IDENTITY vs. ROLE CONFUSION	Adolescence	Peers	Developing a sense of self and an awareness of personal independence is key at this stage. Success is defined as a strong sense of self and a feeling of independence and power. Failure is characterized as insecurity and confusion.	
INTIMACY vs. ISOLATION	Young Adult	Relationships	Personal relationships explored in pursuit of close relationships with others. Success involves rewarding, committed and confident relationships. Failure produces a diminished sense of self tend and, as a result, emotional separation and depression.	
GENERATIVITY vs. STAGNATION	Middle Adult	Parenting	Focus changes from internal to external; on careers and family. Success during this phase is realized by activity in the family and community. Failure is noted by those who feel unproductive and uninvolved.	
EGO INTEGRITY vs. DESPAIR	Late Adult	Life Reflection	Focus on a life well spent. Success produces a sense of accomplishment, integrity and personal wisdom. Failure results in a feeling of a life wasted, bitterness and despair.	

undue noise and temperature fluctuations as well as keep cognizant of any decline in auditory and visual acuity that comes with age.

MAJOR INSTRUCTIONAL APPLICATIONS OF COGNITIVE PSYCHOLOGY

Discovery Learning

Early investigations by a number of researchers stirred interest in educational approaches that encourage the development of cognition. Jerome Bruner's work, in particular, emphasized the importance of active learning as the basis for true understanding, and the value of reasoning in learning. His connection with the National Science Foundation curriculum development projects (circa 1960s and 1970s) was instrumental in formulating discovery approaches to science-based instruction. Bruner believed that the goal of education should be intellectual development and that the science curriculum should lead the way by promoting the development of problem-solving skills through inquiry and discovery.

Some educators use the term inquiry learning interchangeably with discovery learning. In actual classroom application, there is a difference. A key distinction that is often made between the two portrays discovery learning as a process whereby students are provided with data and a process. Through increasingly more specific questioning by the teacher, the learner uncovers principles hidden in the lesson objective. Inquiry learning, by comparison, suggests a more open strategy. Data is provided; however, learners are expected to design their own methodology for processing the information and deriving conclusions. For the adult, inquiry learning offers a more student-focused instructional setting. However, discovery learning often reduces the apprehensions experienced by some adults, especially those who have been away from school for a considerable length of time.

Discovery learning embraces the scientific model. Learners identify and define problems, generate hypotheses, test each hypothesis against collected data, and apply conclusions to new situations. The purpose of this type of instruction is to teach thinking skills. In discovery learning, the instructor must carefully plan the questions to be asked in order to help the learner successfully grasp the principle or abstraction being taught. When teaching adults, the instructor also has the option to order the examples in the lesson as well as the reference materials available during the discovery phase of the lesson and any equipment (i.e., technologies) readily available.

Discovery learning encourages adults to make active use of their intuition, imagination, and creativity – traits identified earlier as particularly unique to andragogy and the adult learner. Because the approach starts with the specific and moves to the general, the instructor can present example after example until the learner uncovers the embedded relationships that bring about understanding. Bruner believes that classroom learning is fostered by inductive reasoning; that is, by using specific examples to discover general principles. For instance, if students are presented with enough examples of triangles and non-triangles, they will eventually discover what the basic properties of triangles must be.

An inductive approach requires intuitive thinking on the part of the learner. Bruner suggests that teachers can nurture this intuitive thinking by encouraging guesses based on incomplete evidence, then systematically confirming or disproving their presumptions, speculations, and estimations. Especially for the adult, teachers must avoid educational practices that often dishearten intuitive thinkers by rebuking wrong guesses and rewarding safe, but uncreative answers. Technology can go a long way in complementing a well-designed discovery learning lesson.

In somewhat related research, Jerome Bruner showed his true colors as a cognitivist by identifying three stages of human growth, similar to the stages of Piaget. Bruner believes that children move from an enactive stage to the iconic stage and finally to the symbolic stage. The enactive stage is tied closely the child and represents an understanding of the world through actions. At the iconic stage (still primarily descriptive of a child), the world is represented in images. This stage corresponds to Piaget's preoperational thinking and his principle of conservation, as discussed previously.

At the final level, the learner matures and is able to use abstract ideas, symbols, language, and logic to understand and represent the world. Discovery learning is firmly seated in this third stage and is most appropriate for the adult learner as they first encounter, then deal with new information. Again, certain technologies are primary tools for representing abstract concepts and are a natural extension of the lesson plan based on discovery learning principles.

Implications for the Adult Learner. In theory, discovery learning seems ideal, but in practice there are problems when teaching adults. To be successful, discovery projects often require special materials and extensive preparation. And, preparations do not always guarantee success. In order to benefit from a discovery situation, adults must possess the basic knowledge concerning the problem and must be familiar with applying problem-solving strategies. Without this knowledge and skill, they flounder and grow frustrated. Too advanced and adults will often abandon the lesson. Too simple and they easily become bored with the content. Critics believe that discovery learning may be so inefficient and so difficult to successfully organize that other methods are more recommended. Here is where technology, effectively planned and implemented, can overcome certain shortcomings. As the discussion of cognitivism continues, consider how specific technologies can be effectively used to teach a discovery-based lesson to adults.

Reception Learning and Advanced Organizers

David Ausubel's contribution to cognitive thought manifested itself in the theory of learning in which the acquisition of knowledge is considered more from the perspective of how it is received than through how it is discovered. In reception learning, concepts, principles, and ideas are presented, then comprehended and understood. The more organized and focused the presentation, the more thoroughly learning is likely to occur.

The theorist dismisses meaningful verbal learning and rote memory since memorization excludes the connection of new and existing knowledge. Ausubel also proposed expository teaching as a model for encouraging meaningful reception learning. Teachers present material in a carefully organized, sequenced, and finished form (sounding very much like a behavioral application). However, in reception learning, students receive the material deductively (from general to specific) and not inductively as Bruner recommended; a process much more akin to the way adults learn.

Before each lesson, Ausubel recommends the use of a now- famous cognitive strategy: the advanced organizer. For our purposes here, the advanced organizer has significant potential when teaching adults.

Advanced Organizers. The best learning generally occurs when there is a logical connection between the student's schemas (i.e., what they already know) and the material to be learned. To advance this relationship, Ausubel suggests that lessons begin with an advanced organizer: an introductory statement provided at the highest level of abstraction, broad enough to encompass all the information that will follow. The function of the advanced organizer is to provide scaffolding; a construct for considering new information. Advanced organizers serve as a conceptual bridge between new information and current knowledge.

Text books often contain advanced organizers. Chapter overviews and learning objectives (as used in this text) are excellent examples. Advanced organizers serve three functions. First, they direct the learner's attention to important material to be presented. Second, they underscore relationships among new concepts. Third, they remind the learner of previous encounters with similar information. Hopefully, adults come to use the advanced organizer to quickly systematize the new material presented and assimilate (or accommodate) that latest information into their existing schemata.

Information Processing Model (IPM)

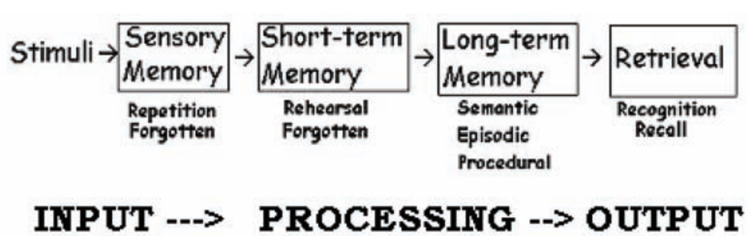
From the computer discipline that began in the 1950s, the information processing model has been around for nearly six decades. Early consideration of the model was adopted by behaviorists who were quick to grasp the power of the computer to provide the stimulus → response → reinforcement (S → R → R) on which their view of learning hinges.

By the 1980s, cognitive educators had come to see the application of the model to its view of human memory and how the input → process → and output cycle (see Figure 4). In the information processing model, the human mind takes in information, performs operations to change its form and content, stores information in either short or long-term memory, retrieves it when needed, and generates appropriate responses, if necessary. The process involves encoding (gathering and representing information); storage (holding information); and retrieval (getting the information when needed) and is guided by a control system that determines how and when information flows. To some, the operation of the brain resembles not just one computer but a number of computers networked together and operating in parallel.

Input. Stimuli from the environment constantly bombard the human receptors, the body's mechanisms for seeing, hearing, tasting, smelling, and feeling. Sensory memory holds these inputs very briefly. The capacity for sensory memory is very large, more than can possibly be handled at once. However, this vast amount of information is short in duration lasting between one to three seconds. The significance attached to raw information received through the senses is called perception. And, how we react to all this information is known as attention. While we may perceive many inputs simultaneously, our attention is a much more restrictive tool. Research in adults as well as children found that we attend to only one or two tasks at a time. For children, educators spend a considerable amount of time teaching them how to pay attention. For adults, teachers spend their time competing against other stimuli at home, in the classroom, or online.

Processing. Once a stimulus is perceived and attended to (i.e., once the information has been input into the human brain), it can be transferred into short-term memory where the processing begins. Unlike sensory memory, short-term memory (also known as working memory) is limited by the number of

Figure 4. The Information Processing Model



‘bits’ of information that it can hold at any given time. Brain research has discovered that most humans, even adults, are limited to five to nine separate items of information. The duration, when compared to sensory memory, is somewhat longer, ranging from about 20 to 30 seconds – somewhat longer for adults who hone their skills in this area. Because short-term memory is easily lost, it must be continually re-activated to be retained. If not, the information is quickly forgotten. Adults, oftentimes, are the victims of poor assumptions at this level of cognition. Teachers assume that their adult learners have mastered the art of processing information, moving it from sensory to short-term and, later, to long-term memory. As cognitive lesson plans are developed, instructors should consider using one of these two types of rehearsals.

- **Maintenance Rehearsal** involves repeating the information over and over again. Tips and techniques for continually repeating information should be built into lesson objectives in order to retain the information in short-term memory indefinitely.
- **Elaborative Rehearsal** involves associating the information to be remembered with something the learner already knows. Pairing a name of a new acquaintance with another attribute (e.g., an animal, an event, etc.) is an example.

The limited capacity of short-term memory (STM) can also be circumvented by using chunking. Information can be retained (up to five to nine bits of information) by grouping them together. Chunking a telephone number or social security number is a good example and can be implemented effectively by a good lesson plan.

Sensory memory holds information that is still being attended to. Short-term memory acts on information. Long-term memory (LTM) takes information that has been acted upon and stores the information depending on how it will be subsequently retrieved. For example, most cognitive psychologists distinguish three categories of long-term memory: semantic, episodic, and procedural. Semantic memory stores information as propositions, images, concepts and schemas. Episodic memory ties new information to a particular place and time as well as tracking the order of things. Procedural memory encompasses how to do things. It takes longer to learn a procedure, but once learned, this knowledge tends to be remembered for a long time.

Output. “Garbage in – garbage out” is a famous adage from the earliest days of computers and information processing. On the output side of the equation, educators deem retrieval of information as arguably the most important component of the model. Regardless of perception and attention, apart from how well the learner encodes to short-term memory through rehearsal, and in spite of the success in transferring to long-term memory, if the learner is unable to retrieve the information when desired, learning does not occur. In the information processing model, recognition is primary demanding only that the learner distinguish characteristics that make retrieval of information possible. Recall, on the other hand, is a more complex activity demanding a more cognitive exertion to retrieve the information from memory.

KEY CRITCISMS OF COGNITIVISM AND THE ADULT LEARNER

Cognitive theorists focus on the mind’s ability to make sense of the world. Thinking, beliefs, expectations, and feelings influence what and how we learn. Cognitivists view knowledge as the outcome of learning and the power of knowledge as the driving motivator in adult learning. The "age-stage" metaphor speaks well to the education of children, but it also has something important to add to the art and science of andragogy. Discovery learning, reception learning, and the information processing model represent the best descriptors of cognitive psychology. In many ways, though, this school is not only the most widely accepted across all disciplines of educational psychology, but also the most pervasive in its explanation of how adult learning occurs. If cognitivism does possess any shortcomings for teaching adults, it would be when trying to explain how learners move from one stage into a new stage. Sure, age is important, but age distinction becomes blurred when considering the adult learner and the higher stages of development. Another key issue for the adult is the impact of social influences on learning. The most serious criticism of Piaget's theory, in particular, is its lack of recognition of the social context in which learning occurs. Since many of his experiments took place in 1980's France, the questions of community versus universal as well as then versus now influences have been raised many times. Perhaps the answer lies in a more humanistic view of learning.

COGNITIVISM AND THE ENGINE FOR DESIGNING ONLINE EDUCATION

Application. Adults share the myriad of learning styles that are found in any good book on pedagogy and the teaching of children. When designing technology-based material, an instructor should include a variety of cognitive-based activities appropriate for different learning styles so learners can select activities based on their preferred style.

Effective technology-based lessons use techniques that allow adult learners to perceive then attend to new information using rehearsal to facilitate the transfer of information to long-term memory. Information should be presented in different modalities to accommodate individual differences in processing and to facilitate transfer to long-term memory. Enter technology.

Where possible, text-based, visual-based and web-based materials (more about how to do this in Part IV) should be incorporated into adult lessons. According to research, information received in multiple modalities (e.g., textual and visual) is retained better than that presented in a single mode (e.g., textual only). Dual-coded information is processed in different parts of the brain, resulting in more encoding (Paivio, 1986).

Technologies, when properly applied, also have the potential to capture the adult learners' attention quickly and maintain it longer. Technology-based learning materials should be designed to include an activity at the start of the session to connect with the learners.

State-of-the-art technologies convey the importance of the lesson and how taking the lesson could benefit the learner as well as how the content to be learned can be used in real-life situations. This strategy helps to contextualize the learning and make it more meaningful, thereby addressing one of the key characteristics of andragogy.

Teaching should encourage exploration of different and real-life situations. Simulations, using real-life cases, are evident in educational software as are web sites that employ interactive links. Transfer of learning is facilitated by real-life simulations; technology-enhanced situations that assist the adult learners develop personal meaning and contextualize the information.

Lessons should be designed for success by sequencing from simple to complex or known to unknown, using a discovery-based approach where adults are given the opportunity to use different strategies to

Figure 5. Available Cognitive Technologies for Adult Education

	Behavioral	Cognitive	Humanistic		Behavioral	Cognitive	Humanistic
Audio Cassette Recorders				MIDI Interfaces			
Black & White Printer				Moodle		X	
Cable Television		X		Multimedia Carts		X	
Calculators/ Graphing Calculators				Multimedia Computers		X	
Camcorders				Music Synthesizers		X	
Cassette Player				Newsgroups		X	
CD Player				Office Productivity Software		X	
Chat Room				Overhead Projectors			
Classroom Carts		X		Personal Response Systems			
Color Printer				Podium			
Computer Assisted Instruction				Portable CD/Tape Players			
Computer classrooms				Portable Public Address Systems			
Computer Labs				Portable Screens			
Conference Phone				Power Point			
Copier				Probe			
Data projectors				Problem Solving Software		X	
Databases		X		Scanner			
Desktop Publishing		X		Simulation Software		X	
Digital Cameras				Slide Projector			
Digital Microscopes				SmartBoards		X	
Digitized Encyclopedias		X		Sounds			
Document Camera				Spreadsheet			
Drawing Tablets				Tablet PCs			
Drill and Practice Software				Transparency Projector			
DVD				Tutorial Software			
Electronic Mail		X		TV		X	
E-Mail Mailing Lists				USB "Key Chain" Flash Drives			
Excel				VCR		X	
Fax Machine				Video (Film, Videotape, Laser)		X	
Games				Video Projectors			
Geocaching				Videoconferencing			
Graphic Presentation		X		Virtual Tours			
Groupware		X		Voice recorders			
Handhelds		X		Web Cams			
Hypertext/Hypermedia/Hyperbook				Web Conferences			
Interactive Lesson		X		Web Site		X	
Interactive Whiteboard		X		Web Surveys		X	
Internet		X		Wired Microphone			
Keyboarding				Wireless Computing			
Laptops				Wireless Network Access			
LCD Projector				Word Processing		X	
Lecture recording system		X		World Wide Web		X	
List Servers							

complete the lesson. Inform learners of the lesson outcome at the outset of the instruction using advanced organizers to keep them on track.

Use performance feedback (readily done using technology-based assessment tools) to encourage adults to apply what they learn in real-life situations. Adults in particular, and all learners in general, prefer to know how they are doing as the lesson progresses and they favor instruction that allows them to apply what they are learning.

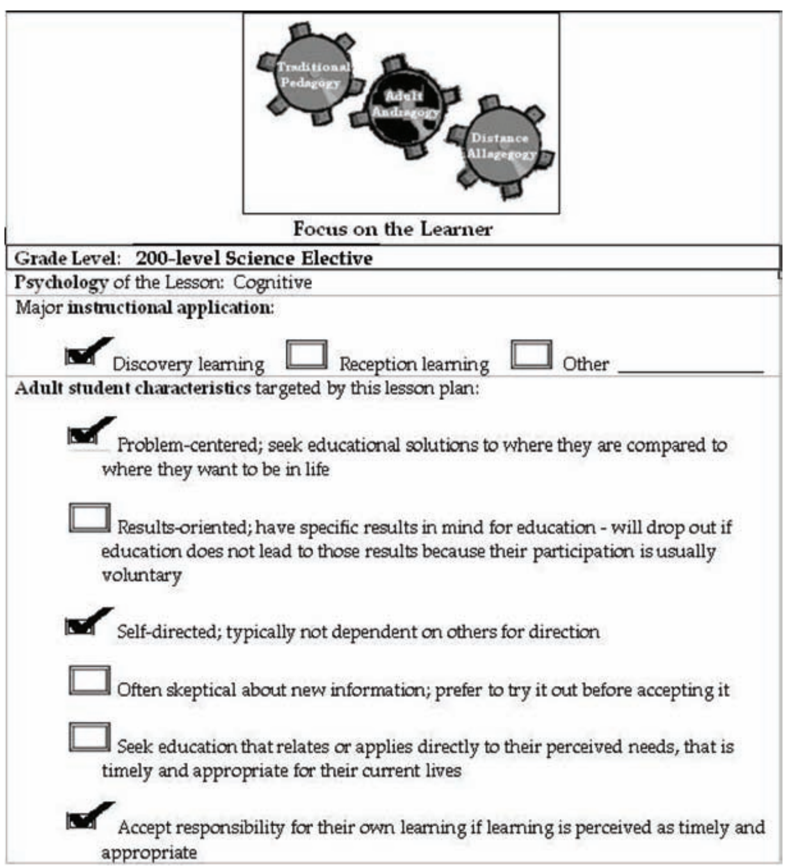
In addition to activities, adequate technical support should be provided for the adult learner. Although technology might be exciting for some, keep in mind that for most adults, technology is a tool; one that should be easy to use and not the object of additional instruction. Also, research has found that students with different learning styles have different preferences for technology. Let's look at some of the most appropriate technologies for the cognitive lesson.

Technologies (SeeFigure 5, Available Technologies for Adult Education). Graphics presentation software is well suited for cognitive lessons. The Interactive (Power Point) Lesson will be discussed in more detail in Chapter Nine. Using the features of action buttons, hide slides, and the kiosk mode, learners encounter a remarkably flexible instructional format, ideally suited for the adult learner. The interactive lesson, together with some of the popular technologies shown in the table below, offer the differentiated teaching styles recommended in this chapter.

*Television in all its formats (i.e., cable television, lecture recording systems, TV, VCR, video, etc.) offers a wide array of technology for teaching cognitively. Video lessons often provide a cognitive approach to learning a comprehensive topic. Take for example a lesson on the Civil War. Using television-based lessons, teachers can dissect the hostilities by dates (from 1860 – 1865), by battles (e.g., Gettysburg versus Bull Run), or by key players (e.g., Grant versus Lee).

Any technology deemed "interactive" is also a logical candidate for cognitive applications. The interactive lesson was already mentioned. Also included on the list is the interactive whiteboard and

Figure 6. Adult Learner Lesson Plan Template (cumulative)



Focus on the Learner

Grade Level: **200-level Science Elective**

Psychology of the Lesson: Cognitive

Major **instructional application:**

☑ Discovery learning ☐ Reception learning ☐ Other ____________

Adult student characteristics targeted by this lesson plan:

☑ Problem-centered; seek educational solutions to where they are compared to where they want to be in life

☐ Results-oriented; have specific results in mind for education - will drop out if education does not lead to those results because their participation is usually voluntary

☑ Self-directed; typically not dependent on others for direction

☐ Often skeptical about new information; prefer to try it out before accepting it

☐ Seek education that relates or applies directly to their perceived needs, that is timely and appropriate for their current lives

☑ Accept responsibility for their own learning if learning is perceived as timely and appropriate the smart board, problem-solving software (nearly always interactive), and simulation software (again, almost always interactive).

CONCLUSION

Appendix B, Adult Learner Lesson Plan Template (Figure 6) demonstrates a completed **Focus on the Learner** portion of the template for developing an adult learner-oriented lesson on the Planets of the Solar System.

REFERENCES

International Association for Cognitive Education and Psychology. (2005). Retrieved from http://www.coged.org/about/

Knowles, M. S. (1968). Androgogy, not pedagogy! *Adult Leadership, 16*, 350-352, 386.

Knowles, M. S. (1980). *Modern practice of adult education: From pedagogy to andragogy*. Revised and updated. Chicago: Follett Publishing Company, Association Press.

Paivio, A. (1986). *Mental representations: A dual coding approach.* Oxford, UK: Oxford University Press.

Piaget, J. (1932). *The Moral Judgment of the Child*. New York: Free Press.

Piaget, J. (1947). *The Psychology of Intelligence*. New York: Armand Colin.

Piaget, J. (1954). *The Construction of Reality in the Child*. New York: Basic Books.

Piaget, J. (1958). *The Growth of Logical Thinking from Childhood to Adolescence*. New York: Basic Books.

Piaget, J. (1965). *Insights and Illusions of Philosophy*. London: Routledge and Kegal Paul.

Piaget, J., & Szeminska, A. (1941). The Child's Conception of Number. In H. E. Gruber & J. J. Voneche, (eds.), *The Essential Piaget* New York: Basic Books.

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

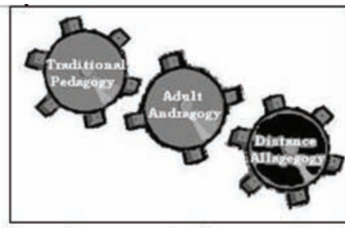
Chapter 3
Learning Theories and Allagegogy:
Teaching the Distance Learner

Learning Objectives. Chapter Three introduces the reader to the newest "ology" of teaching: allagegogy: "teaching to transform" as introduced by Priest (2002), to describe a newer approach to education that focuses on learner independence and the inherent changes that define lifelong learning. Linked closely to allagegogy is the humanistic school of educational psychology. From the humanistic perspective, teachers are concerned with making learning responsive to the affective needs of their students, those related directly to the student's emotions, feelings, values, and attitudes. This goal of this chapter is to familiarize the reader with:

- The nature of the distance learner and characteristics inherent to allagegogy, including the ability to work independently or in a group, completing assignments and readings with minimal supervision, writing in a clear and articulate manner, managing time, using different delivery formats, and working with technology tools.
- A different perspective on accepting learners needs and purposes and creating educational experiences and programs for the development of each student's unique potential.
- Recognizing the importance of human feelings, values, and perceptions in the educational process while developing a learning climate that is challenging, understanding, supportive, exciting, free

DOI: 10.4018/978-1-60566-824-6.ch003

Figure 1. Distance Lesson Plan Template (Focus on the Learner)



Focus on the Learner

Grade Level: **Science Online**

Psychology of the Lesson: Humanism

Major **instructional application:**

☐ Open education ☐ Cooperative learning

Distance learner characteristics targeted by this lesson plan:

☐ Self-motivation

☐ Time management skills

☐ Self-discipline

☐ Reading comprehension

☐ Persistence

☐ Availability of time

☐ Ability to use a desktop or laptop computer, printer, software, and Internet

☐ Typing speed and accuracy

from threat, and instills a genuine concern and respect for the worth of others and skills in resolving conflicts.

- The major theorists of humanism to include Abraham Maslow, Lawrence Kohlberg, and Carl Rogers.
- The major instructional applications of humanistic psychology to include: moral character education, open education, and cooperative learning.
- The key criticisms of humanism and the distance learner.
- Humanism and the Engine for Designing Technology-based Instruction

Lesson Plan Template. Refer to **Appendix C, Distance Learner Lesson Plan Template** as the chapter discusses **Focus on the Learner** as depicted in Figure 1.

INTRODUCTION

Teaching at a distance has come to be accepted as a natural outgrowth of behavioral and cognitive psychologies that have produced successful learning outcomes over the years. From these early beginnings came a growing research base that continues to identify qualities inherent to successful distance learners but can no longer be explained by considering only the environment or schemata alone. Characteristics for successful instruction continue to include demographic variables such as age, gender, and ethnic background as well as situational variables including prior knowledge, knowledge acquisition, and age-stage implications. Today's online learning management systems used in distance learning settings facilitate and guide a new assortment of learners through the educational process.

Allagegogy. In much the same manner as pedagogy is defined as the study of learning in children and andragogy is the study of learning in adults, allagegogy is defined as the study of transformative learning, a relatively fresh term coined by Simon Priest (2002) to emphasize a new path that focuses on learner independence and the effects of change on teaching and learning. Allagegogy seems the natural outgrowth of teaching and learning at a distance and so is linked in this text to teaching the distance learner.

Allagegogy has its own set of characteristics unique to transformative learning and distance education. For example, self-determination is a key characteristic of the transformative learner as one who decides the who, what, where, when, why, how, and whether learning occurs while the teacher assumes a more supportive role. Also, the transformative learner has evolved to become more self-sufficient, taking on greater and greater accountability for learning how to learn. The distance learner is driven by the need for change with technologies as the conduit for gathering global information. As the transformative learner matures, they accumulate the change tools needed to advance their own learning agendas.

Characteristics inherent to allagegogy include the ability to work independently or in a group, complete assignments and readings with minimal supervision, write in a clear and articulate manner, manage time effectively, learn using different delivery formats, and work with a host of technology tools.

Implications for the Distance Learner. As the first component of the Engine for Designing Technology-based Instruction, learning theories in general encourage designers to develop lessons that combine principles from pedagogical and andragogical learning theory to produce a lesson that truly targets the widest possible audience of distance learners. Lessons designed for the distance environment should take into account that some of their target learners anticipate content that must be mastered (behavioral) as well as those who expect exposure to problem-based, real-world experiences (cognitive). The first component of the Engine produces lessons that consider these initial competencies while moving towards truly distance (i.e., allagegogical) education designed with a set of prejudged skills; namely, the ability to learn independently or in a cohort, writing and time management skills, and technology literacy.

Orientation to Humanism. During the late 1940's, a new psychological perspective emerged from the real-world applications of psychology that were underway. These purposes spilled over into research efforts in the learning process by both accident and intent. The movement that grew out of this perspective became known as Humanistic Psychology and attempted to understand behavior from the point of view of the *behaver* rather than the observer. Arthur Combs (1971) was one of those early pioneer humanists and his statement is one of the recognized credos of the early humanist:

"To understand human behavior...it is necessary to understand the behaver's perceptual world, how things seem from his point of view. This calls for a different understanding of what the 'facts' are that

we need in order to deal with human behavior; it is not the external facts that are important in understanding behavior, but the meaning of the facts to the behaver. To change another person's behavior, it is necessary somehow to modify his beliefs or perception. When he sees things differently, he will behave differently."

For the humanist, several mantras come to mind. The Irish live by the maxim, "No one cares how much you know until they know how much you care." Another axiom, attributed to Native Americans and pertaining to human understanding goes like this: "to really understand another person, it is necessary to walk a mile in his shoes." To truly grasp the human condition behind the behavior of a student, the teacher must determine how that student perceives a particular situation. What appears to be strange or unusual behavior may be something else entirely when considered from the other person's viewpoint. Students who fail to achieve the scholarly recognition, individual status, or interpersonal prestige in school often find disruptive actions their only alternative.

Humanism has taken on several forms since its inception. The battle between secular and religious humanism advocates is not so much over the possible forms of human actions than it is about their cause (i.e., worldly versus spiritual). For purposes here, humanism as it is understood in education holds that knowledge and learning is an attempt to explain and advance human intellect. Educational humanists believe that what is best for the brightest learners is the best for all learners.

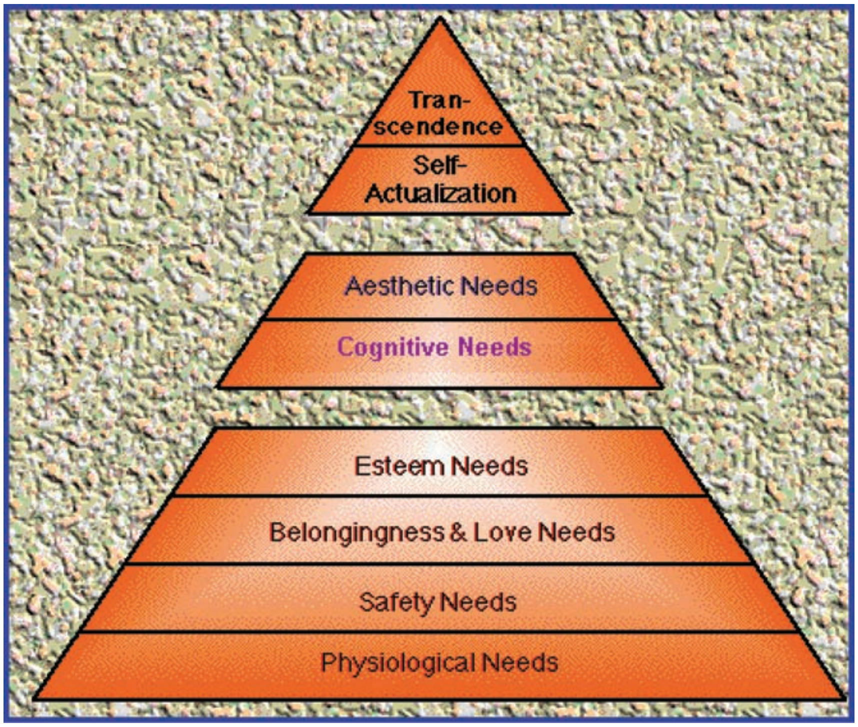
Implications for the Distance Learner. Humanism and its emphasis on internalization is the most appropriate educational psychology for the distance learning environment. Humanists see two parts to learning: the acquisition of information and the personalization of information. According to the humanist, teachers often make the mistake of assuming that students will learn if the subject matter is properly organized and presented (the behavioral bent to learning). However, meaning is not always intuitively apparent in the subject matter presented even if that information is clearly offered. It is the individual learner that instills meaning to a lesson. The teaching dilemma (especially when teaching at a distance) is not how to present subject matter but how to help students derive personal meaning from the information to ensure that learning has occurred. The theorists and applications of humanism suggest further considerations towards this ambitious end.

THE MAJOR THEORISTS OF HUMANISM

Abraham Maslow and the Hierarchy of Human Needs

Abraham Maslow has long been recognized as one of the leading proponents of humanism. His work in the area of self-actualization has been adopted by education and business communities worldwide. In sync with most humanists of his time, Maslow rejected the fashionable beliefs of the 1950s and 1960s that human beings are somehow manipulated by the forces of the environment (i.e., stimuli and reinforcements) of behaviorism or the structured adaptations (i.e., assimilation and accommodation) of the cognitivist. Rather, the humanist focuses upon the intrinsic. They see their fellow human beings as capable of higher level of ambitions and motivations. Humans are by their very nature creative, conscious, and wisdom-seeking. They are inherently drawn toward learning and need very little incentive to pursue an education.

Figure 2. Maslow's Hierarchy of Human Needs (adapted from Maslow, 1971)



Maslow posited a hierarchy of human needs based on deficiency needs and growth needs. Within deficiency needs, lower levels must be satisfied before the individual will pursue the next higher level. Even after such needs has been met, the individual will return to previous levels should a deficiency be detected again. An individual is ready to act upon the upper-level growth needs if and only if the deficiency needs are met.

In his earlier writings, Maslow's identified only the top two levels of his hierarchy: self-esteem and self-actualization. At the pinnacle of the pyramid, self-actualized people are characterized as being problem-focused, manifesting a true appreciation for life, evidencing a real concern for personal growth, and possessing an uncanny aptitude for personal and interpersonal experiences.

Later, he would expand upon his theory identifying two additional higher-level growth needs, cognition and aesthetics, as well as an additional "super-level" called self-transcendence. Self-fulfillment and realizing one's potential now takes a secondary role to the ability to connect to something beyond self and to help others find personal self-fulfillment and potential. (Maslow & Lowery, 1998 and Maslow, 1971). The resulting pyramid of Maslow's hierarchy of needs is now depicted in Figure 2.

Each level of the hierarchy is defined below. Deficiency needs include the following four levels:

- **Physiological/Biological** needs are the most demanding. Only after hunger, thirst, and the need for shelter have been satisfied, do the needs at the next higher level emerge.
- **Safety** needs include security, protection from physical and emotional harm, and the desire for good health.

- **Belonging and love** seek the need for family and friends in the individual and the feeling of acceptance and friendship in relations with others.
- **Need for esteem** follows and moves the individual to their first internal demand for self respect, autonomy, achievement along with status, recognition, and attention.

Growth needs, according to Maslow, now encompass the top four levels, as follows:

- **Cognitive** needs include the necessity for understanding and exploration and houses the level of the hierarchy in which education, teaching, classroom instruction occurs. Amazingly, this was a recognized former weakness in Maslow's previous pyramid that included only 5 levels. Educators were never quite sure where teaching and learning resided and which levels of needs had to be satisfied before classroom instruction could be effective. Now we know – cognitive needs include most traditional classroom learning.
- **Aesthetic** needs look for symmetry, order, and beauty in the world. This level also includes the need to create and experience balance and structure.
- **Self-Actualization** assumes that lower needs have been satisfied; personal motivation is re-directed towards developing human potential.
- **Self-transcendence** connects to something beyond the inner person pushing the individual to want to help others find their own level of self-fulfillment while realizing their full potential as a human being.

Unlike the age-stage theories that are characteristic of the school of cognitivism, Maslow's hierarchy is not so well defined, not nearly as static in its development. Learners, in particular, shift between levels throughout the academic day and certainly throughout their school life. One day, a student may be able to transcend the deficiency needs to deal with classroom issues and everyday family demands. Other days, the student may regress back to the belonging and love or perhaps even safety-related essentials. The hierarchy of human needs does not exist in a vacuum, but is affected by the ever-changing situations and environments.

An important attribute of the pyramid at the lower level of deficiency needs is the lack of motivation even when these needs are satisfied. Resolving issues of food, for example, is not a motivator in the classroom – a fact that many early childhood advocates have come to realize even after a successful implementation of a school breakfast program. Gratifying deficiency needs does not increase student achievement.

Implications for the Distance Learner. Maslow's Hierarchy of Human Needs has important implications for those working with distance learners. Although distance instructors rarely need to deal with issues of physiological or safety needs, concerns associated with establishing interpersonal relationships, overcoming peer pressure, and gaining acceptance (Level 3) are often manifested in online synchronous activities such as discussion groups and chat rooms.

Moving the distance learner to the realm of cognitive needs demands the professional maturity of a seasoned instructor who can guide the learner using opportunities that entail understanding and exploration. It is important that both students and teachers be active participants in distance learning rather than being passive academic bystanders. Distance educators must encourage students to share relevant ideas, event announcements, web sites, and other items and stories from their personal histories as a means of connecting instruction in the virtual classroom to the world outside.

Maslow would have the distance learner take full advantage of every method and form of working and studying collaboratively, consulting with online experts in addition to the instructor, searching out reference libraries and web sites, and brainstorming and discussing ideas, projects, and possibilities with other online students, teachers, and experts both inside and outside the distance learning environment.

Tomei (2006) explored the major instructional tasks expected of an online teacher. In his work, he found humanistic characteristics in each of the three key areas of instruction, counseling, and assessment. In his graduate-level courses, online learners submitted weekly emails to the instructor to validate their progress. As they completed each session, students posted a synopsis of the readings and assignments in a threaded discussion group. Finally, students submitted two projects and an electronic portfolio to the instructor as email attachments. During a typical semester, delivery of instructional content using humanistic devices accounted for some 60 hours (40%) of an instructor's planned teaching load. Student counseling and advisement, in the form of email and online chat room office hours, replaced traditional face-to-face interaction for offering academic guidance. This humanistic element of online teaching added another 40 hours (25%) to the teaching load. Finally, online quizzes and electronic portfolios provided the most popular methods of online formative evaluations and completed the available teaching load by 56 (35%) hours.

Maslow seems to have proven his point that humanism and the distance learner operate on various levels simultaneously and each level should be considered by the teacher when operating in an online course environment.

Carl Rogers and the Freedom To Learn

Carl Rogers was an advocate for more personal and meaningful instruction. His contributions to this school of educational psychology support are best understood by examining his principles for learning. First, Rogers believed that humans have a natural desire to learn, supported by his observations of the innate curiosity of children as they explore their environment. They are eager to learn, discover on their own, and explore their surroundings in an attempt to construct meaning about the world around them, even if it is sometimes wrong. For the adult learner, Rogers cautioned about a decline in this natural instinct perhaps brought on by years of formal schooling.

His second major principle involves significant or meaningful learning that occurs when students perceive new knowledge as relevant to their own needs and purposes – a principle properly attributable to adults. Learning is most successful when the information received has immediate, practical application.

Third, Rogers sees a learning environment free from threat as the right of every student. The process of learning can be enhanced if students have the range of freedom that can test their abilities, allow for new experiences, and even experience mistakes without the sting of criticism and ridicule.

Fourth, for the humanist, learning is most significant and efficient when it is self-initiated and when it involves both the feelings and the mind of the learner. Self- directed learning is motivating; the whole-person learning approach encourages feelings of responsibility for selecting individualized learning objectives and alternatives. If learning is personal, it will promote feelings of belonging evidenced as intrinsic motivation for even more learning (i.e., professional development over the life of a career).

Fifth and finally, Rogers valued the efficacy of learning about the process of learning (i.e., metacognition). Metacognition, or learning about learning, is a task that many teachers recognize but few address. Students are known to complete an entire school career without being confronted by the question of how they learn. For Rogers, this capability in students to learn in a constantly changing environment embodied the allegory: "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." The same concepts hold true for humanistic teaching.

Implications for the Distance Learner. For Carl Rogers, the humanistic teacher is primarily a facilitator of learning in contrast to the behavioral or even the cognitive teacher who assumes more of the responsibility for the learning process. For Abraham Maslow and his advocates, the humanistic teacher shares the responsibility for instruction and learning with the student. The distance education teacher acts as guide and model, providing learners with the resources they will need to decide how they will learn. Technology comes into play as a vehicle for offering the realism, real-world, genuine experiences that defines the relationship between teacher and student.

MAJOR INSRUCTIONAL APPLICATIONS OF HUMANISTIC PSYCHOLOGY

Open Education

In the late 1960s, a study advocating the open classroom (or "classroom without walls") was introduced into elementary education. The concept of an open classroom was quick to spread to schools throughout the United States and its many advocates, perhaps unconsciously, stumbled over the earliest precursors of distance education as both a philosophy of education and application of humanistic and cognitive psychology. Prominent educators have built a list of eight themes commonly attributed to open education. They include:

- **Provisions for Learning**. Manipulative materials are supplied in great diversity and range, particularly true of distance environments. Learner move among various resources freely and collaboration is encouraged.
- **Humaneness, Respect, Warmth**. Use of student-made materials is encouraged. Later, in Chapters Seven, Eight, and Nine, readers will be introduced to the hyper book, the interactive lesson, and the virtual tour – three user-friendly applications of common office productivity software that can help learners as well as teachers develop technology-based lesson materials. Teachers deal with behavior problems by communicating with the student without involving the group.
- **Self-Diagnosis of Learning Events**. Students do much of the diagnosis themselves while the teachers observe and ask questions. Technology can play a key role in this phase of open education, offering the learner and the instructor a unique set of features that are inherently suited for teaching at a distance. For example, students need not depend on the instructor to assess their progress in class. Objective tests, built into every online learning management system, offer the following advantages:
- **Advantages of Self-Diagnosis for the Learner**
    - **Ability development** – presents a variety of opportunities to practice skills already learned
    - **Stimulus** for learning **-** helps establish personal priorities and motivations for learning
    - **Assessment -** identifies difficulties and weakness
    - **Recognition -** acknowledges effort spent learning
    - **Delivery of instruction** – rapid delivery of assessment results to students

    - **Formative assessment** – facilitates reflective learning and provides both students and instructor "mid-course" evaluation toward satisfying learning objectives
- **Advantages of Self-Diagnosis for the Instructor**
    - **Supports distance learning** assessment
    - **Reduces administrative overhead** and allows more time on the instructional task at hand.
    - **Supports both formative and summative assessment** for the inline instructor
    - **Reporting software and instant feedback** offers additional tools to help the instructor with item analysis and course level learning outcomes.
    - **Selection of assessment formats** varies by learning management system and instructor. Graphics and multimedia are additional options for use in assessment tools.
    - **Tests can be scheduled automatically**
    - **Adaptive testing** can be used to match the test to the students' ability
    - **Assessments can be repeated** as frequently as desired to aid student learning
    - **Questions may be reused** in future assessments or in follow-on formative assessments. Questions can be randomly ordered as well as the alternatives presented to the learner. Also, many publishers now release large **question banks** that are easily uploaded into the assessment tools of state-of-the-art learning management systems

Implications for the Distance Learner. Evaluations of open education program generally show that these approaches are slightly more effective than traditional classroom education in improving affective (but not necessarily academic) outcomes. It was found that open classrooms were moderately more successful in improving cooperation, creativity, achievement motivation, and independence. However, on measures of academic achievement, traditional classrooms still rank as clearly superior. These findings are important considerations for the distance educator.

It appeared that while open classes improved the affective outcome, it was often conducted at the expense of student progress in language, math, and reading. In recent literature, educators are urging teachers to reconsider the use of the open classroom. At the very least, more monitoring of student progress is in order so that basic skills are not neglected.

Cooperative Learning

When teachers, traditional or distance, first hear the term cooperative learning, many difference images emerge. Some think that assigning individual projects and allowing students to interact so they can check their own progress meets the criteria for cooperative learning. Others think of students sitting with each other as they do their homework, or asking questions of each other via a chat room or discussion group. Unfortunately, none of the above examples describe this aspect of humanistic psychology and such teaching tactics do little to impart effective instruction to the online student. Still cooperative education has its place in distance learning. For a lesson to be considered cooperative learning, it must exhibit five basic elements:

- **Positive interdependence**. Students must perceive that they the learning is a collaborative effort with ramifications as to the group success or failure of the experience. Common goals are shared by the group as they carve up tasks, divide resources and information, assume responsibility for variously defined roles, and, most importantly, receive their rewards based on group performance.

- **Face-to-Face interaction**. Cooperative education learners discuss the nature of the task; decide how best to approach the assignment, and help each other understand how to solve problems. The importance of helping others is stressed.
- **Individual accountability**. Each student must develop a sense of personal responsibility for themselves and also to the group. This particular aspect of cooperative learning is most prone to be discounted when applied in an online class situation where group discussions and chat sessions are often monopolized by a few of the more opinionated students. A key to success is for each member to master material and be afforded the opportunity to share their ideas so they help other members of their group and, together, achieve success.
- **Collaborative skills**. Placing students in virtual groups and telling them to work 'cooperatively' is a formula for disappointment unless the learners are taught the necessary social skills – and that includes the skills that have come to be known as "netiquette." (see Table 1).
- **Group processes**. This element of cooperative learning occurs when groups discuss and evaluate their own progress and maintain effective working relations among members of the group.

In a cooperative learning environment, students work together in small (4-6 members) teams that remain stable in composition for many weeks. There are numerous ways to organize the classroom, be it traditional or virtual:

- *Teams-Games-Tournaments (TGT)*. In TGT, students of different abilities, race, and gender are assigned to teams. They work together, using quizzes and "games," to prepare for the weekly tournaments. Students are then assigned to "tables" in which they compete with students of similar abilities. As a result, the lowest achieving student has the same opportunity to earn points for their team as higher achievers.

Table 1. Common Netiquette

Common Sense Netiquette Rules • E-mail Netiquette • Use Meaningful Subject Lines • Don't Type With ALL CAPS • Quote Select Parts Of A Previous E-Mail • Be Mindful of Attachments • Don't Spam • Don't Pass Around E-Hoaxes • Don't Pass Around Chain Letters
Chat Room Netiquette • Avoid using all caps • Decide what tone the conversation has before posting • Don't "flood" the chat room • Don't flirt with everyone in the chat room
Best Net Practices • Be aware of basic privacy issues • Be very cautious of revealing personal information • Do not discuss any details that relate to personal finances • People are not always who they say they are online • Be extra cautious about children privacy • Do not to steal other people's work

- *Student Teams-Achievement Divisions (STAD)*. A STAD environment uses the same 4-6 member team composition but replaces the tournament with 15-minute quizzes. Individual scores are translated into team scores and additional points are added for improvement.
- *Jigsaw*. Students are assigned to small, heterogeneous groups and given a portion of the lesson which they must first learn, then teach to other members of their group. The group is evaluated on the material once all the teaching is completed.
- *Group Investigation*. Projects are the focus of this format of cooperative learning. Teams divide the project tasks into subtopics and assign them to team members. Projects are then presented to the class with each member providing his/her portion of the effort.

Implications for the Distance Learner. In most cases, research has found a positive effect on student achievement in a cooperative learning environment, especially online. When teaching at a distance, affective learning becomes an even greater challenge. Cooperative learning experiences help overcome these shortfalls by improving peer perceptions, accepting students, and establishing expectations. The key determinant of the successful application of cooperative learning, however, remains with the proper preparation of the student and the group before entering into a teaching-learning application. Researchers have presented a number of interpersonal skills that are pivotal to the successful employment of cooperative learning in a virtual classroom. They include:

- **Forming**. Forming skills are needed for organizing the group and for establishing minimum norms of appropriate behavior. Examples: staying on task by using the calendar or appointment book features offered by most commercial distance learning environments.
- **Functioning**. Functioning skills involve managing and implementing the group's efforts to accomplish tasks and to maintain effective working relationships among its members. Examples: using group discussion board to solicit ideas that will facilitate when and how to ask for help, clarifying another's position.
- **Formulating**. These skills are directed at helping students to understand and remember the material being studied in the group. Examples: encouraging the group to summarize, using online strategies such as anecdotal notes or comments to remember important ideas.
- **Fermenting**. Fermenting skills stimulate academic controversy so that students will rethink and challenge one another's positions, ideas, and reasoning. Examples: Sound adherence to netiquette rules promotes critical thinking without harming relationships. Knowing how to probe for information and arriving at possible solutions to problems is a cooperative learning skill that should be introduced and encouraged throughout the online course.

Key Criticisms of Humanism and the Distance Learner

Much of the criticism of humanistic education comes from the misplaced conviction that students will learn if they are free of externally directed influences and allowed instead to decide what they want to do in the classroom. The humanist would reject that notion as a trademark of its theoretical base. Each of the other schools of educational psychology, in turn, has both a rationalization for these humanistic shortcomings and a resolution.

The behaviorist complains that humanistic teachers are deluding themselves into thinking that less teacher control implies more student control or that less teacher control is somehow more beneficial to learning. Ashe states, "[students] then simply come under the control of other conditions and we must look at those conditions and their effects if we are to improve teaching" (Skinner, 1999). The teacher who truly understands the behavioral process can help student learn to be free and happy as a result of acquiring the knowledge and skills to become productive individuals.

Although the humanist is more closely aligned with the cognitivist, they too have similar misgivings about the humanistic approach. For the cognitivist, there is an absence of clear direction or purpose in the classroom - direction that provides the structure for new knowledge to be constructed and new information adapted into existing schema. Mastery of basic skills is in serious question in an environment that supports such unstructured exploration.

HUMANISM AND THE ENGINE FOR DESIGING TECHNOLOGY-BASED INSTRUCTION

Application. Humanistic education advocates for a wide variety of skills such as reading, writing and mathematics needed to function in today's world. However, these are considered lesser goals when matched against skills in communicating, thinking, decision-making, problem-solving and knowing

Table 2. Humanistic Tools for Instructors Found in Learning Management Systems

Course planning	
Course managing	
Fast course revising	
Course monitoring	
Instructional designing	
Presenting information	
On-line testing	
On-line grading	
Managing records	
No HTML knowledge required	
Customization of student curriculum	
Student tracking	
Automated grading	
Level of control over design	
Instructor can assign specific course material to individual or group of students	
Multiple choice self test tutorial questions - (automatic marking)	
"Fill in the blank" self test tutorial questions - (automatic marking)	
Customized feedback to tutorial questions	
Redirect path of tutorial depending on question answers	
Timed quizzes (graded with permanent mark retention)	
On line marking and grades management of timed quizzes	
Generate random set of questions	
Allows developer to preview course as a student	

oneself. Humanistic education helps learners believe in themselves and understand their potential while promoting self-respect and esteem for others. Humanistic education deals with basic human concerns – with improving the quality of life through the pursuit of knowledge and meaningful inter and intra-personal relationships.

The most widely accepted technologies for teaching at a distance properly address these ambitious aspirations. Examine the extensive list of tools found in Table 2 found in 12 of 20 of the most popular online learning management systems including Blackboard, Web CT, eCollege.com, IntraLearn, and TopClass, Learning Manager, and WebMentor.

For distance educators, each of these tools plays an important role in "humanizing" instruction. For example, automated grading allows students immediate access to their assessment (e.g., quizzes, exams, even rubric-graded projects). Tracking tools permit instructors to monitor student progress with minimum intervention. The most powerful of the humanistic tools is the personalization of course materials based on individual or group needs.

For the distance learner, a dissimilar but equally as powerful set of tools (See Table 3) can be dropped into the distance environment providing humanistic opportunities for individualized and group learning.

Table 3. Humanistic Tools for Students Found in Learning Management Systems

Authentication	
Bookmark management	
Multimedia support	
Private e-mail	
File submissions	
Threaded discussions	
Course Chat rooms	
Logged chat	
Whiteboard	
Self-assessing	
Progress tracking	
Desktop based file management for uploading to server	
Study skill building	
Un-timed quizzes	
One question-at-a-time function	
Bulletin board/conferencing tools	
Image database	
Student access to own grades	
Access to course grade distribution	
Automated glossary tool	
Automated index tool	
Online assistance	
Search tool for course content	
Student presentations area	
Allows students to view all current courses in which they are registered after logging in	

Figure 3. Available Humanistic Technologies

	Behavioral	Cognitive	Humanistic		Behavioral	Cognitive	Humanistic
Audio Cassette Recorders			X	MIDI Interfaces			
Black & White Printer				Moodle			
Cable Television			X	Multimedia Carts			
Calculators/ Graphing Calculators				Multimedia Computers			
Camcorders				Music Synthesizers			
Cassette Player				Newsgroups			X
CD Player				Office Productivity Software			
Chat Room			X	Overhead Projectors			
Classroom Carts				Personal Response Systems			
Color Printer				Podium			
Computer Assisted Instruction				Portable CD/Tape Players			
Computer classrooms				Portable Public Address Systems			
Computer Labs				Portable Screens			
Conference Phone			X	Power Point			
Copier				Probe			
Data projectors				Problem Solving Software			
Databases				Scanner			
Desktop Publishing				Simulation Software			
Digital Cameras				Slide Projector			
Digital Microscopes				SmartBoards			
Digitized Encyclopedias				Sounds			
Document Camera				Spreadsheet			
Drawing Tablets				Tablet PCs			
Drill and Practice Software				Transparency Projector			
DVD				Tutorial Software			
Electronic Mail			X	TV			X
E-Mail Mailing Lists			X	USB "Key Chain" Flash Drives			
Excel				VCR			X
Fax Machine				Video (Film, Videotape, Laser)			X
Games				Video Projectors			
Geocaching			X	Videoconferencing			X
Graphic Presentation				Virtual Tours			X
Groupware				Voice recorders			
Handhelds				Web Cams			
Hypertext/Hypermedia/Hyperbook				Web Conferences			X
Interactive Lesson				Web Site			
Interactive Whiteboard			X	Web Surveys			
Internet			X	Wired Microphone			
Keyboarding				Wireless Computing			
Laptops				Wireless Network Access			
LCD Projector				Word Processing			
Lecture recording system				World Wide Web			X
List Servers			X				

Email, chat rooms, threaded discussions, bulletin boards, and multimedia support are the most tools selected by students. While these tools have been available at least since the 1990's (several earlier than that), some of the newest tools for humanistic learning include study skill building features, glossary and index tools, student presentation areas (which usually include an online development and storage area), online assistance (usually from several sources simultaneously), and bookmarking management which keeps favorites synchronized on all the various machines used to take an online course.

Technologies (SeeFigure 3, Available Technologies for Distance Education). Interactive technologies comprise the majority of humanistic tools. In addition, a few of the tools that were identified with the previous cognitive school of educational psychology also show up here as well. For example, television, VCRs, and video players serve both as cognitive scheme-building tools and as devices for humanistic self-development and personalization of instruction. Alternatively, several tools focus particularly on humanistic teaching including conferencing via video, web, or phone. Some of the issues surrounding the use of conferencing technologies include:

a. Time spent in video lectures. Recommendations from the literature suggest that lectures of any kind be limited to 50 percent with an ideal ratio closer to 30 percent.
b. Time spent lecturing at any given time. Recommendations are less than 20 minutes at a time.
c. Timing of breaks and course modules to avoid weariness, lack of concentration, and fatigue.
d. Use of remote facilitators or guest lecturers to conduct all or part of the lesson.
e. The need for advanced organizers (yes, a trick taken from the cognitivists) to ensure the learners know what to expect from the lesson before moving very far into the instruction.
f. Decisions regarding conferencing connectivity versus accessibility and cost. Lessons delivered via phone conferences are less expensive and often more reliable than video connections, especially to remote location.
g. Technology support needed to make the lesson a success.
h. Enough time built into the lesson for evaluation

Figure 4. Distance Learner Lesson Plan Template (cumulative)

Focus on the Learner

Grade Level: **Science Online**

Psychology of the Lesson: Humanism

Major **instructional application:**

- [ ] Open education
- [x] Cooperative learning

Distance learner characteristics targeted by this lesson plan:

- [ ] Self-motivation
- [x] Time management skills
- [x] Self-discipline
- [ ] Reading comprehension
- [x] Persistence
- [x] Availability of time
- [x] Ability to use a desktop or laptop computer, printer, software, and Internet
- [ ] Typing speed and accuracy

CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on the Learner** portion of the template (Figure 4) demonstrates how to develop a distance learner-oriented lesson on the Planets of the Solar System.

REFERENCES

Combs, A. W., Avila, D. L., & Purkey, W. W. (1971). *Helping Relationships: Basic Concepts for the Helping Professions*. New York: Allyn and Bacon, Inc.

Maslow, A. (1971). *The farther reaches of human nature*. New York: The Viking Press.

Maslow, A., & Lowery, R. (Eds.). (1998). *Toward a psychology of being* (3rd ed.). New York: Wiley & Sons.

Priest, S. (2002). *Technology think tanks in experiential learning*. Unpublished manuscript.

Skinner, B. F. (1999). *Beyond Freedom & Dignity*. New York: Bantam/Vintage Books.

Tomei, L. A. (2006). Online Teaching and Its Impact on Higher Education Faculty Load: Computing Ideal Class Size for Undergraduate, Graduate, and Doctoral Online Courses. *Journal of Technology and Teacher Education, Assn for the Advancement of Computing in Ed, 15*(3).

Section 2
Focus on Learning

Traditional domains of learning. There is more than one type of learning. A committee of colleges, led by Benjamin Bloom, began an ambitious undertaking as the direct result of discussions held during the 1948 Convention of the American Psychological Association. Bloom gathered a select group of educators who accepted the challenge of classifying educational goals and objectives. The group met from 1949 to 1956 when they published the Taxonomy of Educational Objectives: The Classification of Educational Goals and labeled for the first time, the three primary domains of learning: cognitive, affective, and psychomotor. These traditional domains involve mental skills, feelings and attitudes, and tactile competencies.

The taxonomies that they collectively created carried certain common assumptions concerning educational objectives. These assumptions were reflected in all three domains of learning. Specifically, the taxonomies were arranged in a hierarchy from less to more complex. They recognized a range of learning outcomes from simple to more complex and they viewed learners as advancing through a series of increasingly complex levels in much the same order and about the same age. Although the stages of the taxonomies are consistent, learners can perform at different levels at the same time when addressing different competencies.

Cognitive, affective, and psychomotor domains. ***Chapter Four: The Cognitive, Affective, and Psychomotor Domains: The Taxonomy of the Traditional Learner***, examines the major categories of the first three taxonomies of educational objectives. Fairly familiar to most educators, the time-honored classification systems begin with cognition at the knowledge, comprehension, application, analysis, synthesis, and evaluation levels. The affective domain of learning encompasses receiving, responding, valuing, organization, and characterization by a value. The levels of the psychomotor domain include perception, set, guided response, mechanism, overt response, adaptation, and origination. Educators at all levels (elementary, secondary, post-secondary, and corporate) have studied, applied, and assessed their lessons using one or a combination of these original taxonomies.

Higher order domain of learning. Adult learners are considered *autonomous* and *self-directed*. Active involvement in the instructional process often transfers the learning from the instructor to the adult as they become the principal facilitators of their own learning. They are often characterized by the quantity and quality of *experiences* and *knowledge* that they bring to the classroom. Adults are considerably more *focused than children*. When they enroll in a course, they usually know what they want to attain. **The higher order learning domain** encourages the instructor to link these demands from the adult learner to the role of the instructor, and lifelong experiences into a cohesive teaching strategy. Andragogy and pedagogy are distinguished as technology-based instruction is applied to adults versus delivered to children.

In ***Chapter Five: The High Order Learning Domain of the Adult Learner***, readers become familiar with the K-A-RPE Model that differentiates teaching and learning at three strategic levels of adult learning. The characteristics of the higher order learning domain introduce the adult as learner, expert, and scholar. And, numerous tips and techniques as well as appropriate instructional technologies for teaching adults are presented that support technology-based course delivery.

Technology domain of learning. Many educators now accept technology-based instruction as one of the most important instructional strategies to impact education since the text book. The Taxonomy for the Technology Domain, originally introduced in 2001, has continued to mature as a theoretical model for infusing technology into instruction and, specifically, the natural outgrowth of distance learning as a viable instructional strategy.

As the market for distance students continues to expand, the qualities of a successful distance learner have come under much scrutiny. The characteristics of distance learners are presented in ***Chapter Six: The Technology Domain of the Distance Learner*** along with literacy, collaboration, decision-making, technology for learning, technology for teaching, and tech-ology as the newest taxonomy for teaching and learning in the 21st century. The Taxonomy for the Technology Domain brings a new vocabulary of action statements to classify technology-based learning objectives and promote the effective use of technology for successful teaching and learning.

Summary. A focus on learning will equip the reader with the tools necessary to design instruction for the traditional, adult, and distance learner. Bloom's taxonomies for the cognitive, affective, and psychomotor domains target conventional learners. The higher order learning domain of the adult learner is supported by the K-A-RPE model of knowledge, application, research, practice and evaluation. Finally, the taxonomy for the technology domain focuses on the distance learner with its hierarchical levels of literacy, collaboration, decision-making, technology for learning, technology for teaching, and tech-ology.

Section 2 of the **Engine for Designing Technology-Based Instruction** offers the educator the schemata for constructing new learning objectives at multiple levels. It encourages higher order thinking across five different domains of learning and encourages the best possible applications of technologies available for teaching in the 21st century.

Chapter 4
The Cognitive, Affective, and Psychomotor Domains:
The Taxonomy of the Traditional Learner

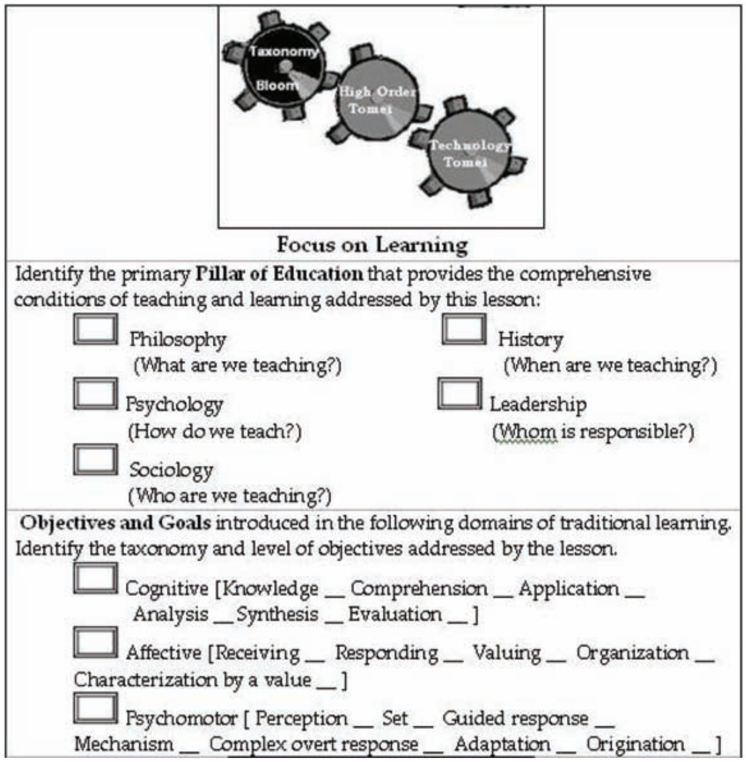
Learning Objectives. The Taxonomy of Educational Objectives, better known as Bloom's Taxonomy, is a classification system that governs how learning objectives are designed, implemented and assessed. First proposed in 1956, Benjamin Bloom began his scrutiny into educational objectives by exploring the cognitive domain (which will serve as the focus for this chapter). Later, with other colleagues including Lorin W. Krathwohl and S. R. Kibler, he considered the affective and psychomotor domains to round out his body of study.

Bloom's taxonomy differentiates six levels of teaching and learning: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. This chapter offers a perspective for developing instruction purposely targeting the traditional learner. Specifically, the reader will understand:

- The characteristics of the cognitive, affective, and psychomotor domains.
- The stages of Bloom's Taxonomy and its application to teaching and learning.
- The uses of the Taxonomy to plan and deliver instruction in the classroom or at a distance.
- Key instructional technologies supporting Bloom's Taxonomy and the cognitive domain of the traditional learner.

DOI: 10.4018/978-1-60566-824-6.ch004

Figure 1. Traditional Lesson Plan Template (Focus on Learning)



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☐ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☐ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the taxonomy and level of objectives addressed by the lesson.

- ☐ Cognitive [Knowledge __ Comprehension __ Application __ Analysis __ Synthesis __ Evaluation __]
- ☐ Affective [Receiving __ Responding __ Valuing __ Organization __ Characterization by a value __]
- ☐ Psychomotor [Perception __ Set __ Guided response __ Mechanism __ Complex overt response __ Adaptation __ Origination __]

Lesson Plan Template. Refer to **Appendix A, Traditional Learner Lesson Plan Template** as the chapter discusses **Focus on Learning** as depicted in Figure 1.

INTRODUCTION

The Taxonomy of Educational Objectives began as an ambitious project undertaken as the direct result of discussions held during the 1948 Convention of the American Psychological Association. Benjamin Bloom gathered a select group of educators who eventually undertook the complex task of classifying educational goals and objectives. The group met from 1949 to 1956 when they published the Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956).

One of the initial goals for building a taxonomy was to reduce the labor –intensive task of preparing questions for comprehensive examinations. Researchers explored several possible methods of classifying behaviors believed to be important for learning. The framework eventually produced taxonomies for three domains:

- **Cognitive domain** – focusing on knowledge, skills, and competencies and consisting of six levels;
- **Affective domain** – focusing on attitudes, feelings, and emotions and consisting of five levels; and,

- **Psychomotor domain** – focusing on fine and gross motor skills and consisting of six levels.

Bloom introduced the term "taxonomy" for his new classification system; a word not familiar to most within education. Bloom prevailed, however, and forever linked his name with taxonomy.

THE TAXONOMY MATURES

Common Characteristics of Taxonomies. Bloom identified six levels within the cognitive domain. As with most hierarchical classification systems, there are certain common characteristics.

First, the primary trait of any taxonomy is that its assumptions concerning educational objectives are arranged in a hierarchy from less to more complex.

Second, Bloom's taxonomy recognizes a range of learning outcomes from simple recall or recognition of facts at the lowest level of knowledge to the more complex and abstract mental levels. The highest level, evaluation, represents the most challenging cognitive skills.

Third, most learners advance through the six levels in much the same order and about the same time in their cycle of cognitive growth. This characteristic of age-stage classification is also found in most cognitive theories of learning and continues to remain a hotly debated topic for educators.

Fourth, although the stages of the taxonomy are consistent, they can be breached by learners; that is, learners often operate at different levels of the taxonomy based on the academic content (e.g., science and math versus language arts), levels of difficulty (e.g., basic instruction compared to complex concepts), and the instructor who may not realize the challenges confronting students when faced with instruction and evaluations on levels that do not sync.

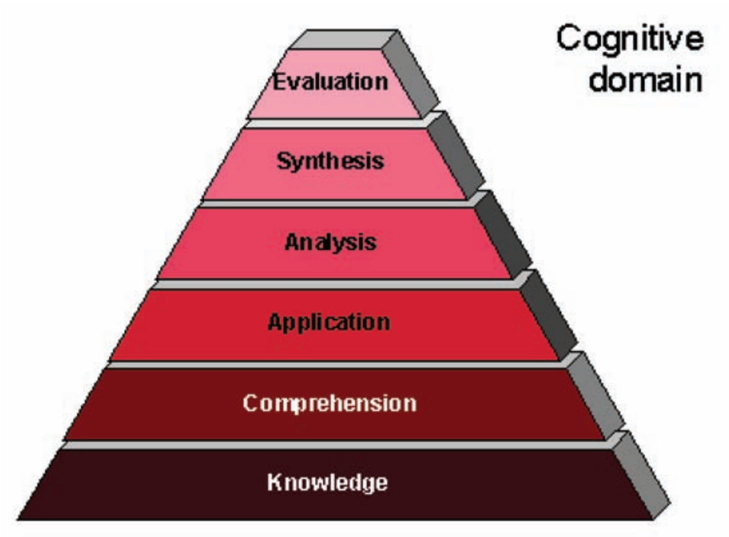
Finally, most teacher-made tests (and this is true in elementary, secondary, and post-secondary education) still focus on the lower levels of the taxonomy. Yet, research continues to show that learners are better able to retain what they have learned when they are asked to grapple with content presented at the higher levels of the taxonomy.

The Six Levels of Bloom's Taxonomy. A familiarization with each of the six levels (Figure 2) is necessary to understand how Bloom's Taxonomy of the Cognitive Domain impacts the traditional learner. As stated before, the levels of the taxonomy are cumulative; that is, each level incorporates learning at all previous levels. Also, the lower three levels (knowledge, comprehension, application) represent convergent thinking in which information learned at the first and second levels is brought together (converges) at the third level and applied. The upper three levels (analysis, synthesis, evaluation) describe divergent thinking processes whereby new insights and thoughts are developed that were not part of the original instruction.

Knowledge. Knowledge is defined as remembering previously learned material and represents the lowest level of learning outcomes in the cognitive domain. Knowledge may involve the recall of a range of material from specific facts to complete theories. Learners are expected to recall or recognize information, ideas and principles, and facts and figures in the approximate form in which the instructor presented the material. Learning objectives at this level emphasize simple reiteration of the knowledge, processes, or facts. Knowledge involves the recall of:

- **Specifics** (isolated, perhaps seemingly unrelated bits of information including dates, events, persons, locations, etc.);

Figure 2. Bloom's Taxonomy of the Cognitive Domain



- **Terminology** (i.e., verbal and non-verbal representations, properties, and attributes);
- **Procedures** (universal, accepted ways of studying, organizing and acting on specific information);
- **Routines** (usages, styles, practices, and forms best suited to deal with observable events or problems);
- **Series and Order** (recognition of processes in action, directions, movement, succession, or categorizations);
- **Criteria** (facts, principles, opinions, research, investigation – results that provide evaluation criteria later in the taxonomy);
- **Abstractions** (major schemes and patterns by which phenomena and ideas are organized
- **Generalizations** (principles by which the environment is abbreviated).

Learning objectives are used by teachers to describe (often in behavioral terms) the results of instruction specifically in terms of what learners will be able to do after completing the instruction. Learning objectives have three major components. They describe the: (1) specific actions that must be demonstrated by the learner; (2) conditions under which the learner must perform the task; and, (3) criteria for evaluating learning outcomes. Table 1 illustrates knowledge-based learning objectives in the cognitive domain taken from the end of a chapter review of a popular elementary school text book.

The first learning objective for language arts exhibits all three components. "Students will read Chapter 2, Sentence Structure…" provides the conditions under which the student will acquire the necessary information to successfully complete the objective. Next, the specific action expected of the student is described as "…restate the rules for using a periods, colons, and semicolons in a sentence…" Finally, "with only one error" is the criteria for success; more than one error by the student is not considered a mastered objective. If the criteria is not stated (as is the case in the second example objective for mathematics), the assumption is that no errors are allowed; the outcomes of the lesson must be perfect.

Table 1. Examples of Learning Objectives at the Knowledge Level

Language Arts	Students will read Chapter 2, Sentence Structure, and restate the rules for using a periods, colons, and semicolons in a sentence with only one error.
Mathematics	Identify the formula for the area of a circle from a list of three mathematical formulas. (Criteria missing)
Science	Draw a diagram that describes sexual reproduction. (Condition and criteria missing)
Social Studies	Define communism. (Condition and criteria missing)
Foreign Languages	Students will use the whiteboard to conjugate the Spanish word for travel within 60 seconds.
Arts/Music	Given a sheet of music, students will be able to identify the symbol for a half note. (Criteria missing, assume without error)
Physical Education	Define the correct distance of a marathon in miles on a map.
Computer Literacy	Explain the procedures for copying text from one document into another. (Condition and criteria missing)
Information Literacy	Describe at least five differences between a fiction and non-fiction book. (Condition missing)
Education	List the principles of behavior modification that enable teachers to maintain control of their classrooms. (Condition and criteria missing)

Table 2. Examples of Learning Objectives at the Comprehension Level Application.

Language Arts	Students will read Chapter 2, Sentence Structure, and describe in their own words when it is proper to use a semicolon instead of a comma in a sentence. (Weak criteria)
Mathematics	Given the mathematical formula for the area of a circle, rephrase the formula and explain the purpose of pi in the equation.
Science	Explain in own words what dominant and recessive gene are and how they affect human growth and development.
Social Studies	Explain why Columbus' theory of finding a shorter route to China was flawed using his speculations regarding the circumference of the earth.
Arts/Music	After our classroom discussion of DaVinci's work, put into plain words opinions about why the Mona Lisa is smiling.
Physical Education	Identify five key rules in baseball and re-state how these rules affect the game. (Combines knowledge with comprehension into one learning objective)
Counseling	In week seven of the AA program, the client will state all rules in the 12-step program that will help her overcome her addiction. (Statement contains all the required elements of a good learning objective)
Educational	Teachers will generalize how they would go about using accepted principles of behavior modification to maintain control of their classrooms. (Criteria very weak)

Other objectives in the table are not quite so complete and should be re-written to avoid confusion and misunderstanding between the teacher and the student.

Comprehension. Comprehension is defined as the ability to grasp the significance, importance, and implications of materials. Comprehension is demonstrated by rendering material from one form to another (e.g., symbols to words and numbers to words). It also is demonstrated explaining or summarizing data or by estimations or predictions. Learning outcomes at this level go beyond simple recall/ remembering and increases the learner's ability to make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implication. Comprehension involves:

- **Translation** (evidenced by accurately paraphrasing or translating content from one form to another as well as the ability to understand non-literal assertions such as metaphors and symbolism).
- **Interpretation** (revealed by reordering, rearranging, or offering a different perspective of the material presented.).
- **Extrapolation** (discloses the implications, consequences, continuation of trends, or effects of situations presented by the instructor or offered in the original communication.

Learning objectives at the comprehension level are most likely to omit one or more of the key elements of a good objective – and most often that element is the criteria. Comprehension is perhaps the least behavioral of Bloom's levels and, therefore, most difficult to differentiate. In Table 2, the use of words such as "rephrase," "explain," and "put into plain words" confuse the key advantages of using a taxonomy; that is, to develop learning outcomes that are readily identified and easily assessed. Still, objectives at this level of the taxonomy can be designed to encourage learners to add to their knowledge base of facts and information and focus on the significance, importance, and implications of instruction at hand.

Application refers to the ability to use instructional material in new situations, both concrete and abstract. Application includes the use of rules, generalized methods, broad-spectrum concepts, principles and procedures, laws, and overarching theories to carry out procedures, apply theory-based practice, solve problems, use information in new situations or otherwise apply what was learned in the classroom to novel situations in the work place or real world.

Learning outcomes here require a higher level of understanding than either knowledge or comprehension but, as with any taxonomy, rely on a familiarization and mastery of these previous levels before successfully dealing with objectives at this level. At this level, well-written objectives possess action in their wording and demonstrable results in their criteria for measuring success (See Table 3).

Analysis refers to the ability to break down information into its component parts in an effort to better understand (knowledge), recognize the message (comprehension), and employ (application) the material. As with previous discussions of the taxonomy, mastery of content at the lower levels is assumed. Analysis may include the identification of parts, analysis of the interrelationships, and recognition of the underlying organizational principles involved. Analysis involves:

- **Dissection and re-arrangement of elements** included in communication or instruction (i.e., the ability to recognize unstated assumptions or distinguish facts from hypotheses).
- **Scrutiny of relationships** (i.e., connections and interactions between elements of concepts, ideas, suppositions, and standpoints).

Table 3. Examples of Learning Objectives at the Application Level Analysis.

Anatomy Given a patient case description, determine the three most likely causes of dizziness. (All components of a well-written objective are present)
Instructional Design Utilize components of the Kemp Model to design an instructional sequence suitable for a visual learner. (Criteria is weak, condition is solid)
Mathematics Compute the area of actual circles. (Condition is missing; criteria is assumed to be 100% correct)
Foreign Languages In an actual conversation in Spanish, use the appropriate vocabulary words to compose a thoughtful response to questions posed by the instructor. (Well-written objective)
Social Studies In a classroom simulation, cite at least two examples of historical settings in which capitalism played an important role in the economics of the United States.
Physical Education After reviewing the team playbook for the season, recommend a specific alignment and roster of football players for selected case study plays and suggest how the zone or man-to-man defense might adjust to scrimmage line-up. (Criteria is implied, but still too weak to assess student outcomes)
Education When confronted with a real-world classroom situation, the student teacher will employ the principles of positive reinforcement to regain control of the classroom within five minutes.

- **Integration of organizational principles** (i.e., explicit as well as implicit structures, along with the bases and necessary mechanics to act on the resulting findings).

Learning outcomes at this level represent a higher intellectual level than comprehension and application because they require an understanding of the structural form of the material to effectively examine the content presented. From the example learning objectives presented in Table 4, identify the specific actions required of the target learner to break down content information into its component parts. In the next level of the taxonomy, these parts will be reunited.

Synthesis. Synthesis is the ability to re-assemble the parts (originally separated in the analysis phase of the taxonomy) to form a new whole. Synthesizing involves working with pieces, parts, elements, components, etc., and rearranging and re-combining them in ways that constitute clearly new information, patterns, or organizational schemes. Specifically, this level of Bloom's Taxonomy encompasses:

- Production of new material with unique content that was previously unavailable to the learner.
- Production of a new plan or new set of operational procedures for solving problems. For example, the novel organization of ideas and statements or a new set of procedures for solving a scientific or mathematical problem.
- Production of a unique communication scheme in which the writer or speaker attempts to convey ideas, feelings, and/or experiences to others in a previously untried manner. For example, using chat rooms, online discussion board, or videoconferencing as the media of transmission.
- Origination of a set of abstract relationships or concepts by combining known theories to classify or explain new data or phenomena using inductive or deductive reasoning skills.

Table 4. Examples of Learning Objectives at the Analysis Level

Language Arts Given a series of poems, identify the specific schema evidenced in each of the different poems as sonnets, limericks, free verse, or haiku and provide a rationale for selecting a particular style. (Excellent objective)
Mathematics Given a math word problem, differentiate the steps in the proper order necessary to solve a long division problem. (Criteria missing, but implied)
Science Given a primer on weather forecasting and meteorology, explain the distinct changing weather patterns that have been identified over the course of the last two weeks by using the information provided in the local newspaper.
Social Studies Explain the causes of the American Civil War from the perspective of economic factors that include mercantilism, sectionalism, and slavery and analyze how the results of the war impacted these factors into the 20th century.
Arts/Music Analyze DaVinci's Last Supper in terms of how well it uses various artistic techniques described in class to achieve its effect. (Criteria weak; objective will be difficult to assess).
Physical Education After watching the video film of a school football game, analyze the key plays in the game in terms of type of defense, type of offense, and the options exercised by both the defense and offense that affected its outcome.
Computer Literacy Given the rough and final drafts of a 10-page document written on a word processor identify the techniques the author would have used to transform the first document into the second.

Learning outcomes in this area stress creative behaviors with major emphasis on forming new patterns or organizational structure. To successfully synthesize information, learners must first work through the previous levels to gather the necessary knowledge, comprehension, experience, and analytical tools to reconstitute the information into new hypotheses for investigation. By definition, synthesis cannot be assessed with multiple-choice questions. Table 5 illustrates learning objectives at this level.

Evaluation. At the top of the taxonomy pyramid is evaluation; concerned with the ability to judge the value of material for a given purpose and based on definite criteria. Both internal criteria (organization) and external criteria (relevance to the purpose) are appropriate tools. Quantitative and qualitative judgments are used to establish standards of appraisal and may be determined either by the learner or the instructor. Evaluations are conducted in light of:

Table 5. Examples of Learning Objectives at the Synthesis Level

Mathematics Integrate several different mathematical theories, formulae, and strategies to solve a real-world problem.
Business education Propose a plan for an experiment that integrates the recognized elements of organizing, managing, directing, and controlling for solving a situational organizational problem described by the instructor.
Language arts Write a well organized paper, give a well organized speech, or write a creative short story, poem, or music. (Missing conditions and criteria)
Science Formulate a new scheme for classifying objects in the solar system; choose a classification scheme, justify its use for this project, and proceed to place at least one representative objects in each class.
Library usage Students will integrate at least ten of the fifteen designated resources to complete a research project in the most efficient manner possible.

- **Judgments and internal evidence** (internal standards, the ability to assess probability of accuracy or the exactness of statement and the ability to recognize logical fallacies in arguments).
- **Judgments and external criteria** (comparison with major theories, generalizations, and facts about particular cultures or by external standards known in the field (i.e., recognized excellence)

Learning outcomes at this level are the highest in the cognitive hierarchy. They contain elements of all the other categories plus the additional characteristics of deliberate value judgments based on clearly defined criteria. Teachers strive to challenge their learners with learning objectives at this level of the taxonomy some of which are illustrated in Table 6 below.

Bloom's taxonomy has withstood the test of time. Due to its popularity for developing behavioral learning objectives, it has been researched, examined, and re-interpreted in a variety of ways. Research findings have led to the discovery of many interpretations and applications. The Taxonomy of Educational Objectives is an accepted framework for classifying statements of student learning outcomes as a direct result of instruction. This framework, as well as subsequent research since the 1950's, has produced a number of tools for the traditional teacher. For example, the list of action verbs (Table 7) was created over time to aid teachers in composing learning objectives at each of the six levels of the cognitive domain. It is assumed that using one of these words to preface learning objectives places that experience within the realm of the respective classification level.

REVISED BLOOM'S TAXONOMY

During the 1990's, a former student of Bloom, Lorin Anderson, led a new gathering of educational psychologists for the purpose of updating the almost 40-year old taxonomy in anticipation of 21st century classrooms, students, and teachers.

Like their predecessor of the 1950's, these participants were conscientious in their pursuit of learning, spending six years to finalize their work. Published in 2002, the revision includes several significant changes in terminology, structure, and emphasis.

Table 6. Examples of Learning Objectives at the Evaluation Level Action Verbs.

Language Arts Critique another student's speech, based on the criteria studied this semester.
Science Before beginning the experiment, employ the scientific method to establish a hypothesis, propose possible solutions, test those solutions, and draw final conclusions to determine the outcome and recommendations of the experiment.
Social Studies Weigh the stated positions of both major political candidates with regard to the issue of gas prices and state reasons (based on the five principles of good advocacy discussed in class) why one candidate's position is more likely to be effective than the other.
Counseling Given a videotape of a client-counselor encounter, evaluate the principles in effective counseling sessions discussed in the text to determine the degree to which the simulation effectively illustrated specific strategies for handling the situation in real life.
Education Teachers will discuss with their peers the situations encountered during their student teaching semester in the classroom which posed the greatest difficulties with respect to behavior, discipline, rewards and punishment, etc. using the prescribed guidelines offered in our Introduction to the Classroom Management course.

Table 7. Action Verbs for Bloom's Taxonomy

Knowledge	Count, Define, Describe, Draw, Find, Identify, Label, List, Match, Name, Quote, Recall, Recite, Sequence, Tell, Write
Comprehension	Conclude, Demonstrate, Discuss, Explain, Generalize, Identify, Illustrate, Interpret, Paraphrase, Predict, Report, Restate, Review, Summarize, Tell
Application	Apply, Change, Choose, Compute, Dramatize, Interview, Prepare, Produce, Role-play, Select, Show, Transfer, Use
Analysis	Analyze, Characterize, Classify, Compare, Contrast, Debate, Deduce, Diagram, Differentiate, Discriminate, Distinguish, Examine, Outline, Relate, Research, Separate,
Synthesis	Compose, Construct, Create, Design, Develop, Integrate, Invent, Make, Organize, Perform, Plan, Produce, Propose, Rewrite
Evaluation	Appraise, Argue, Assess, Choose, Conclude, Critic, Decide, Evaluate, Judge, Justify, Predict, Prioritize, Prove, Rank, Rate, Select,

Changes in terminology between the two versions are perhaps the most obvious differences. Basically, Bloom's six major categories were changed from noun to verb forms. Knowledge was renamed "remembering" in order to better address a narrower view of learning at the lowest level. Comprehension and synthesis were converted to "understanding" and "creating" and broaden their scope. Both the old and the new taxonomy (see Figure 3) retained the 6-step hierarchy; however, evaluation was dropped a level while creating (i.e., synthesis) was given the top location on the pyramid. The debate continues whether reordering the hierarchy is consistent with Bloom's thinking much less the reality of 21st century teaching and learning that was the purpose of the new work.

Bloom recognized early on that the taxonomy was being used in unexpected ways by audiences he never intended (i.e., non-educators). The revised version of the taxonomy targets much broader base of users who will find it as a "more authentic tool for curriculum planning, instructional delivery and assessment" (oz-TeacherNet, 2001).

Figure 3. Bloom's Taxonomy (Old and New Versions)

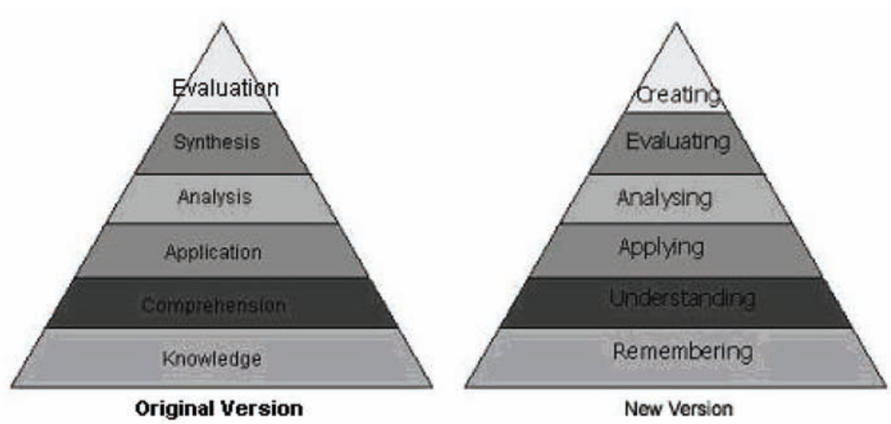


Table 8. Instructional Technologies Supporting the Traditional Learner

Taxonomy Level (Old)	Taxonomy Level (New)	Action Verbs	Available Technologies
Knowledge	**Remembering**	Recognizing Listing Describing Identifying Retrieving Locating/Finding	Quiz/Test tools Flashcards Definition software Worksheet/book Labeling software Listing software Bookmarking tools Web-based tools Social Networking tools Basic Search Engines
Comprehension	**Understanding**	Interpreting Exemplifying Summarizing Inferring Paraphrasing Classifying Comparing Explaining	Recitation software Show and tell software Labeling software Mind mapping tools Outline tools Advanced and Boolean searches Diary/Journaling software
Application	**Applying**	Implementing Carrying out Using Executing Doing	Illustration software Simulation software Presentation software Interview tools Performance tools Editing tools Educational software
Analysis	**Analyzing**	Comparing Organizing Deconstructing Attributing Outlining Structuring Integrating Validating	Surveying tools Database software Relationship maps Reporting/ presentation software Graph/ Charting software Spreadsheets Checklist makers
Synthesis	**Creating**	Designing Constructing Planning Producing Inventing Devising Making Building	Film (Multimedia) software Presentation software Project software Blogging & video blogging Vodcast/ podcast software Video conferencing Game-maker software Modeling software Media product Advertisement Painting tools
Evaluation	**Evaluating**	Checking Hypothesizing Critiquing Experimenting Judging Testing Detecting Monitoring	Debate/ Collaboration software (e.g., Chat rooms, IM, email, Discussion boards) Reporting/ presentation software Evaluation software Investigation software Persuasive speech Commenting, moderating, reviewing, posting tools Collaborating tools Networking tools

KEY INSTRUCTIONAL TECHNOLOGIES SUPPORTING THE COGNITIVE DOMAIN AND THE TRADITIONAL LEARNER

Educators are faced with a number of challenges when considering the role of technology in traditional education. Bloom's Taxonomy (both the old and revised versions) is a superb tool for educators and over the years has served as a way to think about integrating technology into the classroom or training room by considering the integration of technology from perspectives of knowledge, comprehension, application, analysis, synthesis, and evaluation. Table 8 offers some of the technologies suitable for consideration at each of the six levels of Bloom's (original followed by revised) taxonomy.

Knowledge (Remembering). The key action verbs shown in Table 8 remain relatively unchanged from previous versions of the taxonomy. Under the old version, list, define, tell, describe, identify, show, label, collect, examine, tabulate, arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, and state were the recommended prefixes to knowledge-based behavioral learning objectives. The new version (which uses more "action" in its action verbs) is much the same: recognizing, listing, describing, identifying, retrieving, locating, and finding.

A host of knowledge technologies are available at this level of the taxonomy. Quiz and assessment tools are abundant (and usually freeware or shareware). Labeling and listing software help learners create fact sheets of definitions, terms, dates, important persons, etc. Web-based tools include search engines, online journals and archived materials, and content-specific web sites.

Comprehension (Understanding). Summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend, classify, describe, discuss, explain, express, identify, recognize, report, restate, review, select, and translate provide action for the comprehension level of the original taxonomy. The revised version offers interpreting, exemplifying, summarizing, inferring, paraphrasing, classifying, comparing, and explaining.

Technologies at this level are becoming more common with graphics presentation software with Microsoft Power Point being the most popular. They include a list of software such as KidSpiration and InSpiration. Outline tools, such as those available in most word processors, foster brainstorming, clustering, and critical thinking. Diary and journaling software are also excellent organizers for learners to further reflection and deeper understanding along with secure and private communications.

Application (Applying). The earliest version of Bloom's Taxonomy suggested many action verbs for application: apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, discover, choose, dramatize, employ, interpret, operate, practice, schedule, sketch, solve, and use were the most common. The newer version recommends implementing, carrying out, using, executing, and doing. Frankly, the original set of action verbs are better with very little modifications realized at this level.

Hands-on technologies are prevalent at this level. They include illustration software (Photoshop and paint), simulation software, presentation software (presentation, graphics, screen capture), and educational software. Also, appropriate technologies for application include a host of tools such as interview tools (podcast, vodcast, sound recorder), performance tools, and video and sound editing tools.

Analysis (Analyzing). Appraise, calculate, categorize, classify, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, explain, question, and test are common action verbs at the former analysis level. Not much changed in the revised Taxonomy with operations such as comparing, organizing, de-constructing, attributing, outlining, structuring, integrating, and validating.

It should be noted that analytical technologies are a fairly recent phenomenon. With the possible exception of spreadsheet software which has been around since the 1980's, survey tools, relationship maps, and checklist makers as well as relational database, reporting/ presentation, and graph/ charting software are relatively new. Other popular technologies include software that performs SWOT (strength, weaknesses, opportunities, and threats) analysis; Venn diagram, herring or fish bone mind maps, concept development, and other relationship mapping utilities; and, customer satisfaction and user feedback surveying tools.

Synthesis (Creating). The original taxonomy provided a significant number of action verbs appropriate for synthesizing information. They included: combine, integrate, modify, rearrange, substitute, plan, create, design, invent, compose, formulate, prepare, generalize, rewrite, arrange, assemble, collect, construct, develop, manage, organize, propose, set up, and write. As these words are reviewed, it becomes apparent why the revised version traded positions with "Evaluation" on the pyramid and placed "Creating" at the top of the hierarchy with new verbs including: designing, constructing, planning, producing, inventing, devising, making, and building.

The associated technologies at this level of the taxonomy represent some of the innovative hardware and software on the market. Multimedia hardware and presentation software; blogging, and vodcasting, and podcasting technology; audio and videoconferencing; and, game-maker and modeling software account for pioneering technology in support of synthesizing information.

Evaluation (Evaluating). At the original pinnacle of the taxonomy pyramid, learners were expected to act upon their environment using a variety of actions such as: assess, decide, rank, grade, test, measure, recommend, convince, select, judge, discriminate, support, conclude, compare, summarize, appraise, argue, defend, predict and rate. The revised version added checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, and monitoring.

Collaboration software (e.g., chat rooms, IM, email, discussion boards) is readily incorporated into a learning objective at the top level of the new taxonomy. Investigation and evaluation software sustain the research while reporting and presentation software contribute to communications phase of this level. Commenting, moderating, reviewing, posting tools as well as collaborating and networking tools each add more technological capability for teaching and learning.

A BRIEF LOOK AT THE OTHER DOMAINS OF THE TRADITIONAL LEARNER

The Affective Domain. This realm of learning relates to emotions, attitudes, appreciations, and values. Learning objectives written for this domain relate to behaviors that serve as indications of a learner's attitudes, appreciations, and values. If the purpose of the instruction is to change attitudes rather than to transmit/process knowledge, the instructor is well advised to develop learning objectives in the affective domain.

Instructors frequently have at least one goal considered a high priority for the lesson in the affective domain. However, many find it difficult to write measurable or observable objectives in this domain, so Table 9 provides some of the more commonly used action verbs.

The Psychomotor Domain. The psychomotor domain includes physical movement, muscle and hand-eye coordination, and development of both gross and fine motor skills. The psychomotor domain itself is skills-based – learners produce tangible, observable and therefore easily measurable results.

Table 9. Taxonomy of the Affective Domain

Level	Definition	Action Verbs
Receiving	Active mental attending of a physical event.	Asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.
Responding	Active participation Attends and reacts to a particular phenomenon. Attempted copying of a physical behavior	Answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.
Valuing	Attaching value or worth to an object, phenomenon, or behavior. Ranges from acceptance to commitment; attitudes and appreciation.	Completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.
Organization	Bringing together different values, creating a unique value system, resolving conflicts among them, and starting to build an internally consistent value system--comparing, relating and synthesizing values and developing a philosophy of life.	Adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.
Internalizing Values	Individuals develop a value system that controls behavior and has done so over a sufficiently long time. Life styles have been developed that is pervasive, consistent, and predictable	Acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.

The three practical instructional levels for the traditional learner include imitation, practice, and habit. Development of these skills requires practice and is measured in terms of speed, accuracy, coordination, distance, actions, manipulations, or performance during implementation. Fine motor skills use precision instruments or tools to measure success while gross motor skills are assessed using observable bodily activities or athletic performance.

The psychomotor domain occupies seven major categories are listed in Table 10 from the simplest behavior to the most complex. Consistent with taxonomies before, the psychomotor domain represents activities that are progressively more complex and, in this case, require the use and coordination of increasingly more complex skeletal muscles.

Also parallel to the affective domain just presented, action verbs are often harder to identify when compared to the cognitive domain and are included here to assist in the development of learning objectives.

Summary. Published critiques of Bloom's Taxonomy have been as plentiful as the research into its application as a tool for teaching and learning in the classroom. Critics ponder the validity of six categories (too many or too few) and whether additional categories would better help delineate the steps. For example, knowledge as defined by Bloom is viewed by many as far too complex for learning objectives to be assembled into a single classification. A knowledge of specifics (terminology, definitions, and facts) seems to require a different set of cognitive skills than, say, knowledge of universals and abstractions (principles and generalizations). Still other critics pose fewer levels arguing to combine knowledge, comprehension, and application into the single category of lower order thinking skills and analysis, synthesis, and evaluation as higher order skills.

The emphasis on sequence and hierarchy is also under fire from some. To suppose that knowledge, comprehension, application, etc. are somehow age-dependent or that cognitive development moves along such a structure succession is contrary to the beliefs of many practicing educators.

Table 10. Taxonomy of the Psychomotor Domain

Level	Definition	Action Verbs
Perception	The ability to use sensory cues to guide physical activity. This ranges from sensory stimulation, through cue selection, to translation.	Choose, describe, detect, differentiate, distinguish, identify, isolate, relate, select.
Set	The readiness to act; requires the learner to demonstrate an awareness or knowledge of the behaviors needed to carry out the skill.	Display, explain, move, proceed, react, show, state, volunteer.
Guided Response	The early stage of learning a complex skill, Includes imitation as well as the ability to complete steps involved in the mastery of a skill as directed.	Copy, trace, follow, react, reproduce, respond, replicate, repeat
Mechanism	Learned responses have become habitual and the movements can be performed with some confidence. The intermediate stage of learning complex skills.	Assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
Complex Overt Response	Skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated as well as automatic performance without hesitation	Assembles (faster and without error); builds, calibrates (to more precise accuracy), constructs, dismantles (and re-assembles), displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes.
Adaptation	Well developed skills with ability to modify patterns to address, adapt, and adjust to special requirements. Modifies motor skills to fit a new situation	Adapts, alters, changes, rearranges, reorganizes, revises, varies.
Origination	The ability to accommodate an original skill that replaces the skill as initially learned Creating new movement patterns. Emphasize creativity based upon highly developed skills	Combines, composes, constructs, creates, designs, initiate, creates, originates.

Finally, the revised edition of Bloom's taxonomy has churned up more contrary opinions; some from previously unapologetic supporters of the classification system as synthesis is moved higher up the pyramid than evaluation. Some consider the three lowest levels as hierarchically ordered, but the three higher levels as parallel. Others say that it is sometimes better to move to application before introducing concepts at the knowledge level.

Advocates count among their ranks an incalculable number of educators at all levels who have studied, applied, assessed, and grown by using the original Bloom's Taxonomy. There is no reason to believe they will not continue to do so under the revised version currently in the literature. While there are no reliable estimates, surely many millions of successful learning objectives have been infused into classrooms over the years integrating the condition, action, and criteria marks of Bloom's taxonomy. The proof, as they would say, is in the results.

SUMMARY

While compatible with all classifications of teaching and learning (traditional, adult, and distance), Bloom's taxonomy remains a mainstay for the traditional learner.

According to Bloom's biography written by Eisner (2002), Bloom, in some of his final statements before his death in 1999, continued to express disheartening concern that, even after 40 years, his taxonomy was still not well known and worse, the quality of thinking activity is no different in American classrooms than it when it was first introduced.

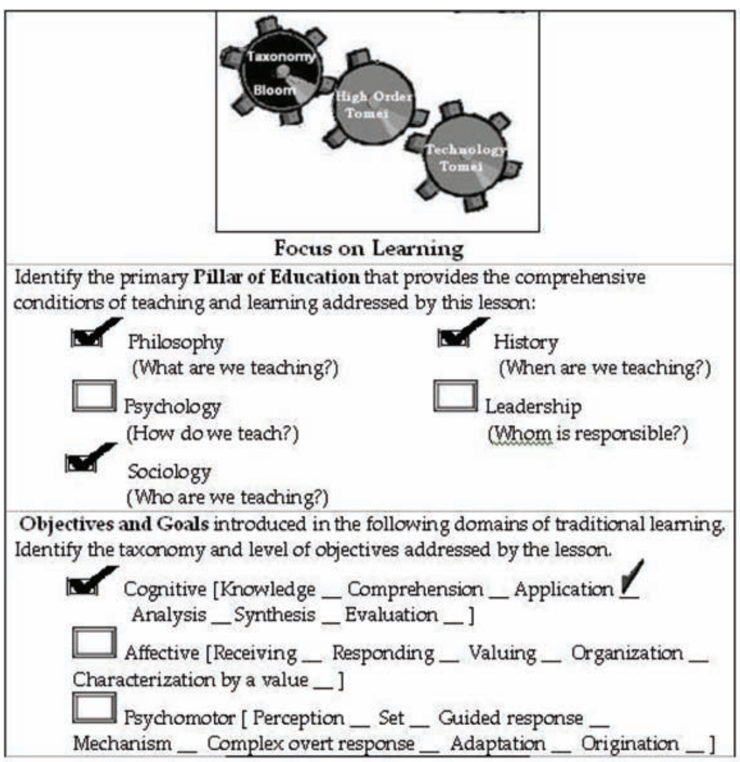
Bloom's taxonomy continues to serve as the basis for what are now called higher order thinking skills. The concept of higher order thinking skills (HOTS) became a major educational agenda item with the publication of the taxonomy of educational objectives. Rather than emphasize the drill and repetition activities of the knowledge level, HOTS focus is on problem solving and higher thinking skills. The Learning Research and Development Center (1991) lists the following higher order thinking skills:

- "Size up" and define a problem that is not neatly packaged.
- Determine which facts and formulas stored in memory might be helpful for solving a problem.
- Recognize when more information is needed, and where and how to look for it.
- Deal with uncertainty by ''brainstorming" possible ideas or solutions when the way to proceed is not apparent.
- Carry out complex analyses or tasks that require planning, management, monitoring, and adjustment.
- Exercise judgment in situations where there clear-cut right and wrong answers are not obvious.
- Step outside the routine to deal with an unexpected breakdown or opportunity. (pp. 3-4)

In any case, it is clear that students can "know" about a topic or subject at different levels. While most teacher-made tests still assess at the lower levels of the taxonomy, research has shown that students remember more when they have learned to handle the topic at the higher levels of the taxonomy (Garavalia, Hummel, Wiley, & Huitt, 1999).

Expect to read more about the taxonomy for the traditional learner in the years to come.

Figure 4. Traditional Learner Lesson Plan Template (cumulative)



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- [x] Philosophy (What are we teaching?)
- [x] History (When are we teaching?)
- [ ] Psychology (How do we teach?)
- [ ] Leadership (Whom is responsible?)
- [x] Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the taxonomy and level of objectives addressed by the lesson.

- [x] Cognitive [Knowledge __ Comprehension __ Application ✓ Analysis __ Synthesis __ Evaluation __]
- [ ] Affective [Receiving __ Responding __ Valuing __ Organization __ Characterization by a value __]
- [ ] Psychomotor [Perception __ Set __ Guided response __ Mechanism __ Complex overt response __ Adaptation __ Origination __]

CONCLUSION

Appendix A, Traditional Learner Lesson Plan Template A completed **Focus on Learning** portion of the template (Figure 4) demonstrates how to develop a classroom lesson on the Planets of the Solar System.

REFERENCES

Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2002). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives.* New York: Longman Publishing Group.

Bloom, B., Krathwohl, D., & Masia, B. B. (1956). *Taxonomy of Educational Objectives: Handbook II, The Affective Domain*. New York: David McKay Co.

Eisner, E. W. (2002). *Benjamin Bloom 1913-99, International Bureau of Education: UNESCO*. URL: Retrieved from http://www.ibe.unesco.org/publications/ThinkersPdf/bloome.pdf

Garavalia, L., Hummel, J., Wiley, L., & Huitt, W. (1999). Constructing the course syllabus: Faculty and student perceptions of important syllabus components. [URL: http://teach.valdosta.edu/whuitt/papers/cons_course_syll.doc]. *Journal of Excellence in College Teaching*, *10*(1), 5–22.

Learning Research and Development Center, University of Pittsburgh. (1991). *The New Standards Project: An Overview*. Pittsburgh, PA: Author

Chapter 5
The Higher Order Learning Domain of the Adult Learner

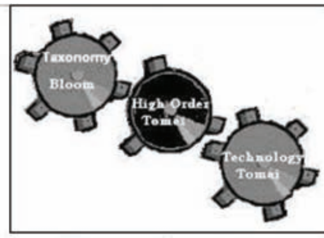
Learning Objectives. The K-A-RPE Model serves to differentiate teaching and learning at three strategic levels of adult learning: (1) Knowledge, (2) Application, and (3) Research, Practice and Evaluation. This chapter offers the reader an archetype for developing instruction targeting the adult learner. Specifically, the reader will understand:

- The characteristics of the higher order learning domain.
- The stages of the K-A-RPE Model and its application to adult learning.
- Key instructional technologies supporting the K-A-RPE Model and the higher order learning domain of the adult learner.

Lesson Plan Template. Refer to **Appendix B, Adult Learner Lesson Plan Template** as the chapter discusses **Focus on Learning** as depicted in Figure 1.

DOI: 10.4018/978-1-60566-824-6.ch005

Figure 1. Adult Lesson Plan Template (Focus on Learning)



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☐ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☐ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the level of the taxonomy addressed by the lesson.

- ☐ Knowledge
- ☐ Practice
- ☐ Application
- ☐ Evaluation
- ☐ Research

What **"essential"** and **"unit" questions** will become the focus this unit?

1. ______________________

2. ______________________

3. ______________________

4. ______________________

INTRODUCTION

Teaching the adult learner has dramatically changed over the years mostly in response to research and investigations that have come to define the term “andragogy.” Although he was not the first to use the term, Malcolm Knowles popularized the term andragogy that first appeared in the writing of Alexander Kapp. Since then, many citations have compared and contrasted andragogy with pedagogy in an attempt to distinguish what makes the teaching of adults different than teaching children. Much of the research focuses on several crucial assumptions about the characteristics of adult learners.

Adults are considered autonomous and self-directed learners. Active involvement by adult learners in the instructional process calls for them to serve as their own principal facilitators for learning. Instructors are advised to solicit participant perspectives about the topics presented and the strategies to be employed in teaching concepts; assessments that will ultimately evaluate their progress and performance and the responsibility for learning that will dictate the conduct of lesson delivery. Group participation and leadership are keys to successful learning. Teachers evolve into roles as guides to the knowledge under investigation rather than the dispenser of facts, data and information. Finally, adults must have foreknowledge of how the class will help them reach their personal goals.

Adults are often characterized by the quantity and quality of experiences and knowledge that they have amassed throughout their lives as a result of work-related accomplishments, family responsibilities, and previous education. Instruction is more successful when connected to this base of knowledge-experience. Relating theories and concepts from text books and lectures to real-world experiences and actual circumstances goes a long way towards promoting adult comprehension.

Adults are considerably more focused than children. When an adult enrolls in a course, they usually have a goal in mind. They usually know what they want to attain when taking a class. They look for an educational program that is organized with clearly defined learning objectives. Instructors, for their part, are compelled to show their charges how this particular class as well as specific readings, projects, and assessments, will help them secure their goals.

Adults must see a reason for learning. Instructors reveal the relevancy of learning objectives before the instruction begins. Theories and concepts must be related to familiar experiences. Participants should be afforded the opportunity to choose projects that point toward their own interests.

Adults are realistic and practical, choosing to focus on aspects of a lesson that will serve them in their work or personal situations sooner rather than later. Unlike children, adults often show little interest in knowledge with no apparent application. Instructors must explicitly reveal how lesson content applies to their job or other consequential life situations.

Adults must be respected as both individuals and learners. Acknowledging the wealth of their experiences, skills, knowledge, and practice contributes to treatment as equals in the classroom.

The literature is replete with recommendations for teaching the adult learner. For example, the use of problem-solving exercises such as case studies, simulations, and accurate scenarios based on real-world events helps make the instruction relevant to the adult's affinity toward realistic learning opportunities. Instruction should be about authentic tasks and not about memorizing content (although some memorization is still appropriate depending on the discipline). Instructors need to put their self-esteem aside and be accepting of ideas not their own. Lessons should be planned to contain occasions where the instructor relinquishes control of the learning situation to the student and does so without threat of intimidation either from the instructor or from peers. Open-ended questions are an excellent vehicle for surfacing the array of personal experiences of the adult learner.

The Higher Order Learning (HOL) domain encourages the instructor to tie the demands of adult learner, the guiding role of the instructor, the contributions of lifelong experiences, the more complex purposes for learning, and the long-term permanence of education into a single cohesive teaching strategy. It is here that andragogy and pedagogy part ways as instruction is applied more directly to adults as learners, experts, and scholars.

CHARACTERISTICS OF THE HIGHER ORDER LEARNING DOMAIN: THE ADULT AS LEARNER, EXPERT, AND SCHOLAR

In *Professional Portfolios for Teachers* (Wilcox and Tomei, 1999), the authors define for their readers three distinct levels of adult learners. They do so in the context of teachers, technology, and the use of portfolios over a lifelong career, but the three levels provide a suitable bridge for the imminent discussion of the K-A-RPE model and the effects on adult teaching and learning that follow.

The Adult as Learner. All adults begin their as learners. Acquiring knowledge was conveniently compartmentalized by Duquesne University in the prologue to their Leading Teacher Program Handbook (2005) into literacy, numeracy, and educated citizenry.

Literacy encompasses essential enabling skills that help the adult perform tasks required both in their daily lives and by their chosen occupation; provide them with a foundation to learn other skills to form lifelong learning; and, enhance their ability to adapt to the world around them. Some of the most essential literacy skills identified by the Human Resources and Social Development Canada (2006) organization include reading text, document use, writing, oral communication, thinking skills (including problem solving, decision making, job task planning and organizing, significant use of memory, and finding information), working with others, computer use, and a passion for continuous learning.

Numeracy refers to the ability to reason with numbers as well as embracing numerical concepts. It is more than basic arithmetic involving confidence and competence with numbers and measures, understanding the number system, a personal inventory of successful mathematical techniques, or an inclination and capacity to solve quantitative or spatial problems. Finally, numeracy demands an understanding of the ways in which data are gathered, analyzed, and presented orally, written, and visually (Wikipedia, 2008).

The value of an educated citizenry makes it possible for adults to thrive in the many diverse roles demanded of everyday life. Most adults exist in a fairly constrained succession of roles that include healthy individual, family member, worker/ employee, citizen, and, in our case, learner (Community Family Life Services, 2006). The Evergreen Student Experience Survey (2006) found that an educated citizenry requires a set of competencies that include: writing effectively, a readiness for education and a career. depth or expertise in a particular field, effective speaking skills, knowledge in a broad range of subjects, the ability for personal expressions in the creative arts, critical analysis, appreciation of responsibilities as a member of a diverse community.

The adult as learner is responsible for acquiring the knowledge necessary to function as a grown-up member of society. Literacy, numeracy, and educated citizenry competencies comprise the foundation upon which is built the full-functioning adult learner.

The Adult as Expert. Regardless of the career field, teachers, engineers, doctors and nurses, scientists, business professionals, computer technologists, communicators, or psychologists each reflect a special set of attributes for the practicing adult. The adult learning styles model offered by Endorf and McNeff ‘s (1991) emphasizes emotional and sociological attributes. For example, to the authors, confidence was a key characteristic. The adult as expert performs in the real world and, as such, is rewarded for pragmatism, goal-orientation, self-direction, intrinsic motivation, and inter- and intrapersonal interactions. Affectively, adults value the educational experience and often see education as its own reward. They willingly cooperate in the learning experience and are disappointed when their personal experiences are not valued in the classroom either by their instructor of their peers. Education is integral to the adult’s schema for personal success, especially within the learning environment (classroom or online) itself. Finally, adult learners are typified as risk takers; they enjoy a variety of learning modalities and are excited about learning new concepts. Their self-confidence, unlike children (or even the adult as learner) is such that they learn best through application of theory; taking assumptions and hypotheses and putting them into practice.

The Adult as Scholar. The third and highest level of adult performance is that of the adult as scholar. At this level, professional leadership characterizes advanced programs and senior level contributors. Adult-scholars are typically older with a grasp of the knowledge acquired (as a learner) and applica-

Table 1. ICT Bachelor, Master, and Doctoral Level Curriculum

		ICT COURSES (BACHELOR LEVEL)
		Junior Year (24 credits)
3 credits	ICTB 2120	Visual Basic Programming
3 credits	ICTB 2121	Visual Basic Programming II
3 credits	ICTB 2210	Operating Systems Concepts
3 credits	ICTB 3150	Intro Web Development & E-Commerce Technology
3 credits	ICTB 3220	Systems Analysis and Design
3 credits	ICTB 3221	Advanced Sys Analysis/Design
3 credits	ICTB 3230	Networks/Data/Computer Communications
3 credits	ICTB 2211	Micro Computing Technology
		Senior Year (27 credits)
3 credits	ICTB 4240	Database Management and Warehousing
3 credits	ICTB 4810	Project Management
3 credits	ICTB 2110	Programming Logic
3 credits	ICTB 3470	Decision Support Systems
3 credits	ICTB 3450	Quantitative Analysis for the ICT Professional
3 credits	ICTB 4170	Global Economics and ICT Ethics
3 credits	ICTB 4830	Strategic ICT System Planning
3 credits	ICTB 3510	Competitive Intelligence Systems
3 credits	ICTB 1020	Intro Decision Support Systems
		ICT COURSES (MASTER LEVEL)
3 credits	ICTM 5150	Intro To Web Development
3 credits	ICTM 5151	Java Programming
3 credits	ICTM 5120	Visual Basic Programming
3 credits	ICTM 5121	Advanced Visual Basic Programming
3 credits	ICTM 5151	Java Programming
3 credits	ICTM 5210	Hardware and Operating System
3 credits	ICTM 5231	Network Technology & Management
3 credits	ICTM 5240	Database Management System
3 credits	ICTM 5490	Computer Network Security
3 credits	ICTM 5290	Data Warehousing Concepts
3 credits	ICTM 5590	Leading the ICT Organization
		ICT COURSES (PhD LEVEL)
3 credits	ICTD 6150	The Information Age and Organizations
3 credits	ICTD 6151	Technology, Human Communication and Information Transfer
3 credits	ICTD 6120	Ethnography of ICT Systems
3 credits	ICTD 6121	Systems and Usability Studies
3 credits	ICTD 6151	Leadership, Strategic Problem Solving, and Change in an ICT Organization
3 credits	ICTD 6210	Managing Knowledge
3 credits	ICTD 6231	ICT Economics
3 credits	ICTD 6240	Data Warehousing Design and Development
3 credits	ICTD 6490	Information Technology in Legal and Ethical Contexts
3 credits	ICTD 6290	ICT Networking and Management

tions achieved (as an expert) over the years. Adult scholars write summaries or essays, provide lectures, offer learning experiences, and initiate relevant discussions in targeted disciplines. They contribute to scholarly publications containing articles undertaken as specialists in their particular field of study. The primary audiences for these scholarly activities are practitioners and students and, as a result, the papers produced and the conferences attended are typically much more advanced.

Adult scholars have credentials within their field of expertise that encourages other learners and experts to actively seek them out. Other authors cite their works and draw personal insights for their own contributions. Adult-scholars often render service to their academic discipline, individuals, or the community, both internally and externally.

To meet the increasingly unique demands of adults for instruction at all three levels of learner, expert, or scholar, the discipline of education has historically focused on pre-service (undergraduate), in-service (graduate), and post-graduate (i.e., doctoral candidates) programs. Likewise, corporate trainers have provided novice, journeyman, and expert training programs for their employees.

For example, in colleges and universities, it is not uncommon to find an information and communications technology program at the bachelor (upper-level courses only to reflect ICT content area only), master, and doctoral level. Examine the curriculum of one such institution in Table 1.

Notice anything unique about these course offerings? To many, several courses appear identical with respect to title, content, length, credits and outcomes. For example, at the bachelor's level, a course called Database Management and Warehousing is a senior–level course. At the master's level, Data Warehousing Concepts is offered. And, at the doctoral level, Data Warehousing Design and Development is part of the curriculum. On the surface, these courses might indeed seem to contain similar content. Students might rightly question, "What will I learn differently about this technology as a freshman than I will as a graduate student or even a doctoral candidate?" Or, "If I take the undergraduate courses as an adult -as-learner, am sufficiently prepared to use this technology throughout my career?"

Enter the K-A-RPE Model….

STAGES OF THE K-A-RPE MODEL

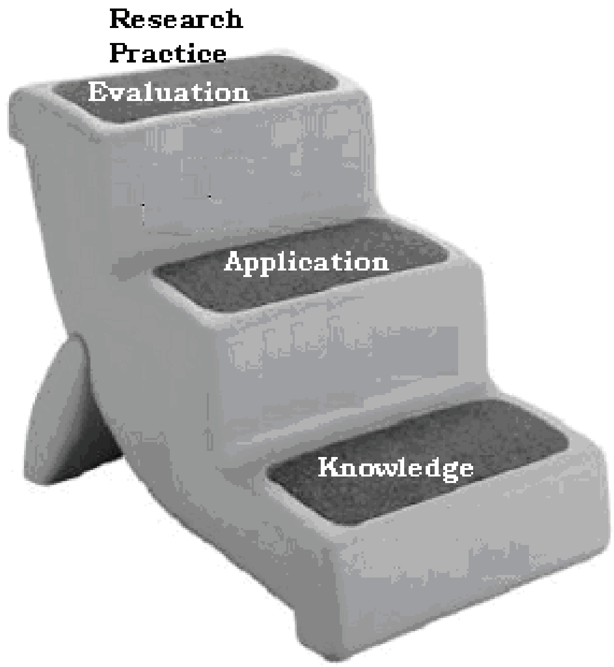
The KARPE Model (Figure 2) began as a way of explaining to adults the inherent differentiation between teaching adults as learners, experts, and scholars.

The <u>Knowledge</u> Level of the K-A-RPE Model. Some authors believe that there are two modes of acquiring knowledge, namely reasoning and experience. Since the adult as learner has yet to amass significant experiential wisdom, the knowledge level of the K-A-RPE model becomes the jumping-off point, establishing skills and competencies as the fundamental basis upon which subsequent advances in learning will take place.

Another popular manifestation of knowledge acquisition is deductive/ inductive representation. Deductive knowledge is acquired by combining prior knowledge with reasoning. For example, mathematics proofs or logical inference represents knowledge acquired by deductive reasoning. Inductive knowledge is also new knowledge; however, it is based more on observations of the learner's surrounding world.

At this first level, adult learners are introduced to the skills and competencies required for lifelong learning. For example, Table 2 illustrates learning objectives found in two courses. In the first course for microcomputer technology, basic hardware and software skills and competencies are encountered. Such skills include defining computer technology, understanding concepts and terminology, and creat-

Figure 2. The K-A-RPE Model



ing spreadsheets, text documents, and databases. In a different course, adult learners are expected to explain project management, describe the roles and responsibilities of project team members, and list the various leadership styles of project managers.

Knowledge is the underlying goal, the chief instrument, the critical theme for designing instruction focusing on the adult-as-learner. Define, use, demonstrate, prepare, and construct are knowledge-based action verbs for instruction at this level of the higher order learning domain.

The Application Level of the K-A-RPE Model. The adult-as-expert, as compared to their learner-focused counterpart, seeks to advance a chosen discipline by infusing instruction into real-world scenarios. At the application level, questions and situations are posed so that students must actually exercise the knowledge learned. Application also refers to the ability to use previously learned material in new and concrete situations. Rules, methods, concepts, principles, laws, and theories are often the target of application-based learning objectives. Outcomes at this level require a higher intensity of understanding than the knowledge skills and competencies previously discussed.

Examples of learning objectives at this level are: apply concepts and principles to new situations, relate laws and theories to practical situations, solve mathematical problems, construct graphs and charts, or demonstrate the correct use of a method or procedure. Further, application questions are often phrased in terms of "how would this knowledge be used to solve a current or new problem?" "What examples support the argument?" "How would this problem be solved using what information already learned?" "How would these factors be organized to show how they contribute to solving a particular problem?" "How would the learner show understanding of ethics by the way he/ she lives their life?" "How would an individual apply new information learned today to develop a plan of action for the future?"

For the adult-as-expert, a database management and warehousing course from Table 3, prepares the learner for the application-oriented objectives that analyze, develop, map, design, generate, and use typi-

Table 2. Knowledge-based Learning Objectives Targeting the Adult-as-Learner

Microcomputer Technology Candidates will demonstrate an ability to: 1. Define what a computer is (both hardware and software) and what it can and cannot do. 2. Employ correct terminology unique to the computer field in communication with experts and novices in the computer field. 3. Understand the advantages and disadvantages of and effectively the basic functions of an operating system and a graphical user interface 4. Use telecommunication tools to communicate and interact electronically 5 Demonstrate competency in selected hardware components 6. Use multimedia software 7. Use software for informational purposes 8. Use word processing software to perform standard student tasks such as writing a mail-merge letter, preparing a table of contents, developing a table, etc. 9. Prepare a spreadsheet to develop a budget, financial analysis, and solve technical problems. Also, use the graph generation features to produce visual displays. 10. Construct a database management system, enter data into the structure, and perform special analyses and generate reports on appropriate problems.
Project Management Candidates will demonstrate an ability to: 1. Define the characteristics of a project and explain the need for project management. 2. Compare and contrast the roles of project managers in organizational environments. 3. Explain the roles of systems analysis and systems management in the life cycle of a project. 4. Describe the ways groups are organized into projects. 5. Explain the roles and responsibilities of project team members. 6. Identify leadership styles of project managers. 9. Identify sources of diversity, either corporate or ethnic, that impact project team effectiveness.

cal application-based software packages. Pay particular attention to the action verbs used at this level; words such as develop, map, convert, write and submit, etc. all indicate action and application.

At the third and highest level of the K-A-RPE model lays research, practice and evaluation. Certainly, adults-as-scholars, too, must learn new facts, concepts, and technologies. They must also be able to apply that knowledge in a very practical sense to the real world. However, they do so with the underpinnings of a richer knowledge base (research) and a vastly more comprehensive review of the literature to support their learning. The adult-as-scholar is charged with changing the way learning is experienced (practiced) in the classroom and they do so with an ever-watchful eye on verifiable achievement (evaluation).

In an example course (see Table 4), the focus on research admonishes candidates to investigate financing of high technology enterprises, uses and sources of venture capital, high technology entrepreneurship, academic spin-offs, and the software industry of a country. To accomplish these objectives, candidates must possess the underlying knowledge necessary to identify the factors of finance, technology, capital, and software to guide their exploration of the topics. They must also be aware of (and most likely have participated in) real-world situations in which enterprises, uses of capital, and the entrepreneurial application of theory have proven successful.

Practice comes into play as candidates are encouraged to design, develop, and implement procedures for offering a technology-based online program appropriate for high school learners. To successfully accomplish this task, content-specific knowledge must first come into play. Next, some practical experience in the application of a delivery system must surround the choices to incorporate traditional classroom delivery, synchronous distance education, asynchronous distance education, and blended learning systems. The second practice objective asks candidates to combine concepts, assess problems, select opportunities, develop and formulate strategies, and implement plans. Again, it is easy to see the need for knowledge

Table 3. Application -based Learning Objectives Targeting the Adult-as-Expert The Research, Practice, and Evaluation Level of the K-A-RPE Model.

Database Management System
Students will:
1. Analyze a business case to design user views and to develop data models in the analysis phase of an assigned project.
2. Develop data models against user views in a project or homework assignment.
4. Map a data model to logical tables using the techniques of logical design.
5. Develop a data dictionary to support the attributes and entities in the tables.
6. Convert the tables from logical design and the data dictionary to physical design tables.
7. Write and submit SQL queries against a database.
8. Generate reports against the database.
9. Use entity relationship diagrams to transform the business model into a dimensional model.
10. Transform the dimensional model into a physical data design

and applications underpinnings before they can be expected to succeed in this endeavor. It is also clear that these advanced expectations are beyond the reach of the bachelor's or master's level student.

Finally, evaluation implies assessment of success or failure. Candidates in lesser programs are expected to recognize the implications of change (knowledge), provide techniques for recognition and response (application), and demonstrate various frameworks for understanding. However, they are not expected to evaluate them. The objectives here is to include techniques for establishing formative and summative assessment criteria using traditional (e.g., objective exams), authentic (e.g., portfolios), or perhaps even virtual (e.g., web-based portfolios) evaluations. Classifying a population based on age/generational differences, education and socioeconomic differences, gender differences, and racial/ ethnic/ geographic differences is another example of evaluation as is continuous quality improvement.

Summary. In 2004, the author completed a study of higher education that examined the differences and similarities among pre-service (undergraduate), in-service professionals (graduate), and post-graduate (doctoral) programs with respect to technology-based curriculum. Specifically, the study attempted to investigate technology courses across the three levels of adult-as-learner, adult-as-expert, and adult-as-scholar in the minds of faculty and students alike as they move through their formal education agendas. The results of this study are presented in Appendix D.

Key Instructional Technologies Supporting the K-A-RPE Model and the Higher Order Domain of the Adult Learner

When considering the role of technology in adult learning, educators are faced with a number of challenges including how to respond to technologies and how to exploit them without diminishing the learning experience. The K-A-RPE Model presents a helpful way to think about integrating technology into adult learning by considering the integration of technology from perspectives of knowledge, application, and research, practice, and evaluation.

Knowledge. As with any other instructional strategy, technology serves to either transform learning or keep alive poor educational practice. Technology enhances adult learning when it lives up to its potential to offer increased modalities for learning, providing heretofore unavailable access to adult learning opportunities. However, researchers agree that "technology in and of itself does not promote learning" (Burge & Roberts, 1993). As such, its use does not negate the educator's responsibility to infuse this strategy into situations that promote successful learning outcomes. A major obstacle to using technol-

Table 4. Research, Practice, and Evaluation-based Learning Objectives Targeting the Adult-as-Scholar

Leadership, Strategic Problem Solving, and Change in an Organization
1. Investigate the financing of high technology enterprises, uses and sources of venture capital, high technology entrepreneurship, academic spin-offs, and the software industry of a country. (R)
2. Research current literature in pedagogical theory appropriate for elementary schools and isolate the factors, criteria, principles, and conditions that comprise the foundational standards for technology offered by the International Society for Technology in Education. (R)
3. Design, develop, and plan for implementing a technology-based online program of study appropriate for secondary course in a content-specific area using a delivery system that encompasses choices including traditional classroom delivery, synchronous distance education, asynchronous distance education, and blended learning systems. (P)
4. Combine critical marketing concepts to uncover and assess a variety of corporate market problems and opportunities in a selected technology-oriented business; Uncover market segments and develop marketing strategies to access the targeted segments; Formulate a strategy by positioning a product or service better; and, develop and implement an effective marketing plan. (P)
5. Include formative and summative assessment information from this practicum in the Teaching Portfolio for use and adaptation throughout a post-secondary academic career. (E)
6. Separate differences in students based on age/generational differences, education and socioeconomic differences, gender differences, and racial/ethnic/geographic differences of a defined population and address these differences in teaching methods. (E)
7. Identify resources for continuous quality improvement in a technology-based organization as it progresses through the four defined stages of organizational growth as defined by Harris & Porter. Include feedback, mentor feedback and self feedback as a minimum. (E)

ogy effectively is an understanding of what adults expect to glean from the instruction when technology is employed. Burge and Carter (1997) explored how technology supports the knowledge demands of adults. They suggest the following:

- Adults expect technology to provide a venue where they collect important ideas, express themselves, and feel secure in the direction their learning is taking.
- Adults insist that technology provide fast and fruitful admission to helpful information when it is needed.
- Adults anticipate that technology will promote their affinity toward autonomy and affiliation, independence and mutually supporting activities, and cognitive as well as affective interpersonal relationships.
- Adults seek technologies that are essential for the immediate task at hand and intuitive in their search for new knowledge.

Figure 3 offers some of the most common instructional technologies supporting the knowledge needs of the adult learner. Bulletin board systems, computer based learning, conferencing (audio, video, text, etc.), e-tutoring, learning objects, programmed instruction, web-based training, and others provide the technologies to support knowledge acquisition for the adult learner.

Application. Interactive environments, computer-based manipulatives, virtual reality, educational software, multimedia, content management systems, and simulations and gaming are examples of highly successful application-based technologies.

Some of the most familiar virtual environments include Second Life, Active Worlds, DigitalSpace Traveler, Meet3D, and Virtools. Educational software includes a host of applications whose primary purpose can be either technology-enhanced classroom teaching or self-paced content learning applications. Such applications take in computer-based, web-based, and computer-based learning software environments like microworlds, computer simulations, hypertext systems, and technology-enhanced cognitive tools. Finally, simulation and gaming encompass modeling, computer-assisted board games, and fully interactive environments. Simulations increase student motivation, facilitate affective learning, support interpersonal relations, improve cognitive outcomes and communication, and promote individualized learning.

Technology can become an effective tool to enrich and enhance the learning experience. Although acquiring technology-related skills is not the primary focus, technology-rich activities frequently scaffold their development. The spread of the Internet and the World Wide Web has made this approach all the more common in teaching the adult learner as well as other education and training settings. Technology has also been used to extend adult literacy curricula by enabling immediate access to Internet-based resources that provide content of interest to their personal situations. It has allowed adult learners to develop skills and have experiences in ways that will benefit them outside the instructional setting.

Research, Practice, and Evaluation. Technology is frequently used to complement instruction by extending available resources beyond the knowledge of the teacher or the applications in the classroom. Research is enhanced with technology tools such as citation generators, computer-mediated communications (audio and video), digital libraries, and web-based search engines. Wikis, for example, are powerful collaborative tools that allow users to add and revise content online and thereby speed up the editing phase of a research project. A blog or weblog is a web-based tool that encourages authors to prepare articles (as posts or entries) in journal style for general consumption. In the (not too distant) past, research was promoted by news groups, gopher sites, and file transfer protocol (FTP). Today, the Internet and World Wide Web provide the venue for advancing personal research agendas in the virtual world.

Practice-based technologies have literally changed the way teachers teach and learners learn in the 21st century. Authoring tools began with then-common programming languages and have evolved over the years to provide mechanisms for creating web sites, interactive hypermedia, simulations, and more. Inquiry-based learning fashions its theoretical base along cycle or spiral lines representing a pattern of questions, investigation, and hypotheses generation followed by testing of solutions or appropriate responses culminating in discussions and reflections that extend the discipline and enhance learning. Virtual reality immerses the learner into simulated environments of time and space generated by technologies that include stereoscopic goggles, tracking devices, data gloves, and other manipulatives that track movement. Virtual reality creates an illusion of real life or invented situations used both for amusement as well as serious learning. Flight simulators and cyber-cities provide the adult learner with opportunities for practicing new concepts and skills in the relatively comfortable (and safe) environment of computer-enhanced graphics.

Evaluation involves several key questions that must be considered before infusing technology into the assessment equation. First, is technology-based assessment an effective modality for evaluating student learning outcomes? Considerations of cost, time, and staffing resources are in order. A good learning assessment program includes a rubric against which results can be compared, a measurement instrument that is both valid and reliable, and a reporting procedure to broadcast the results of the evaluation. Opponents of assessment argue that poor quality tests cause disconnect between the material presented to the learner (i.e., the curriculum) and the assessment instrument. They also express considerable concern surrounding the expense of the process, from instrument to analysis. Integrating technology into the assessment does not necessarily ensure either quality or economics.

Second, how will the use of technology impact the delivery of the assessment tool? For example, the use of a computer instead of paper and pencil might infer with the learner's ability to express their level of learning. Students may indeed perform differently across different modalities types of assessment.

Third, does the performance of different population groups vary because of the method of delivery? Populations are stratified by age, sex, education level, or level of computer experience. As some

Figure 3. Instructional Technologies Supporting the Adult Learner

A	2D interactive environment	K	E-moderation	A	Modeling software
A	3D interactive environment	K	E-tutoring	K	Moodle
K	Adaptive hypertext	RPE	Edu-portfolio	A	Multimedia animation
K	Anchored forum	A	Educational modeling language	RPE	Multimedia authoring system
K	Audioconferencing	A	Educational software	K	Newsgroups
RPE	Authoring environment	RPE	Educational software evaluation	K	Note taking
RPE	Authorware	K	Educational technologies	RPE	Online Design
K	Babble	K	Educational technology	A	Open educational resources
K	Blog	K	Email	A	Open learner model
K	Boxer	K	Expressive digital medium	A	PLATO
K	Bulletin Board Systems	A	Groupware	RPE	Participatory learning environment
K	Computer Based Learning	A	Hypermodel	RPE	Pedagogic method
K	Case-based learning	K	Hypertext	RPE	Pedagogic strategy
RPE	Citation	K	Hypermedia	K	Personal learning environment
K	Cognitive flexibility theory	K	Interactive Videodisc	K	Podcasting
K	Cognitive tool	K	Interactive Multimedia	K	Portal
A	Collective writing	RPE	Immersive virtual reality	K	Presentation software
K	Computer Conferencing	RPE	Inquiry-based learning	K	Probeware
A	Computer game	K	Instructional Technology	A	Professional tool
A	Computer simulation	RPE	Instructional design	K	Programmed instruction
K	Computer-based learning	K	Instrumentation	K	Problem-Based Learning
A	Computer-based manipulative	RPE	Intelligent learning environment	K	Project-based learning
K	Computer-based training	K	Intelligent tutoring system	A	Shared space
A	Computer-integrated classroom	K	Interactive multimedia	A	SimCalc
RPE	Computer-mediated communication	K	Knowledge Forum	A	SimQuest
RPE	Computer-supported argumentation	RPE	Learning e-portfolio	A	Simulation
K	Computer-supported collaborative learning	RPE	Learning environment	A	Simulation and gaming
K	Computer-supported cooperative work	K	Learning management system	A	Social software
K	Concept map	K	Learning object	RPE	Student model
K	Constructionist learning object	K	Learning object repository	RPE	Technology enhanced learning
A	Content management system	K	Learning sequence	RPE	Technology-enhanced classroom
K	Computer-Managed Learning	K	Learning technology system	RPE	Teleteaching
A	CourseBuilder	K	Logo	A	Text-based virtual reality
A	Courseware	K	MOO	RPE	Ubiquitous learning
K	Data Conferencing	K	MUD	RPE	Web authoring system
A	Desktop virtual reality	K	Metadata	K	Web service
RPE	Digital library	K	Microlearning	K	Web-based training
K	E-instruction	K	Microworld	RPE	WebReports
K	E-learning	K	Mind map	K	Wiki
		A	Mobile learning	K	Writing tool
				K	Writing-to-learn

instructional technologies favor the learning styles of specific populations of students, using technology to assess should also be expected to prefer one group of student over others and, thereby, produce significantly different results.

Finally, what are the operational challenges of administering technology-based assessments? To assess using technology requires technology to be available to the designer, the instructor, and the respondent. Online assessments, for example, are easier to administer, cost less per application, and produce viewable analyses much faster than the traditional paper and #2 pencil instrument. However, students must have access to computers to enter the survey instrument online and instructors must have the technology to retrieve and display the results.

Assessment takes many forms in education and training. As a result, assessment can also run the gamut of available technologies. <u>Objective assessments</u> (usually multiple choice, true false, short answer) are best for testing recall of facts and are easily automated. Objective tests assume that there are verifiably correct answers and that all students are held responsible to learn the same facts, details, and specific information. Computer-assisted instruction (CAI) provides a programmed sequence of information followed by objective questions that serve as the gateway to further instruction. Answer the question correct, and the learner passes to the next module; make a mistake, and the learner is returned to the beginning of the lesson for re-learning, review, and re-assessment.

In subjective assessments, the instructor relies on personal judgment to assess the outcome of the learning experience. Essay tests and personal evaluations are examples of how an instructor can build an assessment focusing on more complex concepts. Not many technologies support subjective evaluations; word processing software with features that include edit tracking, spelling and grammar checking, and commenting (such as those available in Microsoft Word) offer the most help to the subjective evaluator.

Self assessments help learners determine for themselves whether they have mastered a topic. These technologies measure learning progress, permit multiple attempts, inform the learner (and, optionally) the teacher, and offer feedback regarding the mastery of the expected outcomes. They include online or web-based practice quizzes; computerized games, simulations, and other interactive exercises; and, practice written assignments/ logs/ thinking journals. Finally, authentic assessments include portfolios (electronic, in our case), educational software (and the built-in evaluations), and virtual experiments vis-à-vis traditional (and often costly and dangerous) laboratory experiments.

SUMMARY

Indeed, as was pronounced at the beginning of this chapter, teaching the adult learner is a challenge, whether the vehicle for instruction is the traditional face-to-face classroom or the high tech virtual reality of online learning. Malcolm Knowles offered us characteristics of the adult learner for our consideration. Adults are considered autonomous and self-directed learners. They are distinguished by the quantity and quality of their life experiences. They are targeted learners with a conscious goal to their learning. Adults must recognize the reason for their learning with realistic and practical ambitions for their learning. Lastly, Adults must be respected as both individuals and learners. Instructors of adults at whatever level (the adult as learner, expert, or scholar) would do well to remember these defining characteristics.

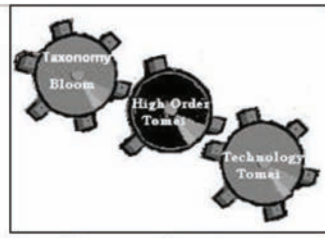
This chapter also presented numerous tips and techniques for teaching adults and supported those suggestions with research into technology-based course delivery. The higher order learning domain of the learner offered a taxonomy for differentiating between teaching adults at the post-secondary, graduate, and post-graduate levels of education higher or at the novice, journeymen, and master level of the corporate learner. Finally, technologies appropriate for the adult learner were suggested for knowledge, application, and research, practice, and evaluation.

Chapter Six contributes to the important discussion of teaching with technology that began in the previous chapter with the traditional learner. In the next chapter of the *Engine for Designing Technology-based Instruction*, readers will explore the taxonomies for the distance learner and the technologies that support teaching and learning at a distance.

CONCLUSION

Appendix B, Adult Learner Lesson Plan Template A completed **Focus on Learning** portion of the template (Figure 4) demonstrates how to develop an adult learner-oriented lesson on the Planets of the Solar System.

Figure 4. Adult Learner Lesson Plan Template (cumulative)



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☑ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☑ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the level of the taxonomy addressed by the lesson.

- ☐ Knowledge
- ☐ Practice
- ☑ Application
- ☐ Evaluation
- ☐ Research

What "**essential**" and "**unit**" **questions** will become the focus this unit?

1. **Apply your knowledge of the solar system to select the planet with the best chance of**
2. **supporting human life.**
3. **Describe the characteristics of a planet in another solar system that would support life.**
4. ____________________

REFERENCES

Burge, E. J., & Carter, N. M. (1997). *It's Building, But Is It Designing? Constructing Internet-Based Learning Environments*. Paper presented at the 18th World Conference of the International Council for Distance Education, University Park, PA, June 2-6 (ED 412 333).

Burge, E. J., & Roberts, J. M. (1993). *Classrooms with a Difference: A Practical Guide to the Use of Conferencing Technologies*. Toronto: Distance Learning Office, Ontario Institute for Studies in Education, (ED 364 206).

Evergreen Student Experience Survey 2006, Evergreen State College. (2008). Retrieved February from http://www.evergreen.edu/institutionalresearch/pdf/surveys/eses/eses2006olympia/olyqu19.pdf

International Society for Technology in Education. *Educational Technology Standards and Performance Indicators for All Teachers* (n.d.). Retrieved January 2005 from: http://cnets.iste.org/teachers/t_stands.html

Leading Teacher Program: Literacy, Numeracy, and Educated Citizenry (n.d.). Duquesne University Baccalaureate Program. Retrieved April 2, 2008 from http://www.education.duq.edu/prospectiveStudents/PDF/LTP_handbook_0405.pdf

Tomei, L. (2006). The Impact of Online Teaching On Faculty Load: Computing the Ideal Class Size for Online Courses, Association for the Advancement of Computing in Education. *Journal of Technology and Teacher Education*, *14*(3).

Wilcox, B., & Tomei, L. (1999). *Professional Portfolios for Teachers: A 'How To' Manual for Today's Teachers.* Norwood, MA: Christopher Gordon Publishers, Inc.

Chapter 6

The Technology Domain of the Distance Learner

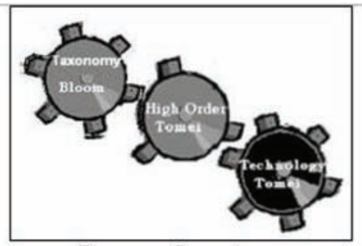
Learning Objectives. Distance learning is a relatively recent innovation in education. Without question, it has taken root in higher education and is experiencing rapid growth as a modality for instruction. The potential impact of distance learning on education is only now being realized and includes innovative teaching strategies and learning styles based on several unique features of this media.

Many educators accept teaching with technology as perhaps the most important instructional strategy to impact the classroom since the text book. The Taxonomy for the Technology Domain was originally introduced as a paper at the 2001 Pennsylvania Association of Colleges and Teacher Educators Conference (PACTE, Oct 2001). It met the scrutiny of the international community during the 2004 IRMA (Information Resource Management Association) Conference. Ultimately, it found its way into publication as a standalone text book from the Idea Group International Publishers in 2005. The Taxonomy for the Technology Domain, like its predecessors in the cognitive, affective, and psychomotor domains, continues to develop. This chapter presents the latest in the theoretical underpinnings and investigative research into its practical application as an instructional strategy for distance learning.

Literacy, collaboration, decision-making, technology for learning, technology for teaching, and tech-ology offer a new perspective for integrating technology into the distance classroom. The common vocabulary of definitions, activities, and technology-based learning objectives that targets the distance

DOI: 10.4018/978-1-60566-824-6.ch006

Figure 1. Distance Lesson Plan Template (Focus on Learning)



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☐ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☐ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the level of the taxonomy addressed by the lesson.

- ☐ Literacy
- ☐ Collaboration
- ☐ Decision-making
- ☐ Technology for learning
- ☐ Technology for teaching
- ☐ Tech-ology

learner is also presented. The following objectives are set for this chapter. After completing the chapter, readers will:

- Identify the foundational skills for distance learners
- Become familiar with the stages of the taxonomy for the technology domain and its application to teaching and learning of the distance learner.
- Be able to apply the Taxonomy for the Technology Domain to the development of learning objectives for the distance learner.
- Identify key instructional technologies supporting the technology domain and the distance learner.

Lesson Plan Template. Refer to **Appendix C, Distance Learner Lesson Plan Template** as the chapter discusses **Focus on Learning** as depicted in Figure 1.

INTRODUCTION

So far in this book, we have considered three popularly regarded domains of learning. The cognitive domain comprises knowledge-based objectives and has four practical instructional levels: facts, understanding, application (including analysis and synthesis), and evaluation. The fact level focuses on recall of single concepts and uses verbs like define, identify, and list. The understanding level requires a comprehension of facts so that two or more concepts can be fused together to describe, compare and contrast knowledge. Application combines two or more concepts together to form new ideas. Evaluation acts further upon the use of knowledge to assess, measure, and judge the impact on the environment as the learner moves up the higher order thinking skills proposed by Bloom et al (1956).

The affective domain governs emotions and beliefs and is considered by many to be feelings-based. The levels of this taxonomy encompass awareness, differentiation, and assimilation. The verbs for this domain are generally limited to words like display, exhibit, and accept and apply at all levels. Assimilation, however, is behavioral in nature and requires the learner to place feelings, emotions, and beliefs into practice in the everyday world.

The psychomotor domain is skill-based. The learner acts upon the environment via imitation, practice, and habit. The psychomotor domain is steeped in demonstration. Imitation occurs under the observant eye of the instructor. Practice validates the presence of an enhanced skill set as proficiencies are built by the learner without the need for the ever-vigilant teacher. Habit is attained when the student can perform the skill from rote memory without cognitive regard for specific procedures.

FOUNDATIONAL SKILLS FOR DISTANCE LEARNERS

Successful distance learners possess unique qualities. They often represent working students who are trying to better their position and need the flexibility provided by an online environment to satisfy a host of individual commitments from work to home to personal goals. As more and more potential students become aware of the modality for distance learning, the virtual classroom becomes an increasingly significant player in the educational community. In general, the literature has proposed that distance students possess, among others, the following qualities. The successful distance learner can:

Communicate effectively through writing. In the virtual classroom, the majority of communication is written, so it is critical that students feel comfortable in expressing themselves in writing. A stumbling block for many adult learners who have been away from school for a considerable period of time or experienced failure in previous efforts to write effectively, many students have limited writing abilities. Such shortcomings must be addressed before or as part of the distance experience and may require remedial efforts before an online regimen of courses commences.

Demonstrate a significant degree of self-motivation and self-discipline. By now, most distance-based programs have effectively discouraged potential students who view online learning as a quick-fix to a structured, traditional program of study. Responsibility for completing assignments, remaining in contact with instructors as well as peers, and completing assignments without daily admonitions from the teacher are part and parcel of a successful distance learner.

Initiate communication when problems arise. Many of the non-verbal signals (e.g., head nodding, hand raising, classroom responses, etc.) evident in the traditional classroom are simply unavailable to the distance teacher. Learners experiencing difficulty at any level (either with the technology or with course

Table 1. Teaching at a Distance versus Traditional Classroom (Tomei, 2006)

Modality	Online	Traditional
Instructional Content	59.18 hours	41.25 hours
Student Counsel and Advisement	40.43 hours	34.75 hours
Student Assessment	56.22 hours	60.50 hours
Total hours required:	155.83 hours	136.5 hours

content) must assume the responsibility for communicating their situation immediately otherwise the instructor will never know what is wrong often until it is too late to correct the condition. Those introverted students who put off self-identification when they misunderstand a lecture or encounter personal hardships during the semester expecting the situation to remedy itself are by far the largest category of unsuccessful distance learners.

Meet the minimum requirements for the program. The requirements for distance-based courses are no less than that of any other quality educational program. The successful student views the online environment as a more convenient way to take delivery of their education – not an easier way.

Commit to the requisite number of hours per week for each course. Online is not an easier modality for learning course content. On the contrary, for both the teacher and the student, distance education demands more time and energy than the more traditional classroom process. In general, online university students devote another 10-20 hours per week in the virtual class modality to complete assignments, remain in contact with their instructor and peers, and prepare submissions for upload and distribution as compared to traditional classroom environments (Buchanan, 2000). Likewise, when research compares the amount of time devoted to distance versus traditional instruction in the areas of delivery of instructional content, student counsel and advisement, and student assessment, the findings clearly indicate that, with the exception of student assessment, additional time is required to deliver a course at a distance (see Table 1). Instructors will commit an additional 14 percent more time to deliver an online course than they would in a traditional classroom format (Tomei, 2006).

Share their educational experiences (job-related, personal, and educational) as part of the learning process. Introverted students find that the online process eliminates many of the barriers that hinder many individuals in expressing themselves in a traditional classroom. Some online communications can be permitted to remain totally anonymous while the mere physical separation of email, online discussion boards, and virtual chat rooms gives students time to reflect on the information before submitting their responses for the scrutiny of instructors and peers.

Accept critical thinking and decision making as part of the learning process. Distance learning requires students to make decisions based on facts as well as experience; instructors must become facilitators of the process, ensuring students receive the necessary data, time, and experiential opportunities to foster this aspect of learning. Critical thinking is a form of judgment based on reflection as well as action. Critical thinking is a tool for making decisions and solving problems, both important attributes of the successful learner whether traditional or at a distance.

Meet a minimum level of technical and academic requirements, including, but not limited to: (a) participation in the virtual classroom 5-7 days a week; (b) working well with others in completing projects on time; (c) using the applicable technology properly; and, (d) meeting other minimum standards as set forth by the institution.

Summary. As the market for distance students continues to expand, there has developed a consciousness among educators as to what constitutes the qualities of a successful distance learner. Administrators, as well as faculty, seek a delivery media that fosters (if not guarantees) successful learning outcomes. The characteristics as set forth above will go a long way in promoting a pool of distance learners will be well served by this newest instructional format.

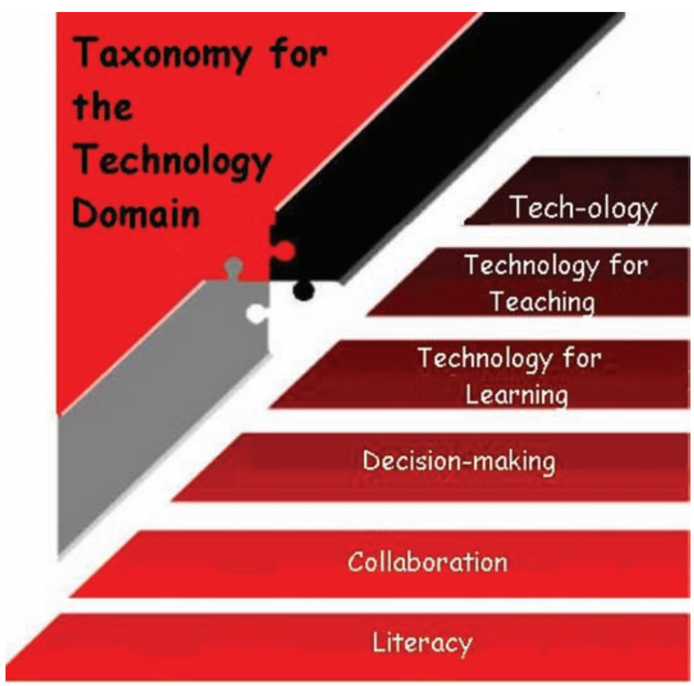
THE TAXONOMY FOR THE TECHNOLOGY DOMAIN

The newest domain for teaching addresses issues of computer fundamentals, hardware and software, audio/visual technologies, and the impact and importance of teaching with technology.

Many educators view teaching with technology as arguably the most important instructional strategy to impact the classroom since the introduction of the textbook. The Taxonomy for the Technology Domain offers an equivalent view for using technology commensurate with the other domains of learning previously discussed.

Research shows that teachers who use a classification scheme to prepare instructional learning objectives tend to produce more successful student learning outcomes (Kibler, Barker, and Miles, 1970 and Krathwohl and Bloom, 1984). The Taxonomy embodied in Figure 6.1 includes Literacy, Communications, Decision-Making, Technology for Learning, Technology for Teaching, and Tech-ology and represents a slight departure from the original Taxonomy for the Technology Domain published in 2005. What

Figure 2. The Taxonomy for the Technology Domain (Tomei, 2005)



remains the same are the six steps that offer progressively more complex stages for teaching technology by constructing increasingly more difficult student learning outcomes as they proceed up the pyramid.

Technology for literacy is defined as the minimum technical competencies expected of learners (from the perspective of this text, the distance learner), teachers, administrators, and instructional technologists. The first rung on the ladder establishes the most fundamental literacies for the technology user. At this lowest level of intellectual activity, users demonstrate varying degrees of basic computer skill. For teachers of distance learning, objectives that promote an understanding of computer terms and concepts, the operation of computer hardware, and the use of basic computer applications are in order. Teachers of distance learners use action verbs that involve general awareness and use of simple technology. Here are two objectives appropriate for distance learning that are grounded in technology literacy:

"Following an online presentation provided as an email attachment and sent to registered students one week prior to the start of the academic term, students will access their Blackboard course via their assigned username and password, and complete the first online introductory session within the next five days."

"Using an Internet search engine, students will locate three referenced web sites provided by the teacher and print the first page of each site, and submit those pages as html files to the instructor for credit."

Level Two: Technology for Collaboration. Effective uses by the distance learner include technology for written and oral communication, the professional exchange of information, and interpersonal collaboration. Distance teachers should seek evidence of collaborative skills in their learners by asking them to share information in written form (word processing, desktop publishing), participate in and interpret interpersonal dialog (via newsgroups, list servers, and chat rooms), and respond to direct interchange of information (electronic mail). While many of the skills at this level of the taxonomy are similar to those expected of any learner, for the distance learner the mastery of such competencies must be evidenced to a much more sophisticated degree. Some example learning objectives in collaboration include:

"Using email, the student will send at least 2 messages and reply to another 4 messages from their instructor during the first two weeks of the semester."

"Students will use the online chat room at least weekly during the grading period to share ideas with fellow classmates about assigned readings."

Level Three: Technology for Decision-Making. Decision-making refers to an ability to use technology in new and concrete situations, including those of the previous two levels (as is typical of the hierarchical structure of any taxonomy). Helping the distance learner acquire decision-making skills via technology includes such important tools as spreadsheets, brainstorming software, and statistical analysis packages. Making decisions using technology requires greater student understanding than the previous stages; specifically, it demands a level of competency in technology literary as well as collaborative skills. Therefore, teachers of distance learners at this level should prepare their charges with the necessary skills to apply various technologies as practical tools for self-learning since much of their learning will occur at a distance. Here are a few example objectives that reflect this level's strength.

"After recording the quantitative results of a two-week observation period, students will capture the resulting weather data in electronic format and use the "what if" features of spreadsheets to forecast the next day's weather and post their results to an electronic drop box."

"Prospective online candidates will use the resources of CD-ROM catalogs to research and identify at least three potential colleges based on area of the country, programs desired/offered, cost and financial assistance opportunities, and reputation and personal interest."

Level Four: Technology for Learning. Technology is a potent tool for discovering academic content. At this level, technology centers on identifying appropriate online instructional resources. Teachers are finding a growing cache of educational software, electronic journals, and Internet sites appropriate for use in a distance-based learning environment. Teachers should challenge distance learners with the latest technology resources available; introducing those that match selected learning strategies with specific lesson objectives. A few objectives that demonstrate technology for learning include:

"The distance learner will assess four Internet sites concerning the Holocaust and select the site that best reflects their feelings and emotions about the Nazi's 'final solution'."

"The distance learner will construct a comprehensive outline using online brainstorming software in support of their undergraduate thesis research project."

"The distance learner will employ advanced math software and complete the first four lessons on algebra attaining at least a 90 percent on the online quiz at the conclusion of each lesson."

Level Five: Technology for Teaching. Technology for teaching asks the distance learner to take several technologies and develop new, previously non-existent materials to help them better understand the current lesson. For example, Internet sites are clearly becoming the media of choice for hosting lesson content. Unfortunately, due to inconsistent application of advanced web interface design principles, they are often disjointed, redundant, sometimes flawed, and frequently confusing to the student. What better way to employ the full advantages of technology in an academic environment than to peruse the available online resources, pick and choose the most appropriate content, and compose new materials using only that content best suited to the learning styles of the particular distance learner?

At this level of the taxonomy, teachers of distance learners should prepare their charges with the technology-based skills to identify content-rich hyperlinks and combine this information with visual and auditory presentations, textual matter, and other technologies to create entirely new lesson materials.

In his landmark research, Howard Gardner (1993, 1999) developed the idea that there is not a single "intelligence," but rather seven: visual/spatial, musical, verbal, logical/ mathematical, interpersonal, intra-personal, and body/kinesthetic intelligence. Distance teachers, using various technologies at this high level, challenge their online students to become self-learners by introducing skills that best suits their individual learning styles. Example objectives at the technology for teaching level include:

"Using advanced word processing skills, the distance learner will gather the content to prepare a workbook from online Internet resources that document their exploration of the possible theories of dinosaur

extinction. Students will select their favorite theory and complete the technology-based hyper book for submission to their instructor before the end of the semester."

"The online learner will design, develop, and use an interactive lesson to examine the skeleton of the human body and correctly identify 8 out of 10 major bones."

"The online learner will use the web-based virtual tour containing digital images, email addresses, and key hyperlinks of personal interests to present a synopsis of the major concepts presented during the semester."

Level Six: Tech-ology. Social issues surface whenever thinking students consider the implications of technology use. At this level, teachers of distance learners should introduce technology-related issues of values, ethics, and standards with respect to the uses of technology that allow the learner to appraise, argue, assess, choose, compare, and defend technology for teaching and learning.

For example, teachers might initiate classroom debates about the availability of information concerning the digital divide. The digital divide is defined as,

"… the gap between those people with effective access to digital and information technology and those without access to it. It includes the imbalances in physical access to technology as well as the imbalances in resources and skills needed to effectively participate as a digital citizen. In other words, it's the unequal access by some members of the society to information and communications technology, and the unequal acquisition of related skills. Groups often discussed in the context of a digital divide include socioeconomic (rich/poor), racial (majority/minority), generational (young/old) or geographical (urban/rural). The term global digital divide refers to differences in technology access between countries." (Wikipedia, 2008)

Topics that address tech-ology include copyright and fair use laws and the use of commercial, off-the-shelf tools (such as TurnItIn software) to monitor plagiarism in the classroom; censorship on the Internet at various levels of education; or, legal and moral behavior when using information and technology. This top level of the taxonomy asks learners to judge the value of technology and consider its impact on society as a whole. Here are some examples.

"Students will prepare a grammatically correct, three-page, double-spaced report critically analyzing the use of commercial software tools to recognize the level of plagiarism of student work submitted for the class."

"Learning groups will integrate US Copyright Office information to prepare an interactive lesson on the topic, "The Fair Use Laws and Their Impact on Educators," to be given to the class."

"Class members will join an online chat room to debate the benefits and drawbacks of the Apple-Microsoft monopoly. After the discussion, four salient points must be used by the student to prepare a point paper describing the effects of any proposed government action against these corporations on individual computer users."

THE USE OF THE TAXONOMY FOR DEVELOPING LEARNING OBJECTIVES FOR THE DISTANCE LEARNER

Taxonomies are tools for both the teacher and the learner. The International Society for Technology in Education (ISTE) produced its first set of technology-based standards for students in 1998 and followed up with revisions in 2007. Since that time, the National Educational Technology Standards for Students (NETS) have served as a roadmap for improved teaching and learning by educators throughout the United States and many countries around the world. Specifically, the NETS address: creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem solving, and decision making, digital citizenship, and technology operations and concepts.

Figure 3 matches the ISTE standards with the various levels of the Taxonomy for the Technology Domain. When combined with the action verbs suitable for the technology domain in the next section of the chapter, it is clear that Taxonomy for the Technology Domain is a useful tool for teachers delivering instruction at a distance.

From previous chapters in this part of the book, action verbs are commonly found in learning objectives created for the cognitive, affective, and psychomotor domains. For the technology domain, however, the action verb alone lacks specificity with respect to the target technologies that will be applied for teaching and learning. To effectively represent the six levels of this taxonomy, action statements are proposed to act upon a specific target technology.

At the literacy level, distance teachers use learning objectives that promote an understanding of computer terms and concepts, the operation of computer hardware, and the use of basic computer applications. They use action verbs that involve general awareness and use of simple technologies.

Distance teachers seek evidence of collaborative skills by asking their students to share information in written form (word processing, desktop publishing), participate in and interpret interpersonal dialog (via discussion boards and chat rooms), and respond to direct interchange (electronic mail).

Decision-making technologies include such important tools thinking and learning tools as spreadsheets, brainstorming software, statistical analysis packages, and virtual tours.

At the technology for learning level, distance teachers are expected to design, develop, and apply various technologies as practical tools for student-initiated learning.

Technology for teaching requires distance teachers and learners to analyze available technology resources and select those that match their own learning strategies with specific lesson objectives. To successfully integrate technology at this level, teachers identify content-rich materials and combine this information with visual and auditory presentations, text-based components, and web-based technologies to create entirely new lesson materials.

Finally, how technology contributes to our society introduces issues focusing on the importance and applications of technology to appraise, argue, assess, choose, compare, and defend.

As with the previous domains, Table 2 lists action statements and intellectual activities appropriate for each of the respective levels. Pay particular attention to how the verbs match with possible technologies.

Figure 3. ISTE Standards and the Taxonomy for the Technology Domain

Taxonomy Level	1.0 Literacy	2.0 Collaboration	3.0 Decision-Making	4.0 Tech for Learning	5.0 Tech for Teaching	6.0 Tech-ology
1 Creativity and Innovation						
Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using						
a. Apply existing knowledge to generate new ideas, products, or processes.					X	
b. Create original works as a means of personal or group expression.					X	
c. Use models and simulations to explore complex systems and issues.				X		
d. Identify trends and forecast possibilities.			X			
2 Communication and Collaboration						
Students use digital media and environments to communicate and work collaboratively, including at a						
a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.		X				
b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.		X				
c. Develop cultural understanding and global awareness by engaging with learners of other cultures.		X				X
d. Contribute to project teams to produce original works or solve problems.			X	X		
Taxonomy Level	**1.0** Literacy	**2.0** Collaboration	**3.0** Decision-Making	**4.0** Tech for Learning	**5.0** Tech for Teaching	**6.0** Tech-olog
3 Research and Information Fluency						
Students apply digital tools to gather, evaluate, and use information. Students:						
a. Plan strategies to guide inquiry.			X			
b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.				X		
c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.	X					
d. Process data and report results.			X			
4 Critical Thinking, Problem Solving, and Decision Making						
Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make						
a. Identify and define authentic problems and significant questions for investigation.				X		
b. Plan and manage activities to develop a solution or complete a project.				X		
c. Collect and analyze data to identify solutions and/or make informed decisions.			X	X		
d. Use multiple processes and diverse perspectives to explore alternative solutions.			X	X		
Taxonomy Level	**1.0** Literacy	**2.0** Collaboration	**3.0** Decision-Making	**4.0** Tech for Learning	**5.0** Tech for Teaching	**6.0** Tech-ology
5 Digital Citizenship						
Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:						
a. Advocate and practice safe, legal, and responsible use of information and technology.						X
b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.						X
c. Demonstrate personal responsibility for lifelong learning.						X
d. Exhibit leadership for digital citizenship.						X
6 Technology Operations and Concepts						
Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:						
a. Understand and use technology systems.	X					
b. Select and use applications effectively and productively.	X					
c. Troubleshoot systems and applications.	X					
d. Transfer current knowledge to learning of new technologies.	X					

Table 2. Action Statements and Technology-Based Activities

Taxonomy Classification	Action Statements
Literacy	• **Understand** computer terms in oral and written communication • **Demonstrate** keyboard and mouse (click and drag) operations • **Use** basic computer software applications. • **Operate** computer input and output devices • **Apply** computer terminology in oral and written communication • **Consider** the various uses of computers and technology in business, industry, and society • **Use** Web-based search engines • **Download** information via file transfer protocol • **Control** various input and output devices
Collaboration	• **Share ideas** using communications tools appropriate for writing and personal communication • **Exchange information** electronically among students • **Communicate** interpersonally using electronic mail
Decision-Making	• **Apply** electronic tools for problem-solving • **Design** effective solutions to practical real-world problems • **Develop** new strategies/ideas with the help of brainstorming software • **Prepare** an electronic spreadsheet • **Create** calendars, address books, and class schedules • **Formulate** new ideas with the help of brainstorming software
Technology for Learning	• **Appraise** educational software and determine its effectiveness with respect to individual student learning styles • **Discriminate** among multimedia resources appropriate for the various levels of student development (e.g., age, gender, culture, etc.) • **Assess** various Internet environments for their strengths as possible student learning tools • **Employ** electronic media to construct new research and investigate lesson content • **Locate, infuse, and assess outcomes from** teacher and student web-based materials • **Locate, infuse, and assess outcomes from** text-based materials using word processing technology • **Locate, infuse, and assess outcomes from** visual-based classroom presentations using presentation software
Technology for Teaching	• **Design**, **construct**, **integrate, and assess outcomes from** teacher-made Internet-based materials for learning subject content • **Design**, **construct**, **integrate, and assess outcomes from** teacher-made text-based materials for learning subject content • **Design**, **construct**, **integrate, and assess outcomes from** teacher-made visual-based classroom presentations for learning subject content • **Consider the uses** of technology to address the strengths and avoid the weaknesses inherent in multiple intelligences • **Focus** student learning using integrated instructional materials • **Assimilate** technology into a personal learning style • **Facilitate** lifelong learning by constructing a personal schemata for using technology • **Enhance** personal productivity with technology tools
Tech-ology	• **Defend** copyright and fair use laws for using technology • **Debate** the issues surrounding legal/ethical behavior when using technology • **Consider the consequences** of inappropriate uses of technology • **Support** copyright and fair use laws for using technology

Key Instructional Technologies Supporting the Technology Domain and the Distance Learner

The various technologies used in distance learning fall into four primary categories:

(1) Print or text technologies,
(2) Audio or voice technologies,

(3) Computer-based environments, and
(4) Video technologies.

Many of the technologies overlap into more than one category. For example, audio conferencing and video conferencing hold places in both computer-based and audio and computer-based and video technologies. As well, the Internet is represented in all of the four categories. See Glossary of Terms for a more complete definition of these categories.

Figure 4 offers a listing of existing instructional technologies. Each technology is prefaced with the most frequent level of the technology taxonomy on which it might be employed; many technologies fit nicely into more than one level.

Level One: Technology Literacy. Print technologies would be most prevalent at this first level of the technology taxonomy. Correspondence courses represent the original form of distance learning. In years past, print materials were mailed to students, assignments returned to the teachers, and evaluations sent back sometime later – all through the postal system. Even though there are numerous new options for distance learning (e.g., eBooks, hypertext, web) text-based resources remain a significant component of most distance courses. In addition, any technology shown in Figure 4 represents a skill or competency would fall under this first level. For example, groupware, instrumentation, Logo, mind maps, study guides, and web services are just a few of the instructional technologies available to support the technology literacy of the distance learner.

Level Two: Collaboration. Level two addresses the ability to use technology to interact with others. For the distance learner, level two provides many of the most critical skills since most, if not all, course collaboration is accomplished electronically. From the list of available technologies, forums, blogs, collaboration software, newsgroups, podcasting, shared space (e.g., MySpace), and of course email, the telephone, voicemail, and writing tools are common expressions of instructional technologies for the distance learner.

Level Three: Decision-Making. Probably containing the fewest technologies for the taxonomy, decision-making tools include modeling software, spreadsheet and spreadsheet derivatives (e.g., templates, functions, graphic organizers, and preset formulas), simulation and gaming tools (e.g., SimCalc, SimQuest, and simulation software), and web-based reports.

Level Four: Technology for Learning. Many of the technologies offered in Table 7.5 reflect their potential as learning tools. In truth, many of the technologies can be shared at other levels of the taxonomy. For example, numerous technologies categorized as technology for learning (Level 4) can also be used to implement teaching (Level 5). Computer-based learning, the Hyper Book, learning managements systems, presentation software, and web-based training are equally suitable for both learning and teaching depending on whether instructors infuse currently available content material or develop and implement their own.

Level Five: Technology for Teaching. A few technologies identified in the table are exclusive to teaching. Computer-integrated classrooms, for example, would serve the needs of the technology-minded instructor as a vehicle for designing and implementing distance learning. So would e-instruction, e-tutoring, and edu-portfolios (although an argument has been made that electronic portfolios are more for student learning than teaching). There are several tools for designing instruction also mentioned such as instructional design tools, an intelligent learning environment, learning technology systems, multimedia authoring systems, and programmed instruction to name a few.

Figure 4. Instructional Technologies Supporting the Distance Learner

2	Anchored forum	6	Educational software evaluation	1	Open educational resources
25	Audioconferencing	6	Educational technologies	4	Open learner model
25	Audiotape	6	Educational technology	1	PLATO
5	Authoring environment	2	Email	4	Participatory learning environment
1	Authorware	1	Expressive digital medium	5	Pedagogic method
2	Babble	1	Groupware	5	Pedagogic strategy
2	Blog	1	Hypermodel	6	Personal learning environment
5	Broadcast video	45	Hypertext (Hyper Book)	2	Podcasting
2	Bulletin Board Systems	1	Hypermedia	1	Portal
45	Computer Based Learning	4	Interactive Videodisc	145	Presentation software
4	Case-based learning	4	Interactive Multimedia	1	Probeware
45	CDROM-based courses	4	Immersive virtual reality	3	Professional tool
1	Cognitive tool	4	Inquiry-based learning	5	Programmed instruction
2	Collaboration software	6	Instructional Technology	4	Problem-Based Learning
2	Collective writing	5	Instructional design	4	Project-based learning
25	Computer Conferencing	1	Instrumentation	4	Satellite course delivery
4	Computer game	5	Intelligent learning environment	2	Shared space
4	Computer simulation	4	Intelligent tutoring system	3	SimCalc
45	Computer-based learning	1	Interactive multimedia	3	SimQuest
4	Computer-based manipulative	123456	Internet	3	Simulation
45	Computer-based training	1	Knowledge Forum	3	Simulation and gaming
5	Computer-integrated classroom	4	Learning e-portfolio	6	Social software
24	Computer-mediated communication	4	Learning environment	1	Study Guides
24	Computer-supported argumentation	45	Learning management system	3	Student model
2	Computer-supported collaborative learning	5	Learning object	4	Technology enhanced learning
5	Computer-supported cooperative work	5	Learning object repository	5	Technology-enhanced classroom
15	Concept map	1	Learning sequence	2	Telephone
15	Constructionist learning object	5	Learning technology system	5	Teleteaching/ Telecourses
5	Content management system	1	Logo	1	Textbook print media
5	Computer-Managed Learning	1	MOO	6	Ubiquitous learning
15	CourseBuilder	1	MUD	45	Videotape
15	Courseware	3	Metadata	2	Voicemail
2	Data Conferencing	1	Microlearning	5	Web authoring system
1	Desktop virtual reality	1	Microworld	1	Web service
25	Desktop video	1	Mind map	45	Web-based training
1	Digital library	4	Mobile learning	25	Webcast
5	E-instruction	3	Modeling software	3	WebReports
4	E-learning	1	Moodle	2	Wiki
24	E-moderation	1	Multimedia animation	1	Workbooks
5	E-tutoring	5	Multimedia authoring system	2	Writing tool
5	Edu-portfolio	2	Newsgroups	2	Writing-to-learn

Level Six: **Tech-ology**. Finally, a host of technologies are suitable for technology at its highest level. Issues of social software, equitable access to technology, ubiquitous learning, and instructional technology in general are appropriate as well.

Summary. Distance learning technologies offer benefits at all levels of education. Convenience, flexibility, effectiveness, and efficiency are the hallmarks of a successful distance learning program. Such a program provides convenient access for both students and instructors. Many of the technologies mentioned in this chapter are easily accessed at home or office as well as the classroom. Other technologies provide a distribution channel that can emanate from a single point (e.g., university or corporate training headquarters) to multiple remote sites.

Many forms of distance learning provide students the flexibility to participate whenever or wherever is most convenient. For the distance learner, who often sports many of the same characteristics as the adult learner discussed in an earlier chapter, elasticity in the form of time and place is critical to their ultimate success. One student may wish to review a videotape in the middle of the night while another cannot check their e-mail until the early morning hours before they head to work. Another student may require 30 minutes to review and assimilate the content taken from a course web site while her peer needs only an hour.

Distance learning has proven itself an effective for teaching and learning. The key to effective use of distance learning is the application of appropriate methods and technologies with respect to the target learner as well as student-to-student interaction and teacher-to-student feedback (Moore & Thompson, 1990; Verduin & Clark, 1991). Also, recall from earlier in the chapter that successful distance learners possess unique qualities to communicate effectively, self-motivation and self-discipline, initiate communication when the situation dictates, meet minimum program requirements, commit to course demands, share educational experiences, accept critical thinking and decision making, and meet minimum levels of technical and academic competency.

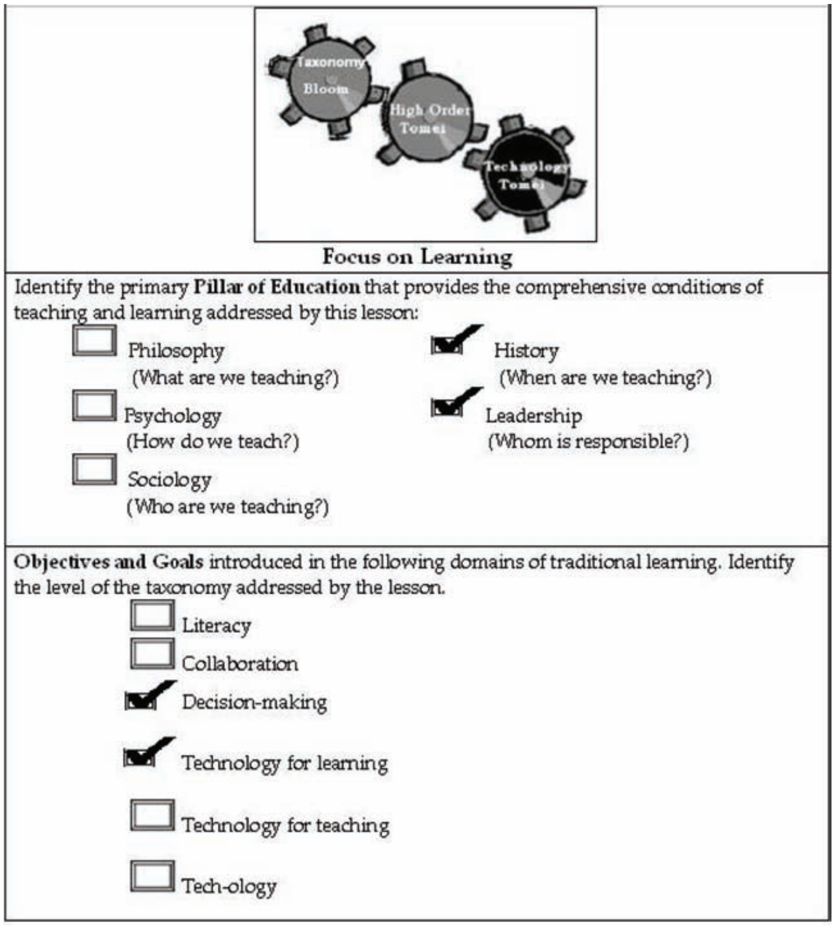
Many forms of distance learning involve minimal cost. Access to telephones, televisions (with cable and playback capabilities), even computers are taken for granted. One of the most salient benefits of distance learning is the wide variety of materials available (with more on the way every day) to meet individual learning styles. An example of the rapidly expanding resources in the area of distance education comes from Annenberg Media whose video programs are distributed via digital satellite channels, streamed on demand at their Learner.org web site, and distributed for online purchase on videocassette and DVD. Annenberg Media is free for schools, colleges, libraries, public broadcasting stations, public access channels, and other non-commercial community agencies and operates 24 hours a day, 7 days a week. The wealth of audiovisual material can only be appreciated by visiting their web site and viewing their programs self.

Ultimately, equity always becomes a critical issue with respect to education and access to learning opportunities. Rural schools, those with fewer qualified teachers, and schools with less funding than others often turn to distance learning to alleviate the shortfalls of inequity and lack of access.

For the distance learner, the keys to success are not inexplicable. Select the appropriate technology, allow time for planning, deliver the lesson in a professional manner while providing consistent and timely feedback that all learners needs will encourage a successful distance learning outcome. Too, student-to-student interactions, adequate technical and pedagogical training for the instructors, combined with a support structure for students and teachers that react to problems which more assuredly will be encountered also contribute to success. Finally, practice, practice, practice admonishes all who teach and those who would learn that regardless of the modality, a conscientious effort goes a long way towards a successful learning outcome.

Literacy, collaboration, decision-making, technology for learning and teaching, and tech-ology offer a new perspective for immersing technology into any program of distance education. The Taxonomy for the Technology Domain brings a new vocabulary of action statements to classify technology-based learning objectives. For the distance educator, the taxonomy will help promote the effective use of technology for successful teaching and learning.

Figure 5. Distance Learner Lesson Plan Template (cumulative)



CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on Learning** portion of the template (Figure 5) demonstrates how to develop a distance learner-oriented lesson on the Planets of the Solar System.

REFERENCES

Bloom, B. S., Englehart, M. B., Furst, E. J., Hill, W. H., & Krathwohl, D. L. (1956). *Taxonomy of educational objectives: the classifications of educational goals.* New York: Allyn & Bacon/Longman/ Pearson Publishers.

Buchanan, E. A. (2000). Going the Extra Mile: Serving Distance Education Students, University of Wisconsin-Milwaukee. *Online Journal of Distance Learning Administration*, *3*(1).

Gardner, H. (1993). *Frames of mind: the theory of multiple intelligences.* Boulder CO: Basic Books, Inc.

Gardner, H. (1999). *Intelligence reframed: multiple intelligences for the 21st century*. Boulder, CO: Basic Books, Inc.

Kibler, R. J., Barker, L. L., & Miles, D. T. (1970). *Behavioral objectives and instruction*. New York: Allyn & Bacon/Longman/Pearson Publishers.

Krathwohl, D.L. and Bloom, Benjamin S. (1984). *Taxonomy of educational objectives. the classifications of educational goals. Handbook I.* New York: Addison-Wesley Company/Pearson Publishers.

Tomei, L. A. (2001). *Writing learning objectives using a taxonomy for the technology domain.* Duquesne University, School of Education. Unpublished manuscript.

Tomei, L. A. (2001). *Using a Taxonomy for the Technology Domain.* Pennsylvania Association of Colleges and Teacher Educators, Annual Conference, Hershey PA.

Tomei, L. A. (2006). The Impact of Online Teaching On Faculty Load: Computing the Ideal Class Size for Online Courses. *Journal of Technology and Teacher Education*, *14*(3).

Section 3
Focus on Resources

Technology-based instructional resources have much to offer the educator of the 21st century. For teachers of traditional, adult, or distance learners, text-based handouts and study guides provide an immediate tool for those who need extra help on topics that may be particularly challenging. Web-based home pages and classroom presentations excite the learner with multimedia images, sounds, and video and bring otherwise lackluster content material to life. The virtual tour is particularly appropriate for students who rely on technology as the primary vehicle for their instruction. And, finally, the hyper book and interactive lesson are vehicles for developing instructional resources that can be made available to learners at any level.

Chapter Seven: Text-based Resources for Teaching begins with an examination of the classroom handout and the student study guide. Handouts are one-page documents that focus on specific learning objectives and include the instructional steps, content material, procedures for learning, and formative assessment to ensure student learning. Study guides focus on a specific learning style by concentrating on a limited number of learning objectives that matches them to successful teaching strategies.

This chapter then moves on to the hyper book and its student-centered, teacher-prepared focus. The hyper book is a workbook that integrates images, real-world exercises, visual charts, graphs, and tables, and real-time hyperlinks to applicable web sites in a text-based format for learning and assessment. To be successful, the text-based lesson is created using word processing, graphics, and the Internet. However, it may be implemented in a classroom without the aid of a computer or any other form of instructional technology.

Visual-based presentations offer a multimedia environment for concepts and ideas critical to student understanding and are introduced in ***Chapter Eight: Visual-based Resources for Teaching***. They create powerful slide shows incorporating bulleted lists and numbered text; multimedia clip art, pictures, sounds, and movies; links to teacher-validated web sites and documents; colorful charts and graphs; and, a choice of output options tailored to individual learning styles.

The interactive lesson is the more technically sophisticated visual-based, learner-centered teaching strategy appropriate for all ages. Traditional, adult, and distance students who find learning easier when confronted with concrete, sequential instruction imbedded with real-time assessment will appreciate the interactive lesson. They are student controlled and offer individualized instruction, remedial or additional practice, or enrichment.

Finally, ***Chapter Nine: Web-based Resources for Teaching*** reviews web home pages; a high-tech vehicle for hosting online instruction by presenting actual learning objectives while focusing attention on the most important aspects of the lesson. Perhaps the most exciting aspect of web home pages is identifying appropriate online sites for student exploration. Internal as well as external links tie together teacher-made web pages, professional pages found on the Internet, and online handouts and classroom presentations.

As with the other two modalities, there is a more complex application. In the case of web resources, the virtual tour lesson offers a web-based teaching strategy that presents multi-sensory, multimedia instruction appropriate for individual student exploration and group learning experiences. Front doors address particular learning styles and amplified sites offer the specific content information. Readers will have an opportunity to grasp the principles of web-based design along with a mastery of basic and enhanced web page construction features.

Section 3 of the ***Engine for Designing Technology-based Instruction*** is different than the other parts and chapters of the book. It does not distinguish resources among traditional, adult, and distance learners as do the other chapters. Indeed, a focus on resources, be they text, visual, or web-based, have application for any learner at nearly any level of skill or competency.

Chapter 7
Text-Based Resources for Teaching

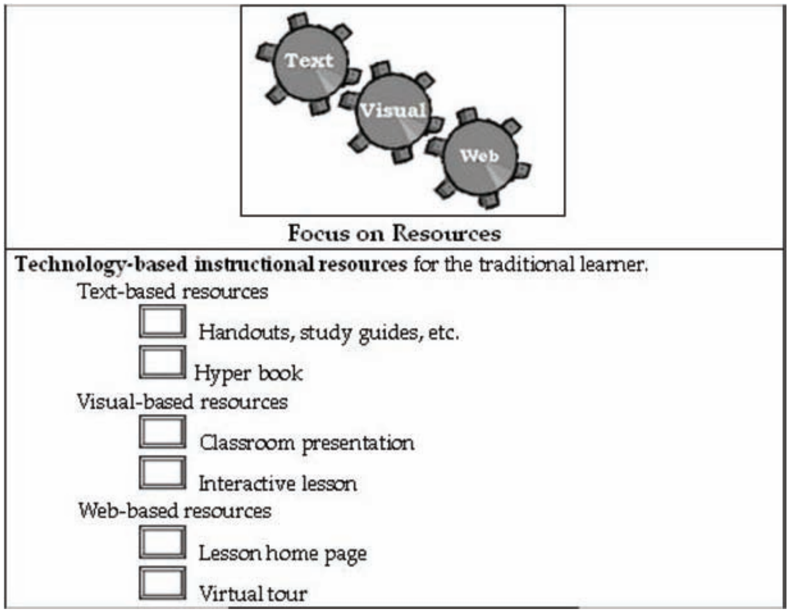
Learning Objectives. In 2001, Christopher-Gordon Publishers printed the book entitled, *Teaching Digitally: a Guide for Integrating Technology into the Classroom Curriculum*. This highly successful publication has already been incorporated into many undergraduate and graduate teacher-preparation courses in instructional technology. While the original Christopher-Gordon text is now out of print, the publisher agreed to restore all copyrights to the author allowing this book to incorporate an modernized version of this valuable hands-on guide to preparing technology-based materials. The features, commands, menu items, and screen shots have been updated to reflect the latest Microsoft Office 2007 package and included as three separate Primers for Text, Visual, and Web-based Materials at the end of this book.

In this chapter, the reader will demonstrate a mastery of:

- Word processing fundamentals, including opening documents, editing, saving, inserting clip art, images, and hyperlinks, spell checking, and printing.
- Text-based design as well as resources harvested from the Internet to produce text-based materials for teaching.
- Advanced word processing features, such as word art, text colors, tables and columns, and hyper text.

DOI: 10.4018/978-1-60566-824-6.ch007

Figure 1. Traditional Lesson Plan Template (Focus on Resources)



- Text-based design as well as resources harvested from the Internet to produce a hyper book lesson.

Lesson Plan Template. Refer to **Appendix A, Traditional Learner Lesson Plan Template** as this chapter discusses **Focus on Resources** as depicted in Figure 1.

INTRODUCTION

With the advent of so much high-tech gadgetry, teachers often overlook the value that concrete, hard copy resources make to effective learning tools. Student handouts serve as inexpensive assessment instruments. They offer highly flexible remedial content for classroom or take-home material. They provide immediate access to enrichment activities for students who complete assignments ahead of schedule.

The hyper book offers targeted instruction in the form of guiding questions, hyperlinks, and visual images for discovery learning, additional readings, and assessment preparation. No matter how many high technology resources are available to the instructor, sometimes text-based materials are still the best way to teach a lesson objective.

Readers will find themselves returning to this part of the text often. It is important to note that the methodologies for developing technology-based instructional materials presented in this (as well as the subsequent two chapters) are the culmination of, and revisions to, previously successful efforts. Microsoft Office includes a robust suite of office productivity tools including the word processing package Word; the graphics presentation system Power Point; spreadsheet application Excel; database application Access; and, desktop publishing capability Publisher. Microsoft Office runs equally as well on both the Macintosh and Windows platforms with minimal differences.

LEARNERS AND TEXT-BASED MATERIALS

Books and other text-based materials remain an important, arguably the most important, resource for learners and teachers. Text has had an integral role in teaching and learning since the printing press made books plentiful, affordable, and ubiquitous. However, even in today's classroom environment, it is not uncommon for teachers to acknowledge that they seek better resources, materials that reflect they way they teach and their students learn, content that stimulates thinking and group processes beyond what is found in today's libraries and publishing houses.

Self-made resources represent a better way to produce the kind of text-based resources that address the unique needs of 21st century educators. Using the tools and techniques presented in this chapter, teachers will be able to design, develop, implement, and evaluate their own text resources. Some of the most important considerations for teaching and learning using text-based resources include:

Effectively addressing changes in learning environments. In recent years, students have demonstrated that they have indeed become a different breed of learners than in the past. The use of text materials must change as well. They must reflect a more interactive design with more visuals than previous editions.

Involving a degree of technology. Digital e-books and web-enhanced links within digital text are all ways to improve otherwise lackluster textual materials.

Providing for multiple levels of reading, writing and listening skills. Based on the competencies of individual learners, relying on a single book to cope with a variety of levels has been recognized as unworthy of today's educational system. Using technology to bend text to the strengths and weaknesses of a particular learner is much more reasonable.

Addressing real-world situations. One of the major complaints about text-based materials is its inherently static nature when responding to abrupt challenges posed by changing world conditions.

Infusing a host of academic content areas. Most text books focus on a single subject matter. Using technology, text materials can be designed for the subject disciplines so that they link the reader with cross-curricular developments – economic, social, political, and environmental with issues of values, morals, ethics, and society.

Assessing learning. Text-based materials remain a primary media for assessment. Hard-copy tests, research papers, etc. will long remain the media of choice for many educators seeking to evaluate learning. Integrating technology with text can launch assessment into the next dimension of teaching by providing the immediate feedback to alter a course or delivery of content while the lesson is actually being delivered.

TEXT-BASED MATERIALS FOR TEACHING

Two prime formats for text-based materials include handouts and study guides. Lesson handouts are often one or two-page documents that focus on a specific learning objective. They provide specific instructional steps, student materials, procedures for learning, and, usually, a short assessment. They are typically completed within a single learning class period.

Study guides focus more generally on one or more lesson objectives. While a study guide might address several objectives, it is usually tied to a single instructional strategy appropriate for a majority of classroom students. Study guide materials are constructed with a common set of components. As a minimum, they should contain:

Table 1. A Primer for Text-based Materials

A Primer for Text-based Materials is provided as an addendum to this book. In this resource, **I. Constructing Basic Text Documents**, step-by-step instruction and practical examples for building handouts and study guides for teaching are considered. The primer begins with launching Microsoft Word and guides the reader through the basics of opening and saving documents, editing, and moving text. It moves quickly into a discussion of enhanced word processing features of inserting clip art, pictures, and text from the Internet, spell and grammar checking, and printing. Novice teachers should follow Section I and the example materials displayed at Supplement 1a to build their own resources. More advanced teachers may disregard this section of the primer and focus their attention on the advanced applications of the hyper book.

- **Title of the Lesson** and a graphic or image appropriate for the content material contained in the resource.
- **Student Name**. Materials to be used by learning groups would offer room to identify all students participating in the experience.
- **Date of the Lesson/Section Number**. Successful materials are used year after year; the date of the lesson identifies learners in multiple sessions over the course of a semester or multiple academic years.
- **Teacher's Name**. Self Explanatory
- **Page Numbers**. Sequential numbering of pages eliminates student confusion and enhances classroom discussion.
- **A variety of sensory aids to student learning**, including clip art, images, and text.
- **Copyright information,** if applicable.

THE HYPER BOOK LESSON

Microsoft Office is the most integrated software package of choice for the majority of schools and school districts both in the United States and internationally. The hyper book has become the first manifestation of text-based technology integrated specifically for teaching and learning. Here's a definition:

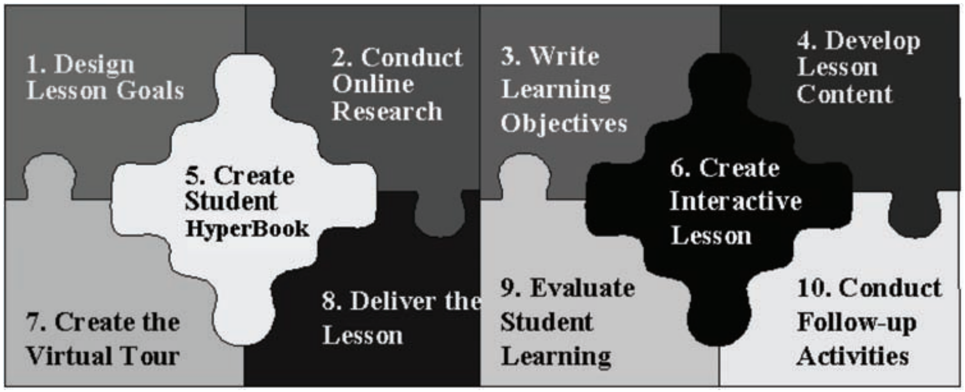
*"**A hyper book is a text-based, workbook -centered teaching strategy integrating images, real-world exercises, visual aids, and real-time links appropriate for learning and assessment**."*

The hyper book lesson offers students an opportunity to work together in groups and encourages teachers to match students who own computers with those who do not. Text-based material is very effective in helping students comprehend new concepts with its diagrams, outlines, and summaries. It opens the door for individualized discovery and inquiry learning opportunities and encourages students to make intuitive guesses using guided questions to keep them on task.

Many teachers prefer to combine text-based workbooks with web-based lessons. Some use the workbook to encourage remedial assistance. Others find the hyper book useful in assessing assigned exercises. Designing, developing, implementing, and evaluating the hyper book follows the *Model for Technology-Based Lessons* (Figure 2) presented below.

Step 1: Design the Lesson Goals. The hyper book provides a series of instructional exercises to help students acquire basic knowledge of the content material. Since introductory information is often found in books, encyclopedias, and the Internet, teachers are encouraged to continue identifying materials from a variety of sources selecting those which specifically address their own learning objectives. Throughout

Figure 2. Model for Technology-Based Lessons



the development of this lesson, keep in mind that the hyper book is ideal for group learning, homework assignments, and individualized instruction. To satisfy the demands of the hyper book format, lesson goals should include, as a minimum:

- **Indicative Information** such as student name, date of the lesson, and the teacher's name.
- **Introduction** to the topic written at the student's level. Note: for early childhood lessons, this may mean pictures rather than words.
- **Instructions** for completing the hyper book. Students should understand what is required to complete the lesson.
- **Allotted Time**. The lesson goals should clearly state the amount of time available and how much of that time is allotted to the completion of the hyper book.
- **Lesson Goals**. The following goals were identified for the hyper book lesson: Select a favorite planet; distinguish between inner and outer planets in the solar system; identify planets by sight and features; share your ideas about planets; and, learn about planets and the solar system on your own.

Step 2: Conduct Online Research focuses on locating material that addresses each of the lesson goals; specifically, the process of exploring the Internet, evaluating content material, and harvesting text, graphics, and files. Search engines are an excellent way of locating resources, especially if the researcher has no idea where to start. An online review, for example, found over 603,000 sites with information about planets and the solar system.

Step 3: Write Learning Objectives. In this step, specific learning objectives are created along with a statement of prior student knowledge and classroom assignments. It is perhaps the most important phase of lesson development as learning objectives are closely matched with the established goals of the lesson. See Table 2.

Step 4: Develop Lesson Content. The primary task in this step of lesson development is to decide on the instructional content of the hyper book by connecting learning objectives with content material as outlined in Table 3.

Table 2. Learning Objectives for the Hyper Book

Lesson Goal: Select a favorite planet Prior Knowledge: Students are familiar with planets from television, books, etc.	**Learning Objective 1: Students will examine the Planet Cards provided in the hyper book, draw a circle around their favorite planet, and explain why this is their favorite.**
	Assignment: Examine the Planet Cards in the hyper book and draw a circle around their favorite planet.
Lesson Goal: Distinguish between inner and outer planets Prior Knowledge: Students working use of computers, mouse, and Internet navigation.	**Learning Objective 2: Students will identify their favorite planet as an inner or outer planet in the solar system.**
	Assignment: Students will draw a picture of their favorite planet.
Lesson Goal: Identify planets by sight and features Prior Knowledge: Student knowledge of planets from the web.	**Learning Objective 3: Students will locate a specific planet by searching provided Web sites and complete the following information.**
	Assignments: complete the information in the hyper book table that calls for name of your planet and a description of its size, distance from the sun, year, etc.).
Lesson Goal: Share your ideas about planets Prior Knowledge: Student experience and practice with group learning and sharing situations.	**Learning Objective 4: Students will cut out planet "trading cards." Not all cards are provided to each student. Students will identify duplicate cards and trade with classmates to obtain desired cards.**
	Assignments: Students may print out additional cards to complete their collection.
Lesson Goal: Learn about planets on your own Prior Knowledge: Students familiarity with previous portions of the hyper book.	**Learning Objective 5: Students will identify anything about planets that they already know from the column of characteristics provided in the hyper book.**
	Assignments: From a list of planet characteristics, place a check next to the characteristics that match your favorite planet.

Step 5: Create the Student Hyper Book. The hyper book is a combination of images, charts and graphs, tables, and Web site links. While text remains its primary format, there is the option of providing students with an electronic version containing active hyperlinks to the selected Web sites. A summary of the key components of a successful hyper book lesson include:

- **The Lesson Overview Page** containing, as a minimum:
    - **Indicative Information**
    - **Introduction to the Topic**
    - **Instructions**
    - **Allotted Time**
    - **Lesson Goals**
- **Exercise Pages**. Components of these pages include:
    - **Learning Objectives**
    - **Student Exercises**
    - **Student Assignment**
    - **Student Evaluation and Feedback**
- **Follow-on Activities** with additional information for remedial students and enrichment activities.
- **Additional Resources** such as videotapes, audiocassettes, and publications.
- **Student Materials**

Step 6: Create the Interactive Lesson, is discussed in detail in Chapter Eight.
Step 7: Create the Virtual Tour, is discussed in detail in Chapter Nine.

Table 3. Hyper Book Content Material

Learning Objective	Hyper Book Lesson Content
Learning Objective 1: Students will examine the Planet Cards provided in the hyper book, draw a circle around their favorite planet, and explain why this is their favorite. .	1. Select from among images of the: • Mercury • Venus • Earth • Mars • Jupiter • Saturn • Uranus • Neptune • Pluto 2. Explanations should include information about the description of its size, distance from the sun, year, etc.).
Learning Objective 2: Students will identify their favorite planet as an inner or outer planet in the solar system.	1. Access the following site. www.kidscosmos.org/kid-stuff http://www.nineplanets.org/ http://www.nasa.gov/ 2. Provide the following information: • Identify the planet as an inner or outer planet 3. Draw a picture of the planet in the hyper book.
Learning Objective 3: Students will locate a specific planet by searching provided Web sites and complete the following information.	1. Place a check next to the characteristics that match your favorite planet. ___ Moons: None ___ Average Distance from Sun: 57,910,000 km ___ Orbital Period: 0 Years, 87 Days, 23.3 Hours ___ Temperature Range: -45° C to 464° C ___ Average Distance from Sun: 108,200,000 km ___ Diameter: 12,756.28 km ___ Temperature Range: -69° C to 58° C ___ Atmosphere: Mostly Nitrogen and Oxygen ___ Moons: One ___ Average Distance from Sun: 149,597,870 km ___ Moons: Two ___ Average Distance from Sun: 227,940,000 km ___ Orbital Period: 1 Years, 320 Days, 18.2 Hours ___ Rotation: 1 Days, 0.67 Hours _____ Moons: 60 ___ Orbital Period: 11 Years, 315 Days, 1.1 Hrs ___ Moons: 31 _ ___ Rings: Yes ___ Temperature Range: -214° C to >-205° C ___ Moons: 16 ___ Average Distance from Sun: 2,870,990,000 km ___ Orbital Period: 84 Years, 3 Days, 15.66 Hrs ___ Average Distance from Sun: 4,504,300,000 km ___ Orbital Period: 164 Years, 288 Days, 13.0 Hrs ___ Rotation: 0 Days, 16.11 hrs
Learning Objective 4: Students will cut out "trading cards." Not all cards are provided to each student. Students will identify duplicate cards and trade with classmates to obtain desired cards.	1. Cut out the planet trading cards provided at the end of the hyper book. 2. Determine which planets are needed to complete the collection. 3. Trade with fellow classmates to complete the collection. 4. Use www.tradingcards.com/planets to locate additional cards to complete the collection.
Learning Objective 5: Students will identify anything about planets that they already know from the column of characteristics provided in the hyper book.	Questions include: 1. Did you enjoy using computers to find planets? 2. What did you discover about planets from the hyper book that you did not know before? 3. What is your experience as a computer user? (**Note: This question is appropriate for Hyper books to determine the status of student technology training**).

Table 4. Constructing The Hyper Book Lesson

Topic II, Constructing The Hyper Book Lesson, offers instructions and examples of the digital hyper book. Additional features required to construct the hyper book include: word art, tables and columns, and hyperlinks. These more difficult features are offered for both novice teachers (although they should begin with Section I) and advanced teachers. The example displayed at Supplement 1b illustrates the elements of an effective hyper book.

Step 8: Deliver the Lesson. The hyper book lesson is most often delivered in its text-based format as a hard copy workbook printed for each student. A variety of graphics and visual materials increase student learning. Clip art includes hundreds of graphics. Images, either scanned from textbook pages or downloaded from the Internet, introduce a visual component to materials that teachers expect the student to read and understand.

The Digital Hyper Book. Although text remains the primary media for the hyper book, there is the option of providing students with an electronic version of the workbook containing active hyperlinks to selected web sites. Offering the hyper book on diskette, for example, is appropriate when teachers wish to discourage access to unsuitable sites or unauthorized "surfing" in general. For homework assignments, the digital hyper book provides an excellent resource to parents who wish to monitor the Internet explorations of their children. Linked web sites decrease hours of potentially unproductive searching, especially for younger children whose typing skills often result in wasted time in front of a computer. Specific web addresses placed as bookmarks speed up the process of locating sites and offer parents some assurance that the teacher and school are aware of the inherent hazards of Internet technology and are taking steps to reduce potential harm to their children.

Each student should be provided their own hyper book. To complete a lesson digitally, students should have access to their own computer, either in school or at home, with both Microsoft Word and an Internet connection. The digital version of the hyper book encourages students in higher grades (fifth grade or higher in most schools) to complete the required exercises and assignments using technology thereby advancing their own word processing and Internet skills. Students should be encouraged to complete the exercises by filling in the available spaces with their own responses.

A Final Consideration. The format and structure of the hyper book with its lesson overview page, exercise page, etc. is meant to ensure that teachers consider all aspects of the lesson during its development. Early childhood teachers, for example, may see the folly in preparing such detailed instructions for students who cannot read yet. In such cases, infusing all the elements of the hyper book may be more for teachers who wish to make these resources available either online or in hard copy form.

Step 9: Evaluate Student Learning. The hyper book serves as an excellent assessment tool if a few key elements are kept in mind. For example:

Select an Appropriate Format for Student Responses. A simple question, checklist, or fill-in-the-blank is often appropriate. A properly constructed hyper book encourages other venues for valid, reliable student assessment as well.

Allow Sufficient Time and Space for Student Responses. The learner should use the hyper book to capture responses to the exercise scenarios. Enough time must be allotted for student to think and reflect. The hyper book offers related topics for individual consideration and contemplation.

Involve Behavioral, Cognitive, And Humanistic Exercises. Behavioral responses ensure mastery and increase student confidence. Cognitive instruction builds on a student's prior knowledge and adds structure to the particular subject at hand. Humanistic opportunities assist in making the information important to each student.

Include a Section for Personal Self-Evaluation (by the learner) at the end of the workbook. Always seek feedback regarding the lesson, learning outcomes, and the learner. Allowing the student an opportunity to ask questions and express concerns often generates important teaching moments during succeeding classroom discussions.

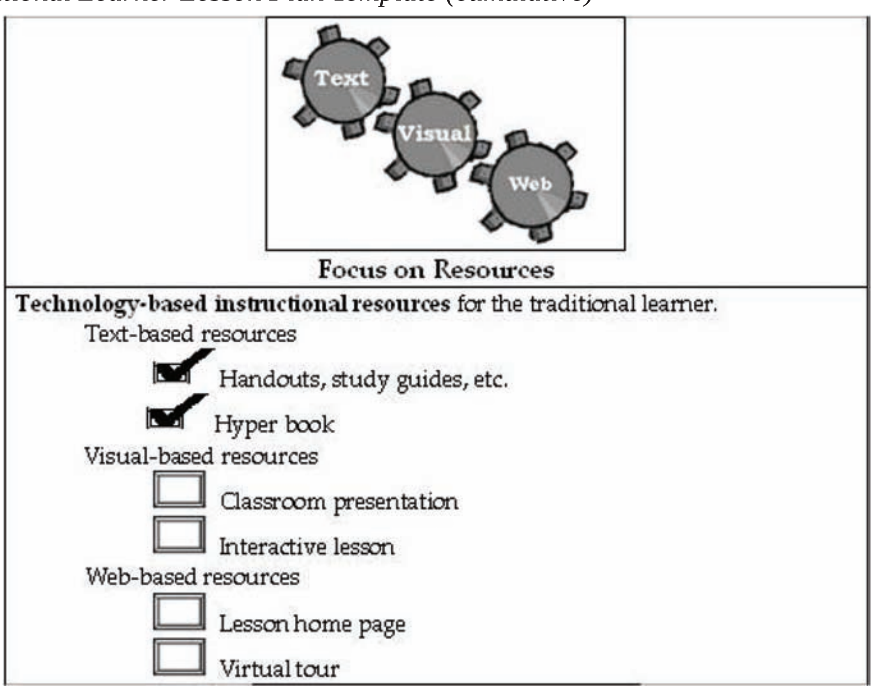
Step 10: Conduct Follow-up Activities. If possible, integrate a variety of technologies into the hyper book lesson such as the Internet, videotapes, audio resources, and other text-based materials. Provide a list of additional Internet sites but do not send a student to a location you have not visited first. Placing additional web addresses at the end of a hyper book ensures that students visit sites containing authentic learning information.

Technology is wonderful, but teachers should not forget other medium for instruction. **The Solar System Hyper Book** (**see Primer 1 – Text-based Materials and Supplements**) references video material readily accessible to the student in the school's library eliminating the risk of offensive or inappropriate material. Audio only resources are being replaced with multimedia materials. However, for many content areas, audio tapes remain a viable instructional resource and should be included in the lesson to benefit the aural learner. Finally, books are natural tools for all learners and should not be overlooked in favor of the more "high tech" resources.

SUMMARY

An essential ingredient in the success implementation of the hyper book is to form the goals, conduct the research, write the objectives, and develop the lesson content before attempting to construct the text-based materials. To complete a successful hyper book lesson, the final steps of the Model for Preparing

Figure 3. Traditional Learner Lesson Plan Template (cumulative)



Technology-Based Lessons (Figure 2) consider delivery of the lesson, evaluation of student learning, and follow-up activities to make the lesson come alive for the student.

For teachers who find it challenging to create the more technical materials demonstrated in later chapters, the hyper book offers a word processing-based lesson with a less demanding range of skills and competencies from which the designer may choose. Yet, the more straightforward and uncomplicated hyper book can ensure just the right combination of technical expertise and student focus to meet the specific learning objectives of the lesson.

CONCLUSION

Appendix A, Traditional Learner Lesson Plan Template A completed **Focus on Resources** portion of the template (Figure 3) demonstrates how to develop a traditional classroom lesson on the Planets of the Solar System.

Chapter 8
Visual-Based Resources for Teaching

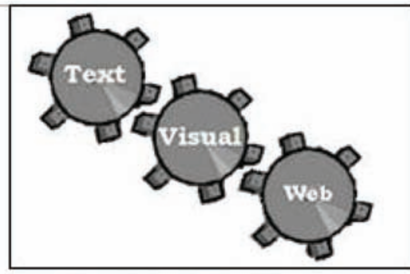
Learning Objectives. The previous chapter discussed the use of word processing to create text-based handouts and study guides as well as the hyper book to foster student understanding and learning. Of equal importance is the use of classroom presentations to meet the needs of visual learners. Towards that goal, this chapter offers the following major learning objectives that will help the reader demonstrate:

- A working knowledge of graphics presentation fundamentals and advanced features of graphics presentation systems, specifically Microsoft Power Point.
- A grasp of visual-based design along with a mastery of enhanced graphics presentation features.
- A combination of these skills with the use of technology resources harvested from the Internet to produce visual-based materials as well as an interactive lesson for teaching.

Lesson Plan Template. Refer to **Appendix B, Adult Learner Lesson Plan Template** as the chapter discusses **Focus on Resources** as depicted in Figure 1.

DOI: 10.4018/978-1-60566-824-6.ch008

Figure 1. Adult lesson plan template (focus on resources)



Focus on Resources

Technology-based instructional resources for the adult learner.

Text-based resources

- ☐ Handouts, study guides, text student materials
- ☐ Hyper book

Visual-based resources

- ☐ Classroom presentation
- ☐ Interactive lesson

Web-based resources

- ☐ Lesson home page
- ☐ Virtual tour

Identify other adult learner-oriented materials needed for the lesson.

1. ________________________

2. ________________________

3. ________________________

INTRODUCTION

Research has found that students learn better when they rely on the instructional strategy best suited to their own particular learning style (Fitzsimmons, 1996). While concrete learners depend on the text-based workbook for reinforcement, abstract learners find visual media more to their liking.

Microsoft Power Point creates presentations suitable for the classroom by offering a multimedia environment for concepts and ideas important for understanding. It provides a suite of tools to create powerful slide shows incorporating bulleted lists and numbered text; multimedia clip art, pictures, sounds, and movies; links to teacher-validated web sites, programs, and documents; colorful charts and graphs; and, a choice of output options tailored to individual learning styles. Power Point offers an extensive fare of commands, options, and menus. With the advanced features of auto content wizard, hyperlinks, and printing alternatives, it also provides an array of all the tools necessary to build truly exciting and interactive instructional materials.

LEARNERS AND VISUAL-BASED MATERIALS

Identifying visual learners in a traditional classroom can be relatively simple. Students who prefer to learn visually are often found in the front seats nearest the teacher, sitting alone in the library flipping though highly graphic text books, or working at the board drawing diagrams or conceptual models from content material covered in a lecture. Visual learners rely heavily on their sense of sight to receive information, process it, and retrieve it. The following characteristics are typical of many individuals with strong visual learning skills.

Use of visual aids. Overhead projectors, digital images, graphs and charts, and diagrams are more easily remembered.

Enthusiastic awareness of aesthetics, the environment, and visual art. The visual learner appreciates beauty and attraction of a well-designed graphics presentation. Alternatively, a poorly designed presentation can quickly detract from the learning experience causing confusion and misunderstanding.

Strong visualization skills. Visual learners create mental pictures when learning new material. They remember the location of words. Oftentimes, they close their eyes to visualize the content and location of characters and images. They can often “see” the information invisibly written or drawn. ***Strong visual-spatial skills***. Sizes, shapes, textures, angles, and three-dimensional depths are important determinants for these learners. Graphic presentations should incorporate drawing tools and clip art to offer the learner spatial relationships.

Attention to body language. Visual learners often pay close of others (facial expressions, eyes, stance, etc.). While this may not be manifested with a totally student-controlled presentation, the use of icons representing people and the incorporation of photos containing human subjects will suggest more to the visual learner than to those who might favor any other learning strategy.

Use of conceptual or inductive approaches. Avoid rote memorization, drill and practice, and simple repetition. Instead, provide the visual learner with images of real-world situations that reflect the hardest tasks in the lesson. Use visual tools to determine what the learner has already mastered before entering the heart of the lesson and new material.

VISUAL-BASED PRESENTATIONS FOR TEACHING

Approximately 40 percent of students are visual learners, preferring to be taught through pictures, diagrams, flow charts, timelines, videos, and demonstrations. The technology-enhanced materials uncovered in the previous chapter remains heavily reliant on presenting content primarily through written text. Without visual cues, some students will remained consigned to underperforming because of the inconsistency between the instructor’s teaching strategies and the student’s learning styles.

Using visual presentations could offer significant learning benefits. Findings reveal that student performance on specific academic topics and overall course satisfaction can be enhanced by combining visual resources with more traditional instructional approaches (Clarke, Flaherty, and Yankey, 2006). When building visual materials for teaching, it is recommended that the presentation be built beginning with the main topic and flowing to the sub-concepts and ideas. Slides should reflect a single thought or concept and the completed presentation should encompass a limited number of concepts considering the age and learning experience of the student.

Table 1. Visual-Based Materials

Primer 2 for Visual-Based Materials is provided as an addendum to this book. **Section I. Constructing Visual-Based Presentations** provides the step-by-step instructions and practical examples for building classroom presentation using Microsoft Power Point. The primer begins with basic features of graphics presentations systems from opening slides to viewing, editing, and saving a presentation. Novice teachers should follow Section I and the example materials displayed at **Supplement 2a** to build their own resources. More advanced teachers may disregard this section of the primer and focus their attention on the advanced applications of the interactive lesson.

Images should be as clear as possible (i.e., always opt for the highest resolution image when downloading photos and graphics from the Internet). Vary the size of lines, printing, and font size keeping in mind that many presentations suitable for a computer screen become unreadable when projected in a large classroom.

Develop a personal style (e.g., background, font and font size, use of colors, etc.) and stick with it throughout the entire presentation and even an entire lesson if more than one presentation is needed to address multiple learning objectives. A well-constructed visual-based presentation consists of 12-15 slides with the following elements:

- **Slides 1 and 2** introduce the lesson.
- **Slide 3** delivers the learning objectives. This initial orientation to the presentation eliminates misconceptions and triggers prior student knowledge of the content area.
- **Slides 4 through 9** confer the content material of the lesson. Images are offered to students who learn best visually and slides are reinforced with textual material to support the lesson.
- **Slides 10 to 11** define vocabulary words and offer an assessment opportunity to ensure that student understanding has occurred.
- **Slide 12** links the students to information in the form of pre-selected web sites, workbook material, and outside research to further explore the topic.

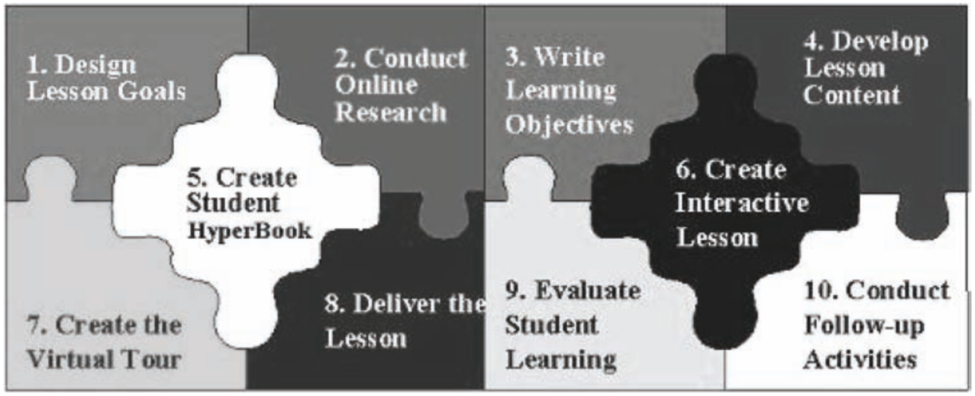
Good design skills are essential to attract, maintain, and direct attention while emphasizing the message. The use of hyperlinks provides teacher-validated Internet sites while helping students eliminate unproductive surfing. Finally, hyperlinks reduce a reliance on typing skills and address technology issues which result in unproductive computer time. Next, some advanced features of graphic presentation systems provide additional options that comprise a truly technology-rich visual-based resource called the interactive lesson.

THE INTERACTIVE LESSON

Interactive lessons are not new. They have existed almost since the start of instructional technology. However, the ***Model for Technology-Based Lessons*** **(Figure 2)**, introduced in the last chapter, combined with the advanced features of Power Point in this chapter, makes this an unbeatable recipe for developing a successful student-centered presentation.

Creating an Interactive Lesson. To be successful, the interactive lesson integrates self-paced content with specific, logical, sequenced instruction that places a good deal of the responsibility for mastering the material directly in the hands of the learner. The interactive lesson embraces mastery

Figure 2. The model for technology-based lessons



learning techniques and suggests alternatives for presenting learning objectives, corrective instruction, and enrichment activities.

Step 1: Design the Lesson Goals. There are two specific tasks associated with this step: (1) selecting a topic for the interactive lesson, and (2) identifying the target learners. The topic for the planets interactive lesson is ***A Tour of the Solar System,*** a lesson that can be directed toward young learners through adults by simply modifying the depth of the content explored in the lesson. To satisfy the interactive lesson format, lesson goals include:

Introduction to the topic, written at the appropriate level for the target learner.

Instructions for completing the interactive lesson. Students should understand what is required to complete the lesson.

Allotted Time. Lesson goals should clearly state the amount of time available and how much of that time is allotted to the completion of the lesson.

Lesson Goals. Students are asked to be able to recognize the nine planets, recall some basic facts about each of the nine planets, and distinguish between the inner and outer planets of the solar system.

Step 2: Conduct Online Research. Online research provides the specific behavioral-based elements from which the interactive lesson is created. An online review of planet sites found several that offer vital facts while providing outstanding visuals of the planets. With research material on the Internet so abundant, the only challenge is the selecting which images, video clips, and other artifacts to incorporate into the lesson. With the interactive lesson, materials from discovered web sites can be incorporated directly into the lesson (after giving proper credit and copyright statements) rather than linking directly to the site. In so doing, the material may be validated by the instructor for content and applicability, online exploration is better controlled, and sites deleted over time are avoided.

Step 3: Write Learning Objectives. The interactive lesson is behavioral in nature with lessons constructed sequentially from first to last, easy to difficult. Writing clear, unambiguous learning objectives requires the instructor to understand the *Taxonomy for the Technology Domain* (Tomei, 2005).

In Step 3, specific learning objectives are created along with a statement of prior student knowledge and classroom assignments. Learning objectives are closely matched with the established goals of the lesson. See the left-most column of Table 8.1 for an example of the ***A Tour of the Solar System*** and its respective learning objectives.

Step4: Develop Lesson Content. In this step, the instructional sequence of the Interactive Lesson connects the each learning objective with specific content material. The content of ***A Tour of the Solar System*** is displayed in the right-most column of Figure 3.

Step 5: Create Student Hyper Book was discussed in detail in Chapter Seven.

Step 6: Create the Interactive Lesson. The planet lesson exhibits the best the Interactive Lesson has to offer. Visual and aural classroom presentation remains the primary strength of this format. The interactive lesson is shown in its entirety as part of the Primer 2. Examine it closely to identify the key elements required for an effective resource. A summary of the key components of a successful interactive lesson include:

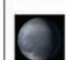
- **The Lesson Overview Page** containing, as a minimum:
  - **Introduction**
  - **Instructions**
  - **Allotted Time**
  - **Lesson Goals**
- **Prior Knowledge Review**. Elements of these first few slides in the lesson include:
  - **Selected questions to arrive at the level of student understanding of the topic**
  - **Positive Feedback slide to reinforce the correct response**
  - **Negative Feedback slide to provide the correct response and encourage further student exploration.**
- **Transition Slide** moves the learner from the pre-lesson to the body of new material.
- **Learning Objective Component** includes a series of slides containing content material presented in the following sequence:
  - **Title slide**
  - **Content slide(s)**
  - **Formative Assessment slide(s)**
- **Summative Assessment slide(s)** recap the lesson goals with a measurement of student learning outcomes over the entire lesson.
- **Follow-on Activities** with additional information (e.g., web sites) for student enrichment activities.

Step 7: Create the Virtual Tour will be discussed in detail next in Chapter Nine.

Step 8: Deliver the Lesson. An interactive lesson is best delivered in a self-paced learning environment; either in a computer classroom or lab or at home on the learner's personal computer. The lesson can be captured to a CDROM or transferred to a web site for download. Regardless, the size of an interactive lesson is likely to become very large as content is added to the presentation. Finally, do not forget to activate the kiosk feature discussed earlier to better control the movement of the learner through the lesson.

Step 9: Evaluate Student Learning. Earlier in the chapter, the interactive lesson was presented as an instructional technique of mastery learning (to review the techniques and characteristics of mastery learning, revisit Chapter One, Learning Theories and Pedagogy: Teaching the Traditional Learner). To recall, an important premise with this popular teaching strategy is its underlying dependence on behavioral psychology. To be successful, the interactive lesson must follow two basic rules.

Figure 3. Learning objectives for the interactive lesson

Learning Objective	Interactive Lesson Content
Learning Objective 1: Distinguish between inner and outer planets.	Inner Planets include: • Mercury • Venus • Earth • Mars Outer Planets include: • Jupiter • Saturn • Uranus • Neptune • Pluto
Learning Objective 2: Identify planets by sight and features	Identify the planets from these images:  Mars  Mercury  Earth  Venus  Saturn  Uranus  Jupiter  Neptune  Pluto
Learning Objective 3: Learn about planets on own **Prior Knowledge: Students familiarity with previous portions of the Hyper Book, if used.**	Look for these planet characteristics throughout the Interactive Lesson: • Nr of Moons • Average Distance from Sun • Orbital Period • Temperature Range • Diameter • Atmosphere • Moons • Rotation • Rings
Learning Objective 4: Learn a few facts about the Sun	Distance from Earth: 93 million miles Age of the Sun: 4 1/2 billion years old Expected to remain: another 5 billion years Temperature at core: at least 10 million degrees Temperature at surface: 5800 degrees Total and partial eclipse
Learning Objective 5: Learn about asteroids	Asteroids are rocky fragments left over from the formation of the solar system about 4.6 billion years ago. Most of these fragments of ancient space rubble - sometimes referred to by scientists as minor planets - can be found orbiting the Sun in a belt between Mars and Jupiter. This region in our solar system, called the Asteroid Belt or Main Belt, probably contains millions of asteroids.

- First, there must be some form of on-going feedback. Mastery learning advocates refer to this as "formative assessment" and Slides 15-17, Slide 23-25, and Slides 33-35 all demonstrate the lesson's use of this technique to gauge learning.
- Second, there must be a final determination of student learning called the "summative assessment." The assessment slide (see Figure 4) accomplishes this second task of ensuring that the learner completes the lesson, masters the learning objectives, and receives some reward for their efforts. If the interactive lesson is delivered in the confines of a computer lab, the summative assessment slide, designed to display bold colors on the computer monitor, alerts an observant instructor that the lesson is finished and the student is ready for the next instructional challenge. Notice that the assessment slide shown references the **Solar System Study Guide** and instructs the student to answer the final questions in the text-based hyper book created in Chapter Seven.

Figure 4. The summative assessment slide

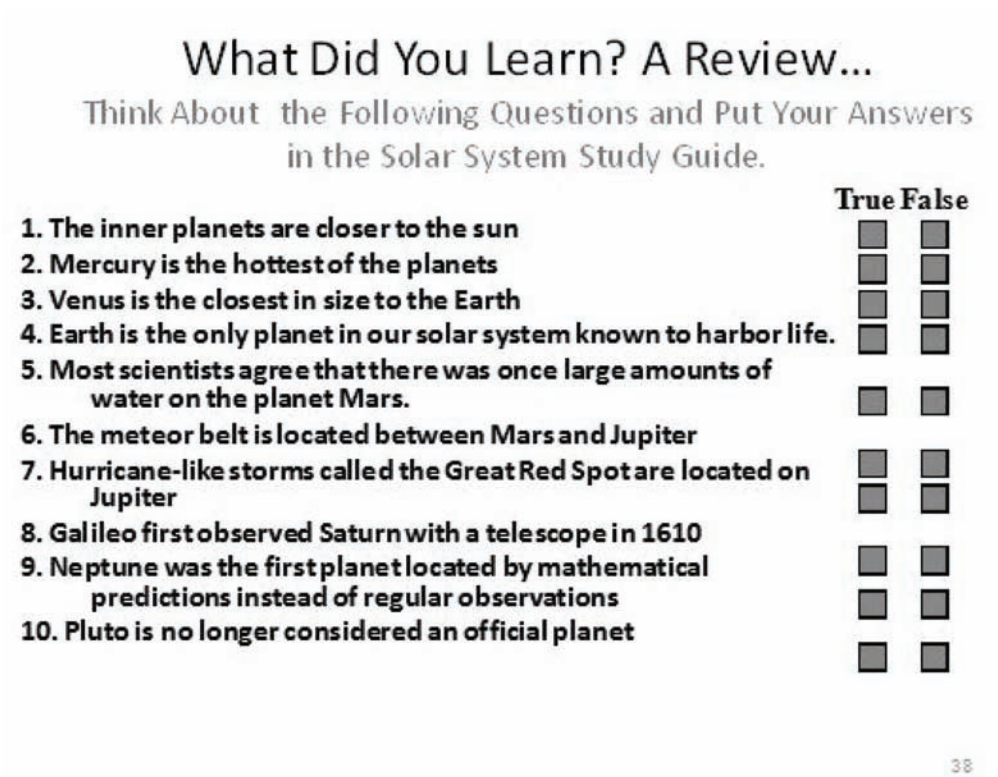
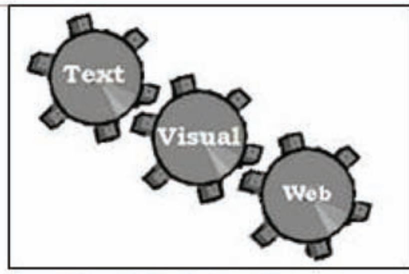


Table 2. Constructing The Interactive Lesson

Topic II, Constructing The Interactive Lesson, offers instructions and examples of the interactive lesson, a visual-based, classroom-centered teaching strategy appropriate for learners of all ages. Additional features required to design an accomplished interactive lesson include: templates and master slides, word art and text colors, drawing tools, slide transitions, action buttons, hide slides, and the kiosk browser. These more difficult features are offered to novice teachers (although they should begin with Section I) and advanced teachers. The example displayed at Supplement 2b illustrates the elements of an interactive lesson.

Figure 5. Adult Learner lesson plan template (cumulative)



Focus on Resources

Technology-based instructional resources for the adult learner.

Text-based resources

- ☐ Handouts, study guides, text student materials
- ☐ Hyper book

Visual-based resources

- ☑ Classroom presentation
- ☑ Interactive lesson

Web-based resources

- ☐ Lesson home page
- ☐ Virtual tour

Identify other adult learner-oriented materials needed for the lesson.

1. **Film: Inner and Outer Planets of the Solar System**
2. **Video: The Milky Way Galaxy**
3. ________________________

Step 10: Conduct Follow-up Activities. Concluding activities are in order as the lesson is completed. These culminating projects do not need to involve technology and surely not the same technologies used to present the interactive lesson. Films and videos make excellent concluding activities; perhaps "2001 – A Space Odyssey" would offer a final venue for a classroom discussion of the solar system and space. The interactive lesson has many practical applications for content rich subjects and is highly recommended as a delivery mode. But, as with all the technologies, it must be properly used in conjunction with a variety of other instructional strategies to produce the desired learning outcome across a classroom of individual learners.

SUMMARY

An essential ingredient in the success implementation of the interactive lesson is to form the lesson goals, conduct the research, write the objectives, and develop the lesson content before attempting to construct the visual-based materials. To produce a successful interactive lesson, the tendency is to include as many audiovisual and web-based resources as possible on each and every slide. Such misuse of technology is highly discouraged. Images, hyperlinks, and sounds must be used judiciously throughout the presentation and then only if they contribute to student understanding of the content under exploration.

Most course developers find the interactive lesson of medium difficulty. Only the hyper book is technologically less demanding with its word processing-based lessons and hard copy workbook format. On the other hand, web-based materials presented in the next chapter offer many more features with a corresponding degree of difficulty.

CONCLUSION

Appendix B, Adult Learner Lesson Plan Template A completed **Focus on Resources** portion of the template (Figure 5) demonstrates how to develop an adult learner-oriented lesson on the Planets of the Solar System.

REFERENCES

Clarke, I., III, Flaherty, T. B., & Yankey, M. (2006). Teaching the Visual Learner: The Use of Visual Summaries in Marketing Education. *Journal of Marketing Education, 28*(218). Retrieved from http://jmd.sagepub.com/cgi/content/abstract/28/3/218

Fitzsimmons, B. (1996). *What's kid's learning style: auditory, visual, hands-on?* San Francisco: Jewish Community Publications Inc.

Tomei, L. A. (2005). *Taxonomy for the Technology Domain*. Hershey, PA: IGI Global Publishing Inc.

Chapter 9
Web-Based Resources for Teaching

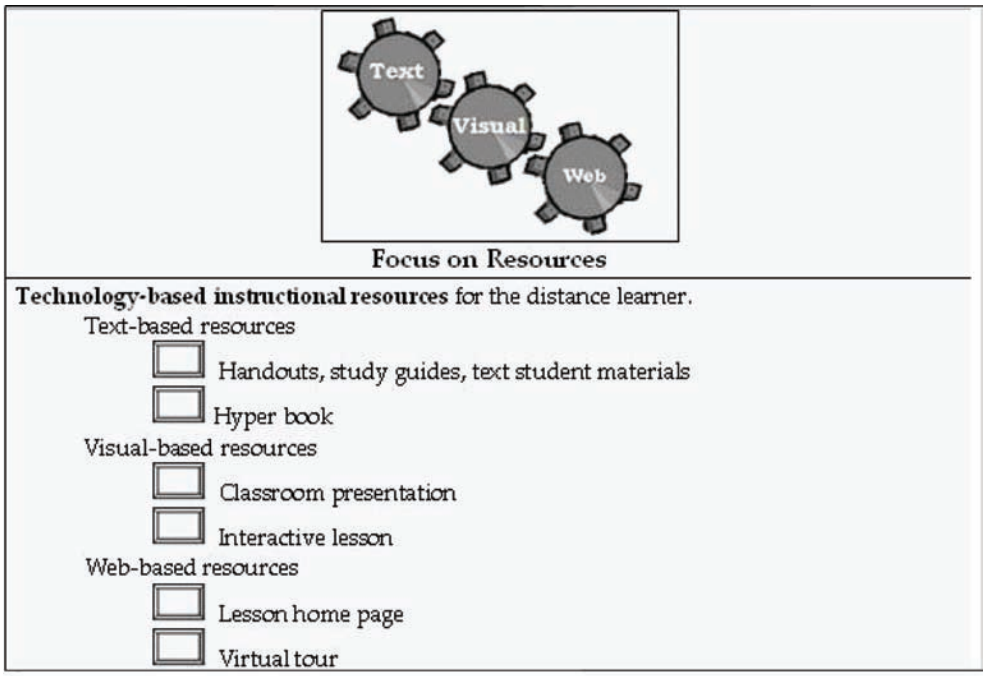
Learning Objectives. This chapter examines how resources found on the Internet may be molded into viable instructional materials matching specific lesson objectives with learning strategies. In support of those objectives, readers who complete Chapter Nine will be able to:

- Explain the history of the Internet from the perspectives of its content, organization, and technologies.
- Discuss the most popular applications of the web for teaching and learning.
- Demonstrate a mastery of web page fundamentals.
- Combine these skills with the use of technology resources harvested from the Internet to produce web-based materials (i.e., Basic web pages and the virtual tour) for teaching.

Lesson Plan Template. Refer to **Appendix C, Distance Learner Lesson Plan Template** as the chapter discusses **Focus on Resources** as depicted in Figure 1.

DOI: 10.4018/978-1-60566-824-6.ch009

Figure 1. Distance lesson plan template (focus on resources)



INTRODUCTION

Whether the instructor prefers handouts, study guides, and workbooks or overheads, 35mm slides, and projected images, the fact remains that the Internet is much too valuable a resource to dismiss as a passing fad. Yet, if the Internet is to reach its full potential as a teaching and learning strategy, educators must come to know and understand not only how to find these resources but how to create them as well.

Over the past 10 years since web browsers first became popular, a rivalry emerged among the leading competitors to become the single provider of web browsers in the industry. Mosaic, Netscape, Internet Explorer, Safari, Mozilla/ Firefox, and others remain in an on-going battle for supremacy of the web browsing public. Unfortunately, users of the Internet often become victims as companies compete – and such is the case with browsers and authoring tools.

In the beginning, browsers did not come bundled with authoring tools – there simply were no authoring tools. Developers were hostage to the html programming language and its string of tags, commands, and scripts. One of the first packages to offer WYSIWYG authoring was Netscape's Composer followed closely by Internet Explorer's Front Page. Composer was included free-of-charge by Netscape. Front Page began as a costly add-on, but was eventually packaged free along with its browser to chip away at Netscape's dominance in the marketplace. Simultaneously, other vendors (Adobe's Dreamweaver being the most prominent) were delivering their own proprietary products for designing web pages at a considerable cost to the user.

Sadly, the situation has deteriorated further. Netscape Composer is no longer bundled with its browser. Microsoft has disconnected Front Page from its Explorer package, and frankly, the rising cost of authoring web pages is no longer a consideration for any of the vendors.

Yet, on the plus side, Netscape continues to provide Composer as part of its earlier versions of the browser; version 7.0 to be precise. And, since educators are always looking for the least expensive way to secure capabilities for designing instruction, it will be suggested that Netscape 7.2 be downloaded until they, too, fall victim to the bottom-line.

The Internet has become arguably the most powerful tool for education and its use has rapidly expanded. Yet, many teachers struggle with how to use this tool for teaching. The clash with this particular technology includes both how to use the web to teach and how to go about taking full advantage of its many capabilities and features. In practice, the web becomes an effective teaching tool when teachers themselves develop web pages for their own courses rather than relying on oftentimes suspect pages found by wandering exploration.

This chapter will introduce the fundamentals of web page design and offer ideas of how the web can be used for developing instructional materials. The chapter discusses some style comments about web pages, since web design is different than typical page layout and can have a strong effect on the usability of web pages. Finally, the design and development of working with the virtual tour lesson are explored.

BACKGROUND OF THE INTERNET

The Internet is organized as a complex network of interconnected computers. Every host computer and every file contained on those machines constitutes a vast and unprecedented archive of materials. Every website, whether containing commercial, educational, or governmental information, is part of this collection. The history of the Internet can be considered from three different perspectives: content, organization, and technologies.

Content. From a content perspective, print media has dominated the Internet since its earliest inception. Traditional print materials remain overwhelmingly popular and are, by far, the media of choice for educational applications. Much of the material that was once available only in hard copy can now be viewed with the click of a mouse. The internet has been called the largest unmediated forum for information of publicly distributed resources in the history of the world. Much of the print material on the web is new. Other resources have been retrofitted, embedded with state-of-the-art hypertext and multimedia.

The Internet's archive of audio and video resources has arguably increased at the faster pace of any of its content materials, particularly since the introduction of multimedia-capable computer technology in the early 1990's. Today, these resources take the form of embedded links attached to the most sophisticated web pages, stand-alone files on super-fast web servers, and streaming audio and video with up-to-the-minute news and social networking objects. The ready availability of video and audio files gas already enhanced the pedagogical potential of websites and the internet for educational purposes.

Organization. The Internet is a global network of networks consisting of many smaller networks linking an untold number of computers and users. The exact number of computers connected to the Internet has long since been lost in the virtual maze of technologies that share the resources of the Internet. The history of the Internet can be traced by examining three stages of its organizational development over the years:

a. Government control (APRAPNET)
b. Expansion to the global community (Internet)

c. Further expansion of Internet II

In the mid-60's, the RAND Institute was commissioned by the Air Force to study an alternative means of communication after a nuclear attack. The solution suggested involved a technology called "packet switching" that would allow a message on a network to find its destination from among a plethora of alternative routes and paths. The ARPANET, launched in the 1960s for the US Department of Defense, was funded by the Advanced Research Projects Agency (ARPA). Its primary mission was to augment aspects of national command and control apart from the more vulnerable telephone-based landline communications. The potential of the ARPANET, however, was quickly realized by all the key partners in its development: military, education, and commercial.

In the mid 1980s, internet protocol became the official standard of the US Department of Defense and the original ARPANET was separated into two components: the MILNET network remained under the auspices of the military while the Internet became the domain of education and industry. Immediately, educational institutions found an application called file transfer protocol (FTP) to push its classroom resources, administrative policies and procedures, and just-in-time enrollment materials to a waiting user population. Gopher was introduced as a text-based system of documents that allowed server based text files to be hierarchically organized and viewed by users who accessed servers from remote computers. Veronica offered access to information resources held on most gopher servers using Boolean logic (AND, OR) queries and keyword searches.

A consortium led by 207 universities working in partnership with industry and government led to the development of an advanced network of applications and technologies, further accelerating the Internet. Internet II has more than one class of service and computers are able to select the one most appropriate for each type of communication. At least one class guarantees the bandwidth capacity for the most effective transmission of information. Video conference is faster while text-based resources (by far, still the largest traffic media) can operate on slower transmission lines. At the heart of Internet II are the possibilities for collaboration between scientists and scholars as well as burgeoning distance education programs for students and faculty.

Technologies. Early computer technology (1975-1991) hosted the text-based preponderance of materials very well for many years. SinceMicrosoft was founded by Bill Gates and Paul Allen in 1975 and Apple Computer made its splash on the educational scene in 1978, personal computers have been the primary venue for delivering Internet resources. The early life of these machines made text-based resources the only viable materials for transfer, download, archiving, and storage. As a result, the content and organization mentioned earlier followed a sensible blueprint consistent with the power and capacity of these earliest computers.

With the advent of gigahertz speed, megabyte storage, and CDROM-capable drives came the explosion of multimedia and the resulting expansion of audio and video resources on the Internet. The second phase of Internet growth was the direct result of increased machine capacity. Faster speeds allowed quicker download and made audio/video applications more seamless. Greater disk capacity provided the critical hard disk space to save files which, when compared to the kilobytes of text-based documents, now demanded megabytes, even gigabytes of storage. CDROM became the media device for digital encyclopedias, high graphic games, and digital images that brought instructional material to life.

Finally, the technologies of the new millennium further enhanced the Internet and defined the current historical genre of the Internet. LCD flat screens bring a new degree of realism to web pages. Web cameras, digital video, and digital cameras have revolutionized the way images and video clips are captured, stored, and shared. iPods, cell phones, and social networks have moved the boundaries of interpersonal communications far past where educators once thought possible.

Web pages are indeed the "stuff" of 21st century education.

LEARNERS AND THE WEB

The advancement of web-based resources has allowed educators to utilize the Internet for teaching and learning far beyond what educators might have imagined as little as twenty years ago when the Internet was still in its infancy. Since the infusion of multimedia-capable technology in the mid-1990s, web pages have evolved quickly into perhaps the most effective host of effective instructional delivery since the printed text book. Some of the most popular applications for teaching and learning include the use of web-based resources for:

Acquiring Skills. Students use online tutorials or specially-prepared exercises to acquire technical skills or to master a subject area.

Virtual Exploration. Students move between targeted web pages to learn more about a particular content area that what can be collected in any one text book, video, or even a single web site. Student investigations are controlled by the instructor yet offer students the opportunity to explore on their own as they proceed virtually through the best interactive media.

Inquiry and Information. Students no longer seek out library references as their first line of inquiry when considering new problems. The Internet and the World-Wide Web have surpassed libraries (for better or worse) as the vehicle of choice for online investigation by teachers and learners.

Problem Solving. Students use internet resources to answer fundamental questions or explore previously unfamiliar problems. Many web sites have been developed specifically for this reason; that is, to assist the learner with activities and tools to simulate and solve real-world problems.

Generating Results. Online interactive databases test hypotheses and produce useful data for further analysis by researchers of all levels. Such activity may stand alone or be part of a larger project; but, web pages provide the venue for inputting data and generating reports.

Researching. Students engage in multidimensional use of the internet for major projects over a period of time. In addition to researching specific topics, students may participate in multi-location research projects and exchanges.

Sharing and Publishing Information. Students use the full gamut of web capabilities to communicate with others, both formally (i.e., teachers, classroom peers, etc.) and informally (e.g., social networking environments). Web pages offer a medium for publishing information and encouraging feedback from strangers and invited guests as well.

Learning about the Web. Students can learn to use the internet more effectively by understanding it as a technology that encompasses its own design standards in addition to its own programming language. The web is an emerging social environment with a unique set of rules and etiquettes that deserve adherence of its users. Like technology in general, the web is both a tool for learning and an academic content area to be studied in its own right.

SUMMARY

The continuing evolution of the web over the past forty years has enabled educators to move beyond the concept of an electronic archive of resources and to begin exploring new pedagogical possibilities for teaching and learning. As educators, teachers and learners must remain alert to the downsides of the web as a source of unwelcome shortcuts to learning, unethical venue for inferior workmanship in the classroom, and wanton disregard for human interaction. Most certainly, the advantages far outweigh the drawbacks as the web-enhanced classroom continues to bolster the learning process with incredible artifacts linking reality and imagination.

Basic Web Pages for Teaching

As the number of educational web pages continues to increase exponentially, it is especially important to consider the sort of material placed on the page, its overarching purpose for teaching, and how it is displayed for the target learner. Certainly, educational web pages are distinct from commercial sites intended to sell a product or publicize a position.

As with other technologies used for teaching and learning, the teacher suddenly has access to powerful tools for the presentation of academic content. Many of these tools were previously available only to instructional experts and media specialists. The result, in both cases, has been some wonderfully valuable and creative web pages. Unfortunately, it has also resulted in some very poor quality, instructionally ineffective content.

So the question arises -- what are the qualities that make an effective educational web page? At the technical level, there are several style guides that discuss proper syntax, and how to make sure a page displays appropriately. Some common characteristics of an effective web page are discussed.

A web page should be more than just a list of links to other sites, files, documents, or multimedia resources. Many teachers build simple pages of favorite links and add nothing of consequence to other's content. Certainly, in some cases, this is acceptable as teachers often find themselves in the position of offering academic web sites that they are compelled to visit (and validate) before sending unsuspecting children on an exploratory activity.

A well-designed web page always answers the question, "What is this place?" before moving the viewer to more important content. The first thing a learner does when arriving at an unfamiliar site is attempt to answer this question. If the site does not quickly resolve the issue, the user may feel compelled to leave and never return. Designing web pages for teaching is all about making a good first impression. The simpler the text and more direct the purpose, the better. "This web page will help students learn more about planets and the Solar system that surrounds us." Then link to a more robust page or virtual tour.

Good web pages use images and graphics that emphasize the learning objectives of the lesson. Good pages provide consistent, reliable, simple navigation, never hiding links within a color scheme that makes them difficult to find. If a link is in a particular position on one page, it should be in that same place on every page.

One of the main characteristics of an effective web page is the uniqueness of the material presented thereon. Given the vastness of the web, personalized content distinguishes a teacher-made site with a more generic, commercial page. The better web pages always provide a sense that there is something just beyond the next click and entice the learner to seek and explore with the implied promises of pedagogical rewards and new discoveries.

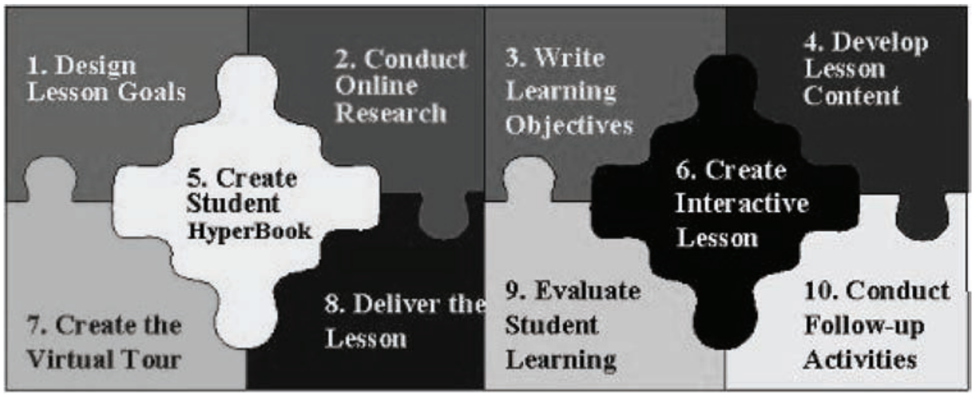
Table 1. Web-based Materials

Primer 3 for Web-based Materials is provided as an addendum to this book. In this resource, **I. Constructing the Basic Web Page** step-by-step instructions and practical examples for building a comprehensive web page suitable for teaching are considered. The primer begins by launching an Internet browser and guides the reader through the basics of editing, moving text, saving and browsing a web page. Novice teachers should follow Section I and the example displayed at **Supplement 3a** to build their own web pages. More advanced teachers may disregard this section of the primer and focus their attention on the advanced applications of the virtual tour.

Finally, web pages are meant to reflect the imagination and practice of the author. Instructional web sites should be an expression of the teaching style of the instructor with the biographical information, attention to academic content, and learning styles evidenced in the target student population. Make the web page personal. Specifically, a successful instructional web page consists, at a minimum, of the following elements:

- **Banner Title and Image** that leads into the topic of the lesson and confirms the location of the page. It is highly recommended that the image appearing on the Banner also be provided the student in a handout, study guide, or classroom presentation introducing the web page.
- **Introduction**. Targeted specifically on the content of the lesson, the Introduction provides a brief explanation of the topic and the key elements to be covered on the page.
- **Instructions**. There should be no confusion about the tasks to be accomplished or the learning that is to occur as a result of completing the web-based materials. The instructions should describe which questions must be completed in a handout. They should identify any outside readings required before or after the web page is viewed and should spell out any special sequencing of materials (for example, reviewing the classroom presentation before exploring the web page).
- **Lesson Objectives.** Likewise, instructors should share expectations for learning. Most learners appreciate viewing the actual learning objectives that will be used to evaluate their understanding. This section of the web page reduces confusion and focuses attention on the most important aspects of the lesson.
- **Web Sites for Student Exploration**. Internal as well as external links to other web pages should be included. An internal link ties instructor-made web pages to other web pages or to online handouts and classroom presentations. An external link provides access to other pages on the web that have been validated for their academic content and application to the lesson.
- **Student Assessment Information**. Provide the criteria for grading in this section of the web page.
- **Address Block**. The Address Block furnishes the policies regarding use of web-based materials including author citation with name, affiliation, and email address. This information is important not only for the student but for anyone who might have found the web page while browsing the Internet and needs to contact the page designer.
- **Fair Use**. Copyright and Fair Use statement should be provided along with a date the page was created and last revised.

Figure 2. The model for technology-based lessons



THE VIRTUAL TOUR LESSON

A ***virtual tour is a "web-based teaching strategy which presents multi-sensory, multimedia instruction appropriate for individual student exploration and group learning experiences."*** It offers the learner a host of "***front doors***" (defined later) each uniquely suited to address a particular learning style along with "***amplified sites"*** (also defined later) that provide specific content information.

The virtual tour is a humanistic teaching strategy appropriate for learners who benefit from a multimedia format. Such web-based resources work for those who learn best when instruction is offered in a student-centered, student-controlled learning environment that embraces discovery and cooperative learning techniques. With the advanced features introduced earlier, the ***Model for Technology-Based Lessons (Figure 2)*** continues to offer a step-by-step approach for developing a successful virtual tour lesson.

Step 1: Design the Lesson Goals. The initial stage of the development process establishes the appropriate goals for the lesson. While the virtual tour makes for the ideal instructional unit because it combines several academic disciplines, this step is also the most time-consuming phase in the preparation of the lesson.

In addition to the academic content offered in the virtual tour, two other considerations are paramount to a successful lesson. First, the technical skills of the learner must be considered. Specifically, the learner must be able to use browser software to navigate the Internet, bookmark important sites, and harvest images and text. Second, consistent construction of web pages is the key to student understanding. It is highly recommended that the virtual tour include:

Introduction to the topic written at the student's level. Consider using pictures rather than words for instruction that depends on reading comprehension.

Instructions for completing the virtual tour lesson. Learners must understand what is required to complete the lesson.

Allotted Time. Lesson goals should clearly state the amount of time available and how much of that time is allotted to the completion of the lesson either in the computer lab or from home.

Lesson Goals. The virtual tour affords learners an opportunity for personal investigation. However, they must be guided in the lesson by a set of objectives that clearly defines Included in this exploration are specific goals that guide the learner to select a favorite planet, distinguish between inner and outer

Table 2. Learning objectives and lesson content for the solar system virtual tour

Learning Objective	Virtual Tour Lesson Content
***Learning Objective 1*: Students will examine the planets provided in the virtual tour and identify their favorite planet, and explain why this is their favorite.**	Quick Facts about the Sun Quick Facts about Mercury Quick Facts about Venus Quick Facts about Earth Quick Facts about Mars Quick Facts about Jupiter Quick Facts about Saturn Quick Facts about Uranus Quick Facts about Neptune Quick Facts about Pluto
***Learning Objective 2*: Students will locate a specific planet by searching provided Web sites.**	Visit These Web Sites http://www.kidscosmos.org/kid-stuff http://www.nineplanets.org/
***Learning Objective 4*: Students will cut out "trading cards." Not all cards are provided to each student. Students will identify duplicate cards and trade with classmates to obtain desired cards.**	These web sites contain excellent images of the planets. http://www.kidscosmos.org/kid-stuff http://www.nineplanets.org/
***Learning Objective 5*: Learning about planets on own.**	Visit each of the planet sites Create a portfolio containing a web page from each of the sites in the Virtual Tour Construct a portfolio that will be evaluated for its contents and appearance

planets in the solar system, identify planets by sight and features, share ideas about planets, and learn about planets and the solar system.

Step 2: Conduct Online Research. Online research with respect to web-based materials presents a slightly different venue than previous text and visual-based resources. Rather than recreating online materials, the primary goal of the virtual tour, then, is to access existing web sites to present lesson content. Learners receive a guided tour of the Internet examining sites already found by their instructor. As with the interactive lesson and the hyper book, material on the Internet is so abundant that the challenge is limiting the URLs for the learner.

Step 3: Write Learning Objectives. The virtual tour places considerable emphasis on the needs of the target learner. In this step, specific learning objectives are added to the virtual tour after being matched with prior student knowledge and classroom assignments. See Table 9.1 for an example of the ***Solar System Virtual Tour*** and its respective learning objectives.

Step 4: Develop Lesson Content. With the lesson goals, online research, and learning objectives firmly in mind, the next step is to advance actual lesson materials. The ***Solar System Virtual Tour*** includes content items added to Table 2.

Step 5: Create Student Workbook. Since the hyper book was completed in Chapter Seven, it might be a good idea to review its contents at this time. The virtual tour uses this text-based tool to provide some of the online exercises required of the students.

Step 6: Create the Interactive Lesson. The interactive lesson was completed in Chapter Eight. As a reminder, the learning objectives for the interactive lesson covered basic facts concerning the inner and outer planets of the solar system. For this chapter, we move on to the development of the virtual tour.

Step 7: Create the Virtual Tour. Two definitions are in order to begin the virtual tour.

First, a ***front door*** is defined as the home page of a virtual tour designed and developed by the instructor to link web sites and related resources (e.g., hyper book, interactive lesson, etc.) to a single content page that addresses the learning styles of target student(s).

Second, an ***amplified site*** is one or more specific web sites linked to the front door of a virtual tour. These sites are not created by the lesson designer but instead have been identified as generally available on the Internet and containing content information particular to the lesson. An amplified site runs the risk of containing outdated information. It may be deleted from the web without warning or it may have its URL change without notice. Amplified sites must be pre-visited by the instructor prior to each implementation of the virtual tour to ensure the site remains appropriate for the learner.

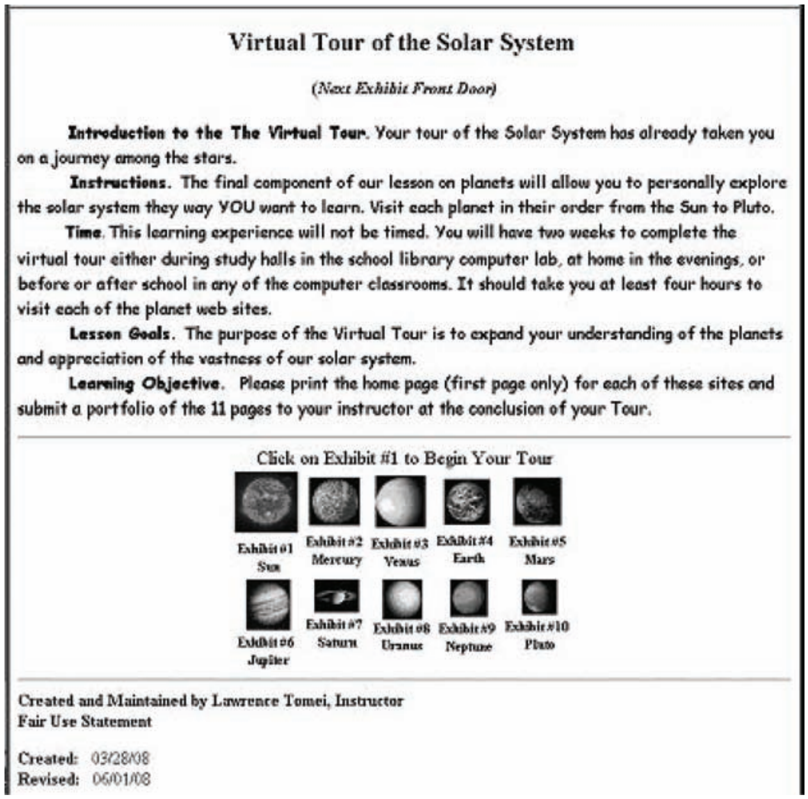
The ***Virtual Tour of Our Solar System*** is one example of the 14 different facades that have been found to offer the virtual tour. Selecting a front door commensurate with lesson objectives and individual technical skills is not difficult. With 14 formats available, selection should be based on an analysis of the lesson goals, the learning styles of the student, and the technical expertise of the designer.

There are 14 actual front doors (see Figure 3) offering just the right facade for the virtual tour and its amplified sites. They are divided into two broad categories of abstract and concrete. Some are more appropriate for creating a lasting image in the mind of the learner and are therefore classified as abstract front doors. Others work best to provide concrete information in a sequential, logical, consistent format. A brief introduction is offered for consideration.

1. **The Next Exhibit (NEFD) Front Door.** One of the most easily mastered formats of the virtual tour, the **Next Exhibit** (Figure 4) opens with the essential elements: introduction, instructions, time allotted, lesson goals, and, most important, learning objectives. Textual material is held to a minimum and images control movement through the lesson. Learners travel *sequentially* from one exhibit to the next until they reach the final site.

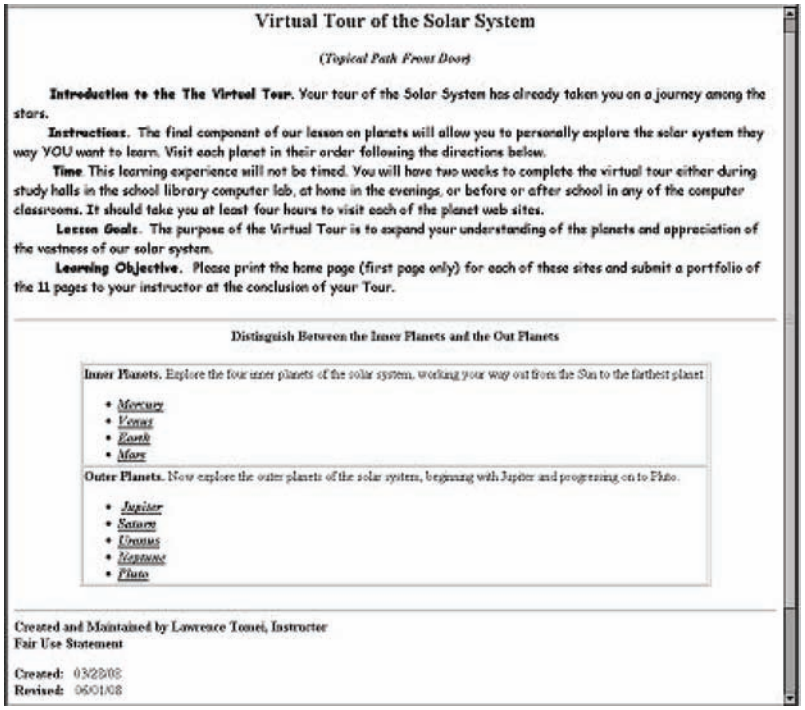
Figure 3. The 14 front doors of the virtual tour

Figure 4. The next exhibit front door



2. **The Topical Path (TPFD) Front Door.** The **Topical Path** (Figure 5) provides learners an opportunity to use their prior knowledge to select amplified sites containing additional instructional material. Text is predominant and images are reserved for subsequent amplified sites.
3. **The Event Sequence (ESFD) Front Door.** Another approach to a virtual tour is the development of mini-lessons, one for each chronological periods of time. The Event Sequence (Figure 6) focuses on a single unique occurrence in time and place – in this case, the discovery of each planet. Unfortunately, more often than not, events are lost in the annals of time as is certainly the case with planets and their discovery. Historical or geographical points in time, viewed as a sequence of evolving changes or the movement of an object during a designated time period, is also a very popular method for creating an events sequence front door.
4. **The Chronology Text (CTFD) Front Door. Chronology Text** (Figure 7) uses a timeline approach to create text-based links to new information. Time increments are expressed in days, weeks, years, decades, centuries, or (in the case of planets) billions of years. They link to more detailed material oftentimes created by the instructor or found on the Internet. Chronology is an instinctive learning style for behavioral lessons as it follows the natural time sequence to present information.
5. **The Gallery (GFD) Front Door.** One of the most popular front doors, the Gallery (Figure 8) promotes cognitive learning by organizing a series of images matching the specific learning objectives of a lesson. The Gallery's reliance on graphics promotes concrete learning and fosters the building block approach that cognitive learners relish. A key difference between the gallery and the next

Figure 5. The topical path front door



Virtual Tour of the Solar System

(Topical Path Front Door)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

Distinguish Between the Inner Planets and the Out Planets

Inner Planets. Explore the four inner planets of the solar system, working your way out from the Sun to the farthest planet

- *Mercury*
- *Venus*
- *Earth*
- *Mars*

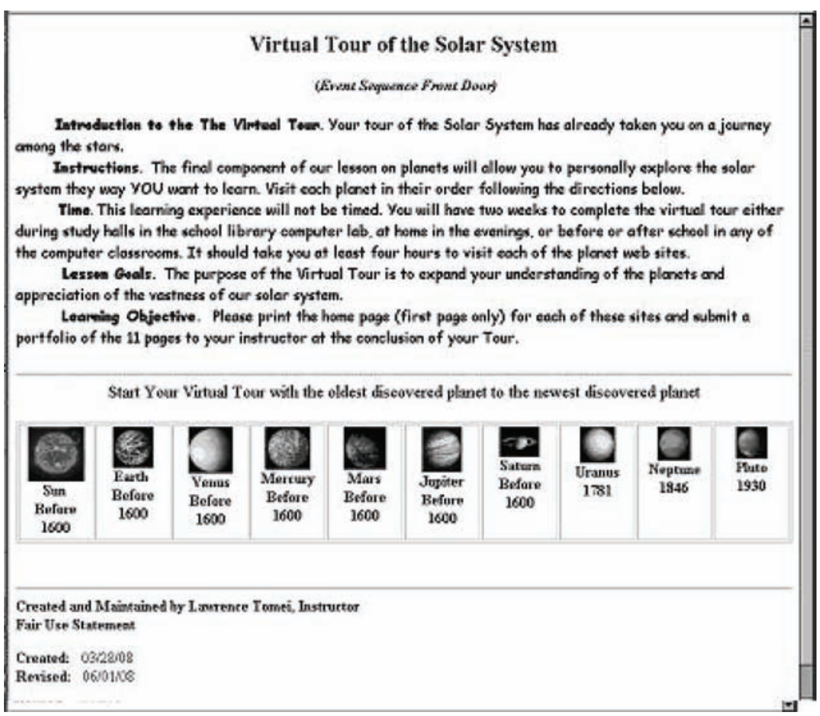
Outer Planets. Now explore the outer planets of the solar system, beginning with Jupiter and progressing on to Pluto.

- *Jupiter*
- *Saturn*
- *Uranus*
- *Neptune*
- *Pluto*

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement

Created: 03/28/08
Revised: 06/01/08

Figure 6. The event sequence front door



Virtual Tour of the Solar System

(Event Sequence Front Door)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

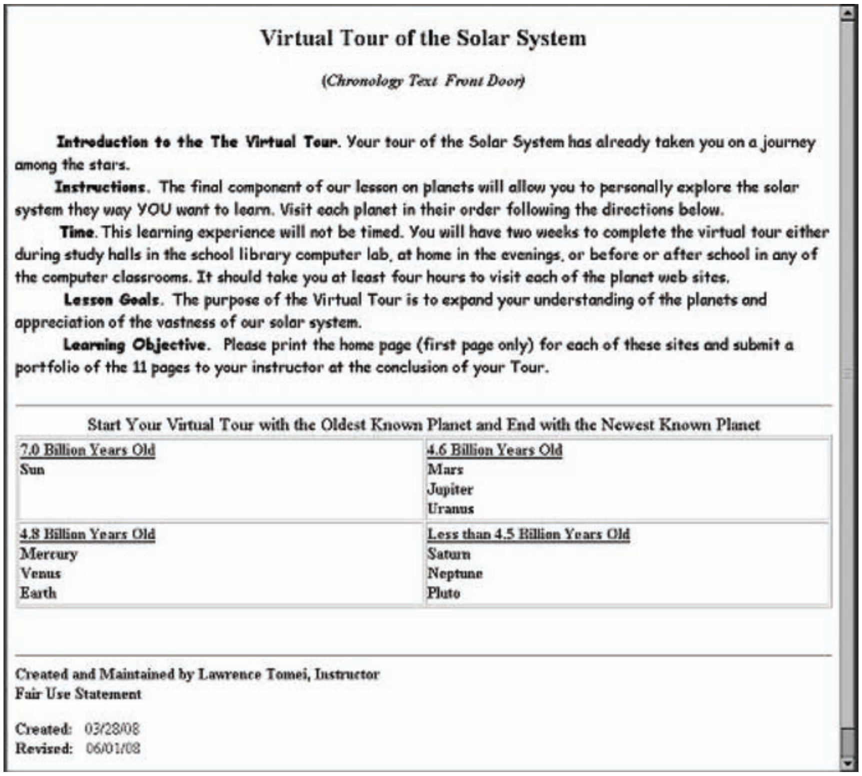
Start Your Virtual Tour with the oldest discovered planet to the newest discovered planet

Sun Before 1600	Earth Before 1600	Venus Before 1600	Mercury Before 1600	Mars Before 1600	Jupiter Before 1600	Saturn Before 1600	Uranus 1781	Neptune 1846	Pluto 1930

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement

Created: 03/28/08
Revised: 06/01/08

Figure 7. The chronology text front door



Virtual Tour of the Solar System

(*Chronology Text Front Door*)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

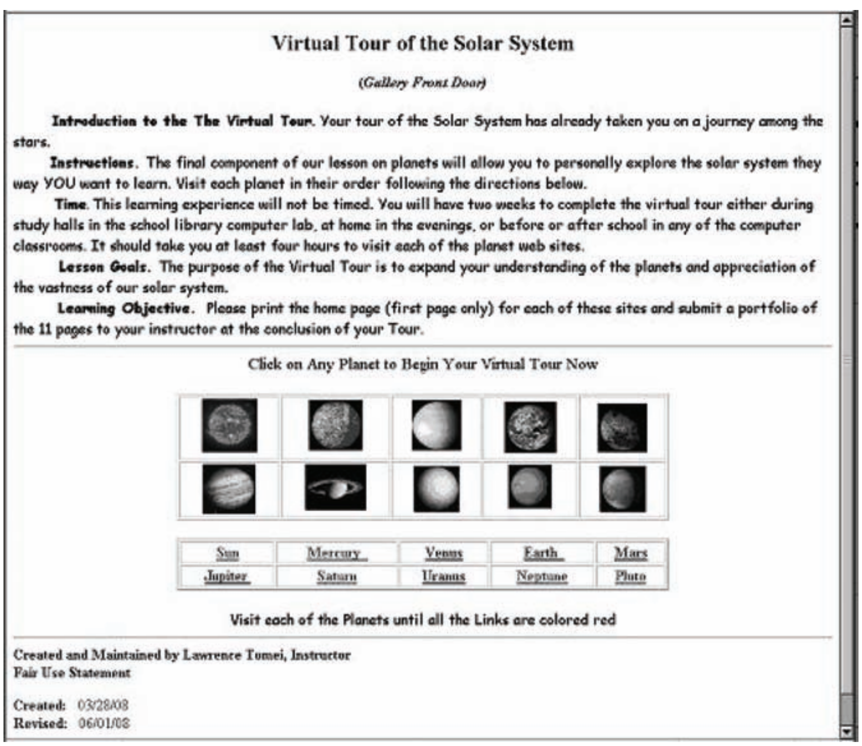
Start Your Virtual Tour with the Oldest Known Planet and End with the Newest Known Planet

7.0 Billion Years Old Sun	4.6 Billion Years Old Mars Jupiter Uranus
4.8 Billion Years Old Mercury Venus Earth	Less than 4.5 Billion Years Old Saturn Neptune Pluto

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement

Created: 03/28/08
Revised: 06/01/08

Figure 8. The gallery front door



Virtual Tour of the Solar System

(*Gallery Front Door*)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

Click on Any Planet to Begin Your Virtual Tour Now

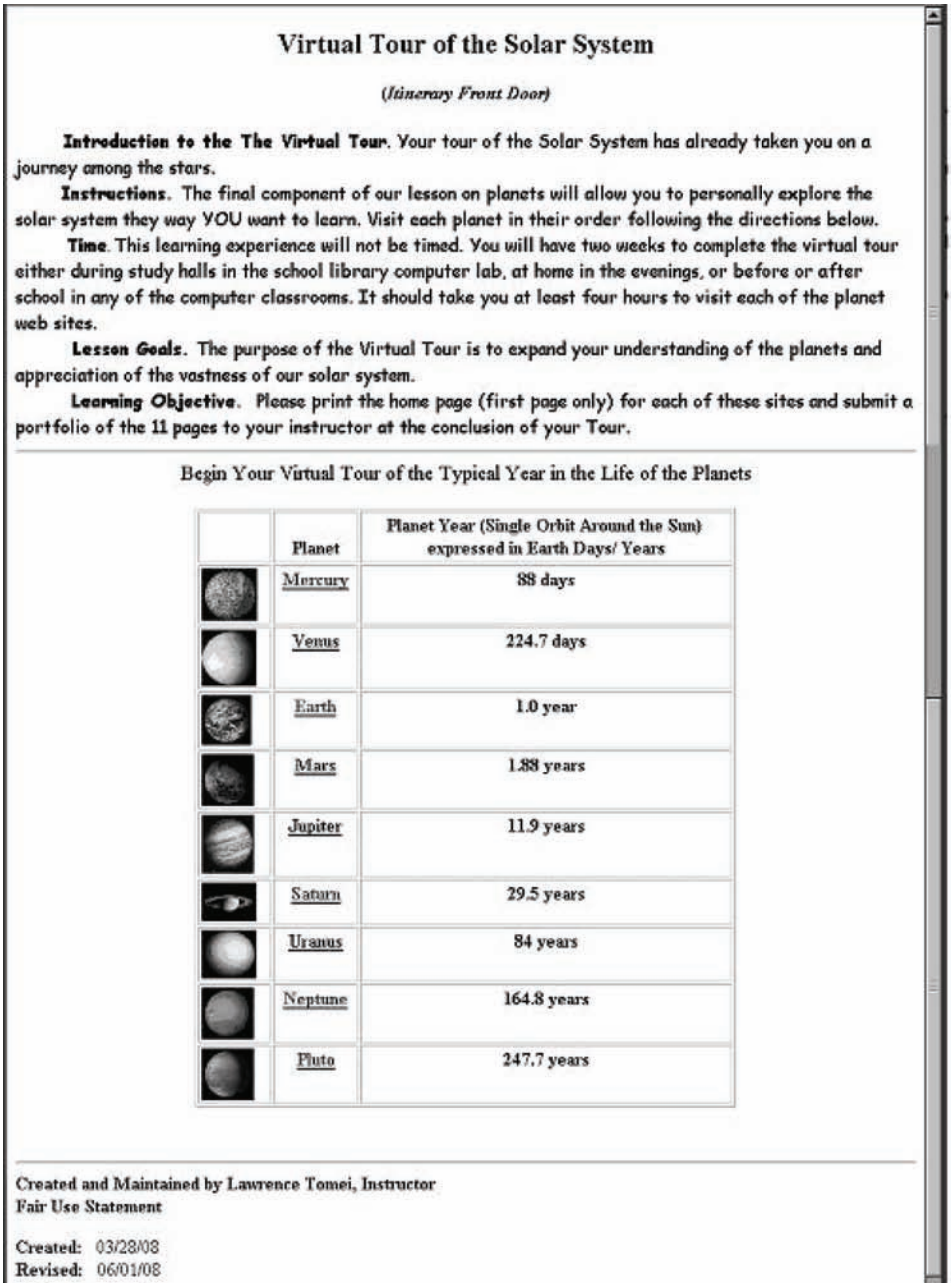
Sun	Mercury	Venus	Earth	Mars
Jupiter	Saturn	Uranus	Neptune	Pluto

Visit each of the Planets until all the Links are colored red

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement

Created: 03/28/08
Revised: 06/01/08

Figure 9. The itinerary front door



Virtual Tour of the Solar System

(Itinerary Front Door)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

Begin Your Virtual Tour of the Typical Year in the Life of the Planets

	Planet	Planet Year (Single Orbit Around the Sun) expressed in Earth Days/ Years
	Mercury	88 days
	Venus	224.7 days
	Earth	1.0 year
	Mars	1.88 years
	Jupiter	11.9 years
	Saturn	29.5 years
	Uranus	84 years
	Neptune	164.8 years
	Pluto	247.7 years

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement

Created: 03/28/08
Revised: 06/01/08

exhibit front door is the randomness of the gallery (i.e., learners are free to explore the gallery in whatever order suits their learning style).

6. **The Itinerary (IFD) Front Door.** The Itinerary (Figure 9) front door is patterned after a person's (or in this case, a planet's) diary, presenting instruction as a series of related activities, appointments, experiences, or personal memories. Many Itinerary front doors simulate the activities of a subject during a "typical" 24-hours period.

7. **The Picture Button (PBFD) Front Door.** Appropriate for many age groups, the Picture Button (Figure 10) provides a visual menu of sites for exploration. Each site is visited without regard for sequence, allowing the designer to add new features and new sites as they become available. Particularly appealing to younger learners who readily comprehend what is expected of them when using the buttons to navigate through the material presented. Notice that the introduction, instructions, time allotted, goals and objectives are integrated onto the picture buttons which now contain only pictures of the various planets.
8. **The Table (TFD) Front Door.** Tables provide a relatively uncomplicated front door for links. The amplified sites are typically text-based with links programmed to change colors after they are visited. The Table (Figure 11) front door fosters student understanding of classification, categorization, sorting, and organization. The use of multiple Tables is recommended for complex lessons and to organize sites logically for the learner
9. **The Guided Tour (GTFD) Front Door.** The Guided Tour (Figure 12) presents ideas and concepts in a very logical sequence, constructed much like a tour of the stars' homes in Hollywood. Learning

Figure 10. The picture button front door

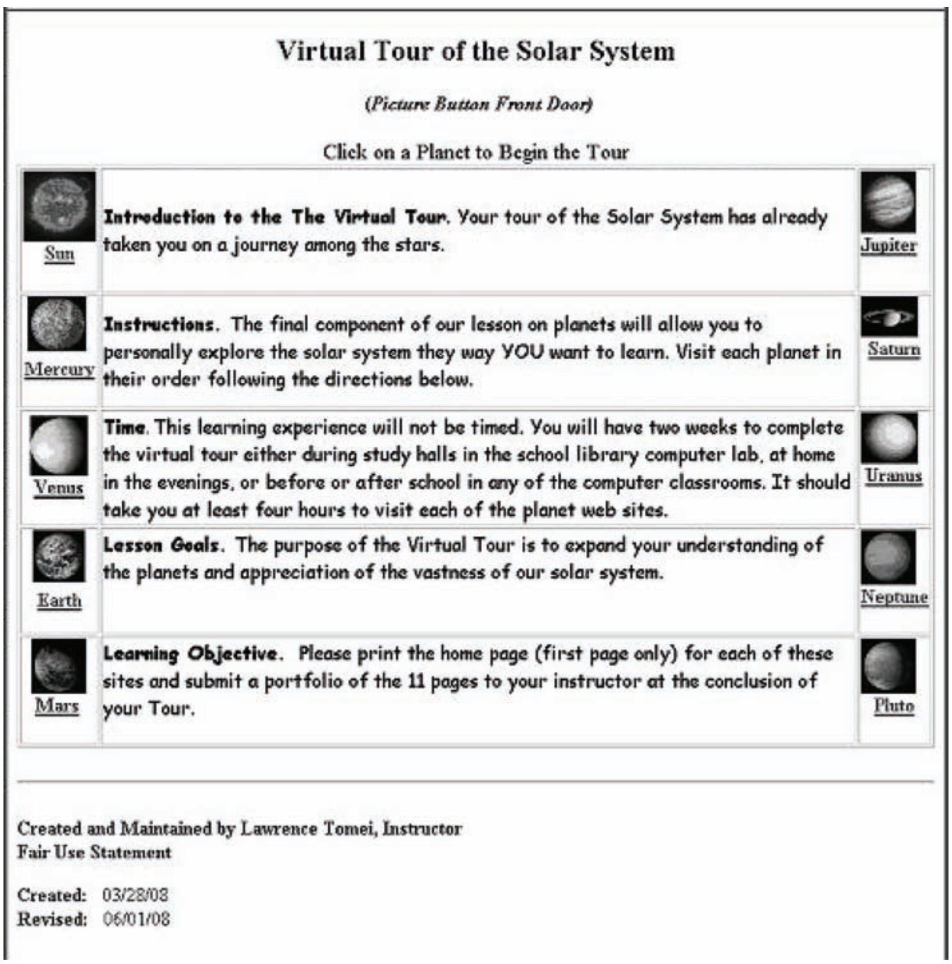


Figure 11. The table front door

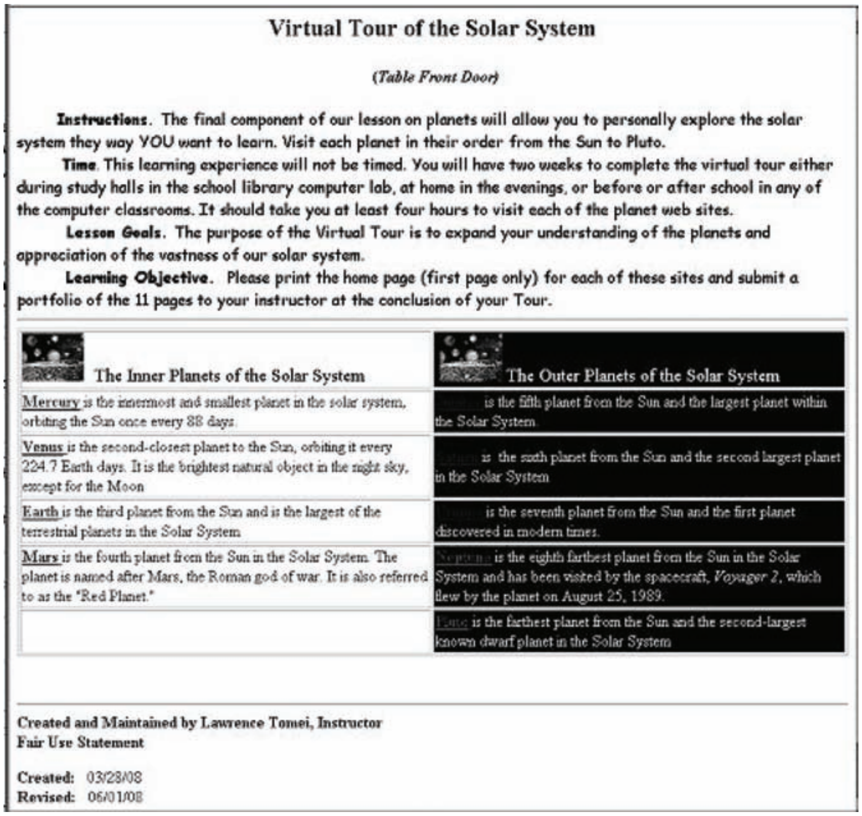
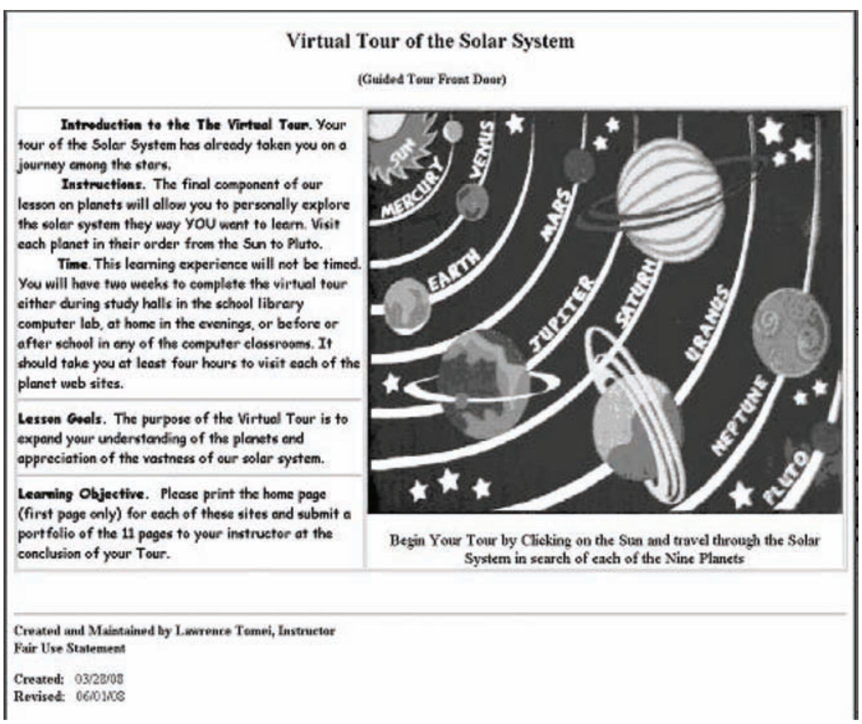


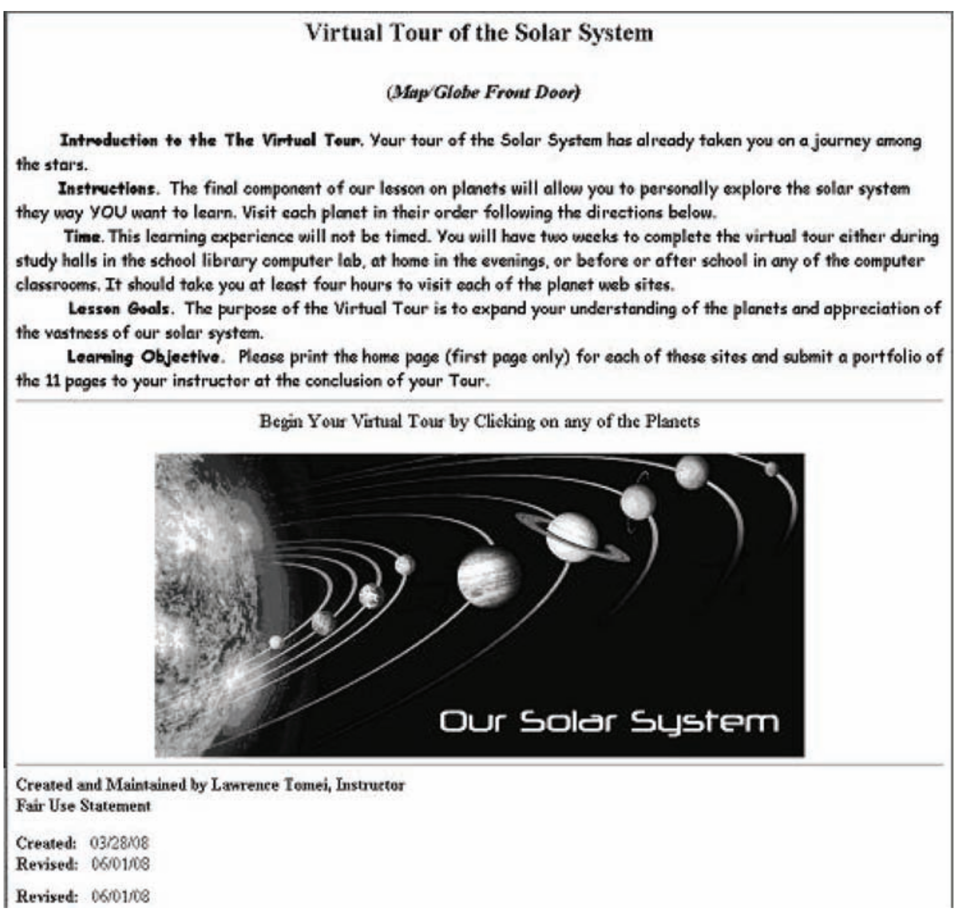
Figure 12. The guided tour front door



occurs when completed tours trigger student-centered classroom discussions allowing them to share facts, concepts, and ideas in an open forum.

10. **The Map/Globe (MGFD) Front Door.** Well suited to a social studies lesson in geography or history, a virtual tour using the Map/Globe (Figure 13) front door literally links learner to the world – or in this case, the universe. The designer chooses from many different venues for the amplified sites. Countries, states, continents, and planets are all potential representations of important lesson content. Some prior knowledge is an important key to successful learning outcomes using this front door as it offers the learner an opportunity to expand personal thinking skills.
11. **The Timeline Map (TMFD) Front Door.** Most timeline maps combine a clickable bitmap image with text-based or table-based links to amplified sites. A sophisticated understanding of graphics and web design is required before the Timeline Map (Figure 14) may be used effectively. This particular front door presents sequenced instruction designed to focus on drill and practice or tutorial presentation – all content that is behavioral-based. There are tools available for designing the bitmap image. Still, it cannot be recommended for the technical novice. Only those who understand more difficult aspects of web design should attempt this front door.
12. **The Button Advance (BAFD) Front Door.** Buttons are merely images combined with text to aid the learner with Internet navigation. It takes practice with graphics software to find the right size

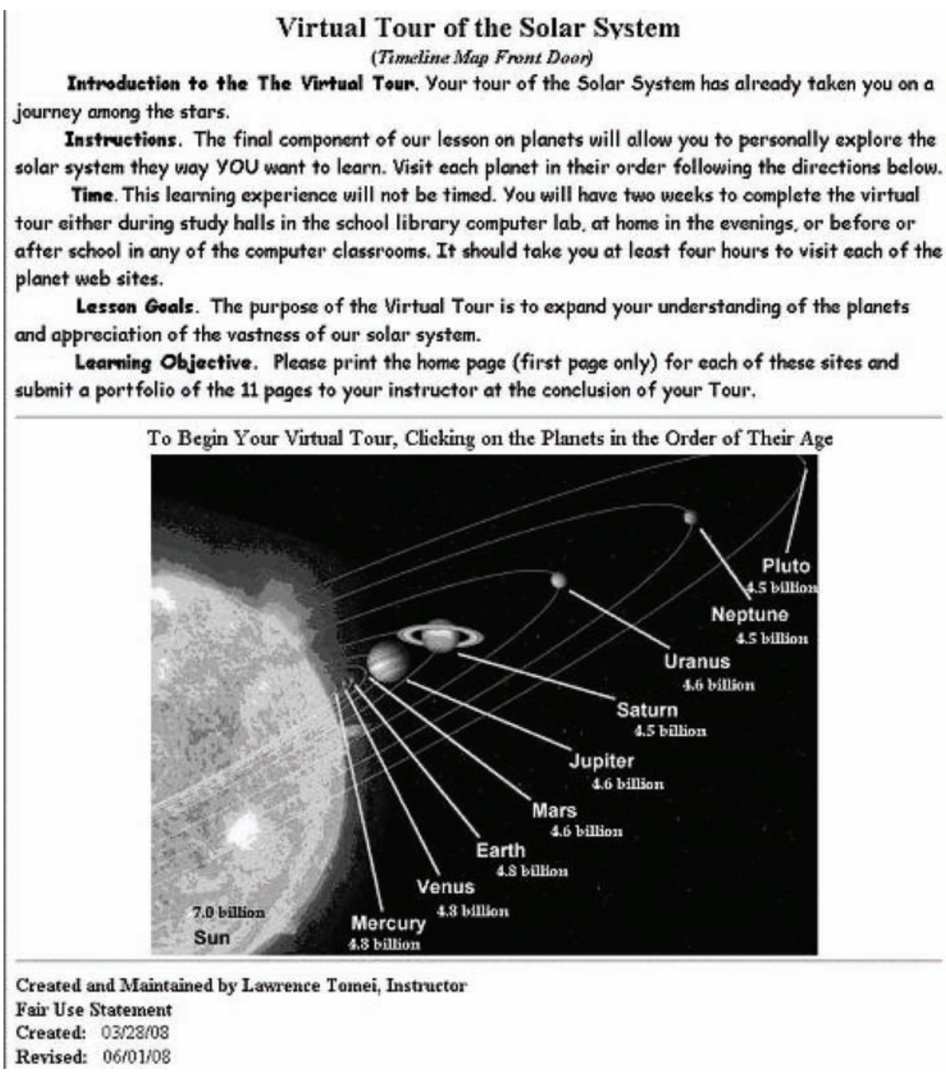
Figure 13. The map/globe front door



button and overlay the proper text before inserting the new image directly onto the front door. The Button Advance (Figure 15) is an excellent format for the visually challenged student since they can be designed to be as large as necessary for visual accuracy. Of course, learners must be readers before this front door will work. The designer should vary the imbedded text depending on the reading level of the student since buttons tend to become boring for the more mature learner.

13. **The Room Exhibit (REFD) Front Door.** A bitmap image provides the graphical interface for this front door. Analogous to the rooms of a house or the halls of a museum, the Room Exhibit (Figure 16) supports a variety of teaching applications. Each room links the learner to amplified sites that address detailed lesson content.
14. **The Vehicle (VFD) Front Door.** The Vehicle (Figure 17) front door is a particularly effective format but difficult (technically) to create and maintain. Imagine a graphic depicting the compartments of a submarine, various systems on-board an airplane, the newest features of next year's automobiles,

Figure 14. The timeline map front door



Virtual Tour of the Solar System

(*Timeline Map Front Door*)

Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. Visit each planet in their order following the directions below.

Time. This learning experience will not be timed. You will have two weeks to complete the virtual tour either during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system.

Learning Objective. Please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour.

To Begin Your Virtual Tour, Clicking on the Planets in the Order of Their Age

Created and Maintained by Lawrence Tomei, Instructor
Fair Use Statement
Created: 03/28/08
Revised: 06/01/08

Figure 15. The button advance door

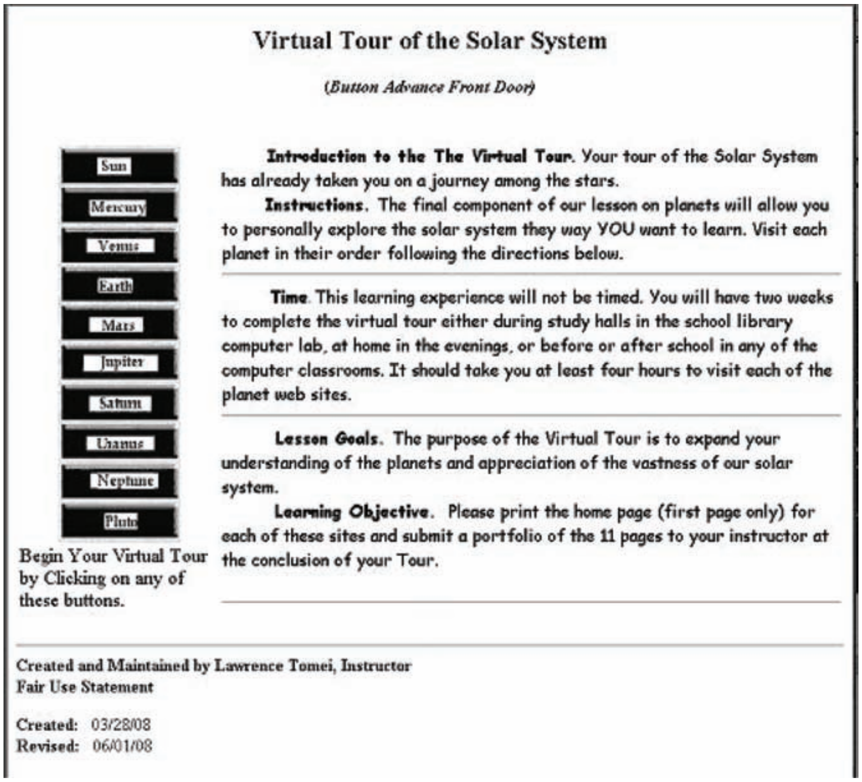


Figure 16. The room exhibit front door

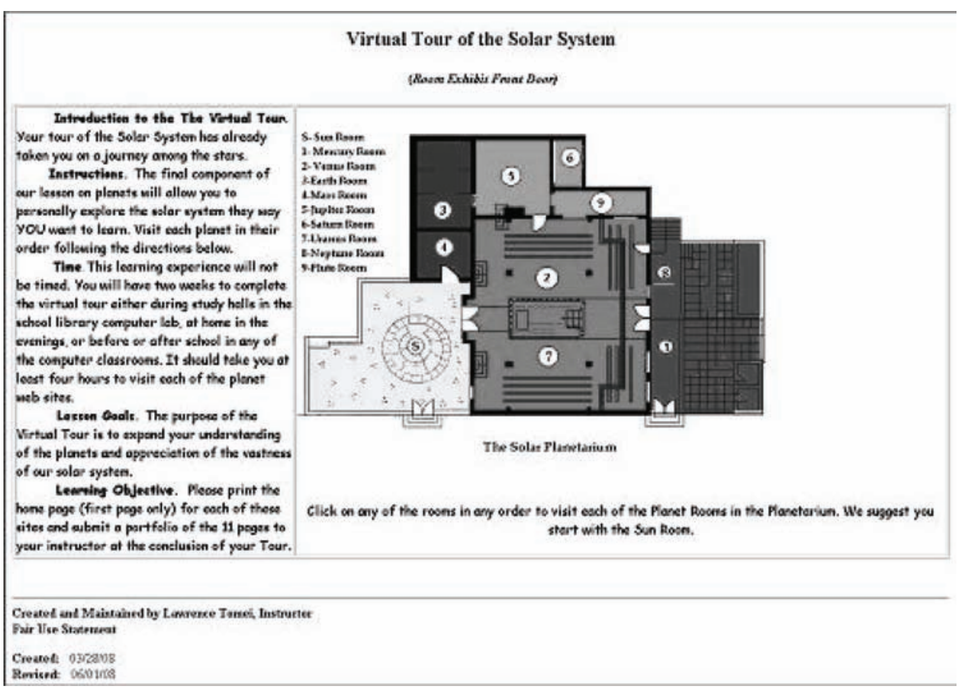
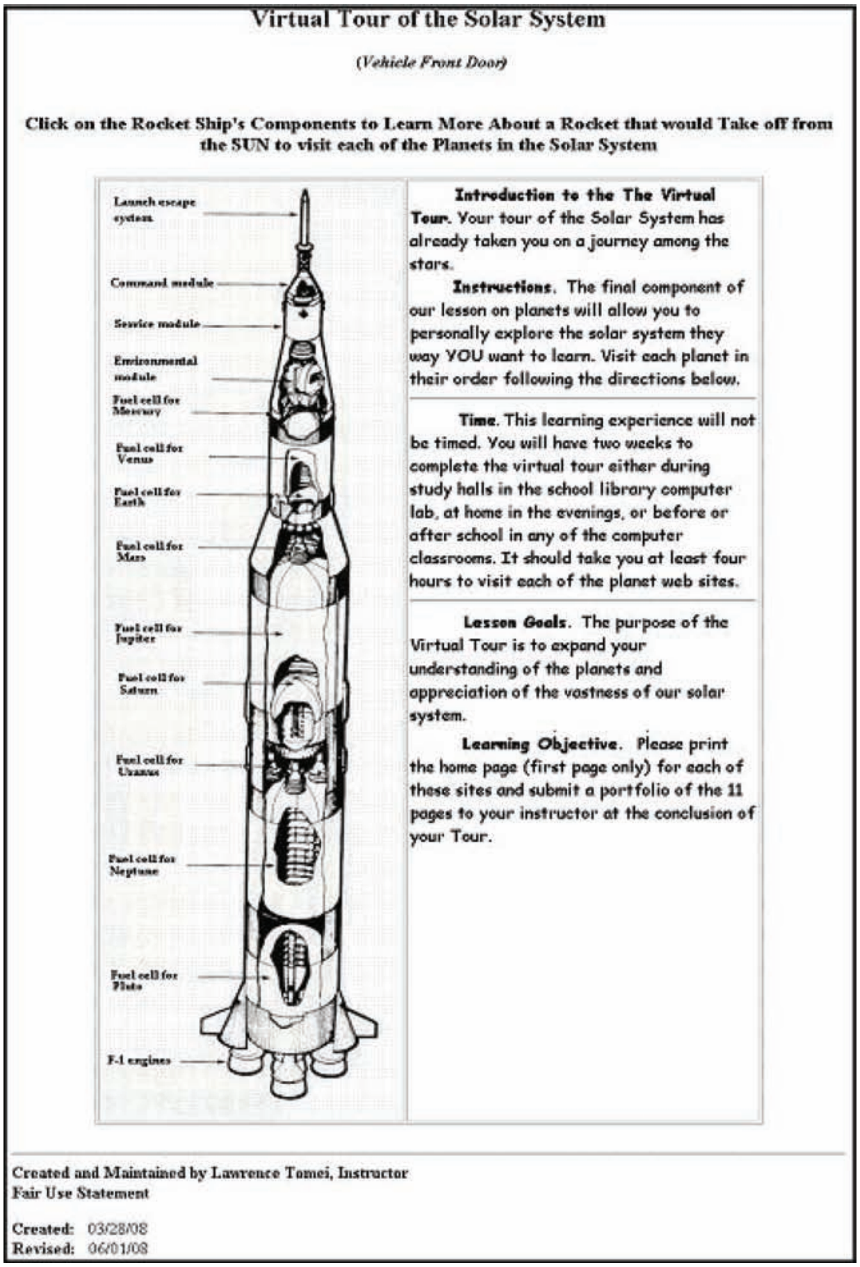


Figure 17. The vehicle front door



or, in our case, the sections of a exploratory rocket ship. Each component of the front door bitmap image is visually separated from the composite graphic and serves to link the learner to amplified sites containing additional instructional content.

Step 8: Deliver the Lesson. One of the many advantages of the virtual tour is the flexibility that web-based lessons offer the instructor. However, once the web page is created, the next step considers how to make this information available to learners. To publish a virtual tour (or any web page for that

Table 3. Evaluating the front door lesson

Front Door	**Assessment Possibilities for Front Doors**
1. Next Exhibit	Assessment almost non-existent; requires external review via objective tests such as matching, true-false, completion.
2. Topical Path	Similar to the Next Exhibit, this Front Door requires external assessment via class discussion or essay tests.
3. Event Sequence	Most effective evaluation includes authentic assessments such as portfolios and thinking journals.
4. Chronology Text	Use a hard-copy, text-based quiz with this Front Door to assess student's understanding of the material.
5. Gallery	Learners are best assessed using typical discovery learning techniques such as group work, reports, and presentations.
6. Itinerary	Subjective evaluations are most appropriate here. Assess student's knowledge with reports.
7. Picture Button	Buttons contribute to ready self-evaluation; but it takes some effort to design the assessment.
8. Table	Track student progress by examining visited links. Not particularly reliable, but significantly more useful than some of the other front doors.
9. Guided Tour	Strongest assessment of student learning uses matching objective tests.
10. Map/Globe	Essays, objective assessments, and class discussions are best alternatives.
11. Timeline Map	Follow-on pages can provide true online assessments.
12. Button Advance	Must be supported with outside measurement tools.
13. Room Exhibit	Best when using cooperative learning strategies.
14. Vehicle	For designers competent enough to design this front door, creating an assessment to go along with it should be easy.

matter), follow this simple procedure: First, **locate all files in the same physical directory.** To avoid problems associated with directories, all related web files and images should be saved to a common media, either hard disk, CDROM, or jump drives. Launching a virtual tour assumes that all internal links (.htm and .html files) and graphic images (.gif or .jpg files) are located in the same physical directory unless specific paths are designated. Placing all related files into one unique directory is an excellent organizational scheme when uploading an entire web site to a server. Second, schedule periodic file backups to ensure materials are not lost. Third, consider student printing needs (students often prefer hard-copy printouts of web pages). Fourth, build in time for continuous improvement of content material based on current research of the latest and best web-based resources.

Step 9: Evaluate Student Learning. Table 3 offers a final look at each of the front doors examined in this chapter and offers a few words regarding their strengths and weaknesses in the area of student assessment. The virtual tour is the answer to locating, organizing, and incorporating content specific sites into student-centered lessons and, at the same time, evaluating whether learning outcomes were achieved.

Step 10: Conduct Follow-up Activities. A total of 14 different front doors are available to present abstract and concrete concepts; behavioral, cognitive, and humanistic content; and, technically challenging or difficult construction. Developing follow-up activities is a matter of creating additional web pages or identifying great sites already available on the Internet and linking them to the virtual tour. Additional examples are provided at the following URLs (see Table 4) to increase understanding of the proposed front doors and offer some excellent examples of possible follow-up activities.

Table 4. Example front door sites

Front Door	Site Name and URL
1. Next Exhibit	George Catlan and His Indian Gallery http://americanart.si.edu/catlin/catlin_highlights2.cfm
2. Topical Path	The Particle Adventure http://ParticleAdventure.org/
3. Event Sequence	The Many Faces of Mount St Helens http://www.olywa.net/radu/valerie/StHelens.html
4. Chronology Text	Timelines of History http://timelines.ws/
5. Gallery	National Gallery of Art http://www.nga.gov/collection/gallery/gg62/gg62-main1.html
6. Itinerary	Day in the Life of a President http://www.lbjlib.utexas.edu/johnson/archives.hom/diary/diarycol.asp
7. Picture Button	Wonders of the Ancient World http://www.cleveleys.co.uk/wonders/sevenwondersofthe-world.htmlhttp://www.cleveleys.co.uk/wonders/sevenwondersoftheworld.html
8. Table	Dragonfly Museum http://www.joeant.com/DIR/info/get/4899/34069
9. Guided Tour	US White House http://www.whitehouse.gov/history/life/video
10. Map/Globe	Seven Wonders of the Ancient World http://7wonders.mrdonn.org/index.htmlhttp://7wonders.mrdonn.org/index.html
11. Timeline Map	First Century of Flight http://history.nasa.gov/centtimeline/index.htmlhttp://history.nasa.gov/centtimeline/index.html
12. Button Advance	Mount Zion Jerusalem World Peace Center http://mznet.org/main.html
13. Room Exhibit	Museum of Science and Industry http://www.msichicago.org/visit-the-museum/museum-maphttp://www.msichicago.org/visit-the-museum/museum-map/location/tx_msiexhibits_exhibits_5/
14. Vehicle	Space Ship Floor Plan http://www.principlesofwar.com/miva/graphics/00000001/profantasy/gallery03.jpg

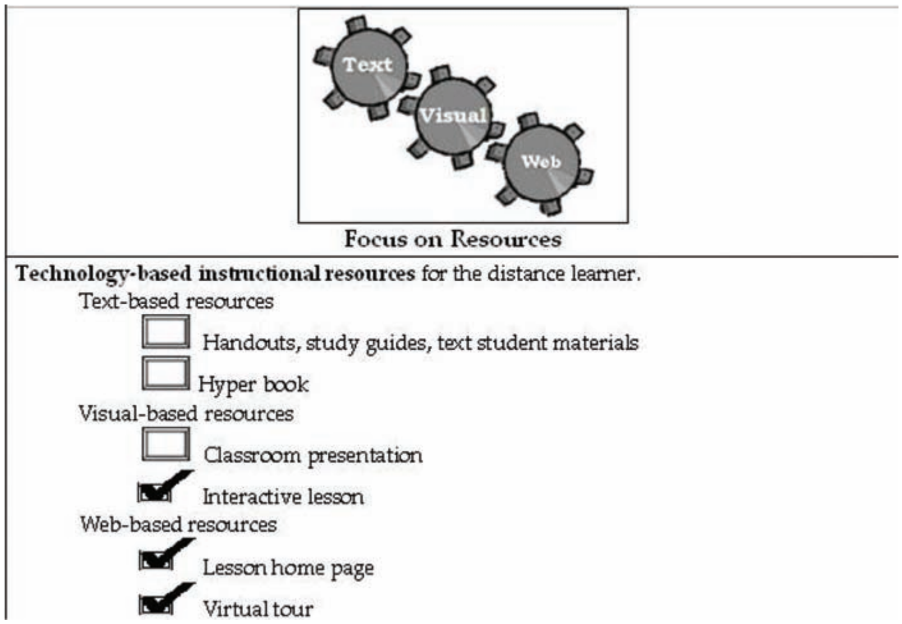
Table 5. Constructing The Virtual Tour Lesson

Topic II. Constructing The Virtual Tour Lesson, offers instructions and examples of the Virtual Tour. Additional features required to construct the tour include: page properties, horizontal lines, tables, image hyperlinks, animated graphics, and targets. They are offered for both novice teachers (although they should begin with Section I) and advanced teachers. The example displayed at **Supplement 3b** illustrates the elements of a virtual tour.

SUMMARY

The virtual tour is a natural extension of sequential learning with content presented from first to last, simple to complex, general to specific. The cognitive teacher offers content in progressive steps until a schema, or pattern, emerges to aid the learner in the construction of new knowledge. Humanism offers the personalized approach to learning, selecting information determined to be important to the student. The virtual tour supports each of these major psychologies perhaps better than any previous teaching strategy ever devised.

Figure 18. Distance learner lesson plan template (cumulative)



With the advent of the World Wide Web, responsibility for creating learner-centered, age-appropriate material rests in the hands of the instructor. The design of the virtual tour is the newest strategy for linking literally millions of content specific sites that add images, sounds, and video media to an instructional lesson.

CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on Resources** portion of the template (Figure 18) demonstrates how to develop a distance learner-oriented lesson on the Planets of the Solar System. The author in this particular example is using a variety of technology-based resources.

Section 4
Focus on Delivery

Any text professing to address itself to the theme of designing technology-based instruction must first come to grips with the concepts of what constitutes a "good teacher" – regardless of the teaching environment or the learner.

Chapter 10: Delivering Instruction to the Traditional Learner, introduces the reader to the Pillars of Education. Philosophy, psychology, sociology, history, and leadership provide the conditions of teaching and learning in the traditional classroom. They answer the all-important questions: "What are we teaching?" "How do we teach?" "Who are we teaching?" "When (in the history of education) are we teaching?" and "Whom (sic) is responsible for successful learning outcomes?" Chapter 11 goes on to consider effective principles and practices of teaching, common learning styles, and a variety of teaching and learning strategies appropriate for the traditional learner. Readers are encouraged to consider lessons that target the visual, linguistic (verbal), logical (mathematical), interpersonal, intrapersonal, convergent, and accommodative learner. A host of appropriate methodologies for teaching the traditional learner are suggested. They include activity-based strategies, cooperative learning strategies, direct instruction strategies, independent learning strategies, and thinking skill strategies. The first chapter in this part of the text establishes the ADDIE Model of instructional design as the vehicle of choice when designing instruction for the traditional learner. Its popular systematic approach moves the designer through analysis, design, development, implementation and evaluation. A practical template is provided at the end of the chapter to help the reader consider the lesson components necessary for a successful student traditional learning outcome.

Chapter 11: Delivering Instruction to the Adult Learner continues the look at the many delivery systems available to teachers – this time for teachers of adult learners. While there may be no commonly accepted definition of an adult learner, there are certain familiar characteristics commonly attributed to adults. Some of the more important traits included in this chapter involve the adult learner's inherent appreciation of education, extracurricular responsibilities outside of class, experience in the real-world, prior knowledge about most topics, immediate application of learning, and the great diversity among adult with respect to ages, abilities, job experiences, cultural backgrounds and personal goals.

The pillars of education are once again examined. This time they provide vastly different answers to the previous questions of "what," "how," "who," "when," and "whom" for the older (some would call them "non-traditional") learner. So, too, will be the chapter's examination of effective principles and practices of teaching, learning styles, and teaching and learning strategies. Activity-based strategies, cooperative learning strategies, direct instruction strategies, independent learning strategies, and thinking skill strategies are also revisited in light of the varied characteristics of the adult learner. While direct instruction and thinking skills strategies represent the majority of strategies for delivering instruction to the traditional learner, the activities-based and independent strategies are more in line with adult education.

Chapter 11 goes on to acquaint the reader with the Backward Design Model as a schema for designing adult-focused instruction. Its five stages include identifying desired results, determining acceptable evidence of learning, planning learning experiences and instruction, creating resources to engage the learner, and revising and refining the lesson suggest a more natural flow of lesson development for the adult learner. Readers are encouraged to create lessons first by considering the desired end results. Only then should teachers create actual learning experiences and instruction for their students. Educators of adult students will be persuaded to follow the Backward Design Model to analyze, design, and develop their lessons using the template provided at the end of the chapter to ensure the necessary considerations have been measured and the required elements of a successful adult-focused lesson are infused in the instruction.

Chapter 12: Delivering Instruction to the Distance Learner completes the scrutiny of technology-based delivery methodologies by looking again at the pillars of education related to the distance learner. Contrary to teachers of traditional and adult learners, distance educators must be integrators and facilitators of instruction. They must take a more active role in the design of their own online instruction. The delivery of distance learning instruction is effective in the cognitive, affective, and psychomotor domains using either asynchronous or synchronously tools. Similar to adults, the distance learner can be discretely characterized. Distance learners are typically a little older on average than their adult counterparts (26-45 age group). They have completed some college and wish to explore ambitious, determined career improvement goals using distance to accelerate the timeline. Similar to adults, distance learners evidence self-motivation and self-discipline and remain committed to lifelong learning.

With the portrayal of distance learners in hand, Chapter 12 goes on to consider effective principles and practices of teaching at a distance. Independent strategies, especially those that integrate instructional technologies, are offered as evidencing the greatest potential for use in a distance learning environment. Finally, the nine-phase Kemp Model will be introduced as a viable methodology for designing distance instruction. Chapter 12 separates the model into phases: preparation, development, delivery, and evaluation. As with the other delivery modalities in Section 4, a lesson template for developing distance lessons is provided at the end of the chapter for further consideration.

Summary. Section 4 offers a methodical, systematic, comprehensive course of action for delivering technology-based instruction to the traditional, adult, and distance learner.

Section 4 recommends consideration of perennialism and idealism for traditional learners, realism and progressivism for the adult and social technology and radical instructional design for distance education. It presents a commonly accepted definition of the traditional, adult, and distance learner and offers descriptive characteristics that the reader will find useful when designing technology-based instruction.

Five distinct learning strategies are proposed: direct instruction and thinking skills for the traditional lesson, activities-based and independent strategies for the adult lesson, and independent strategies (specifically those infused with technology) for the distance education lesson.

Finally, methodologies for designing instruction are highlighted along with models that will help the reader develop lessons for each target learner. The five steps of the ADDIE Model provide a popularly accepted approach for analyzing, designing, developing, implementing, and evaluating traditional lessons. The Backward Design Model is recommended for designing adult instruction and the Kemp Model describes an approach that considers a multitude of factors that present themselves when designing distance-based instruction. Section 4 of the ***Engine for Designing Technology-based Instruction*** offers the reader a look at the principles, practices and tools that make for an effective teacher of traditional, adult, or distance learners.

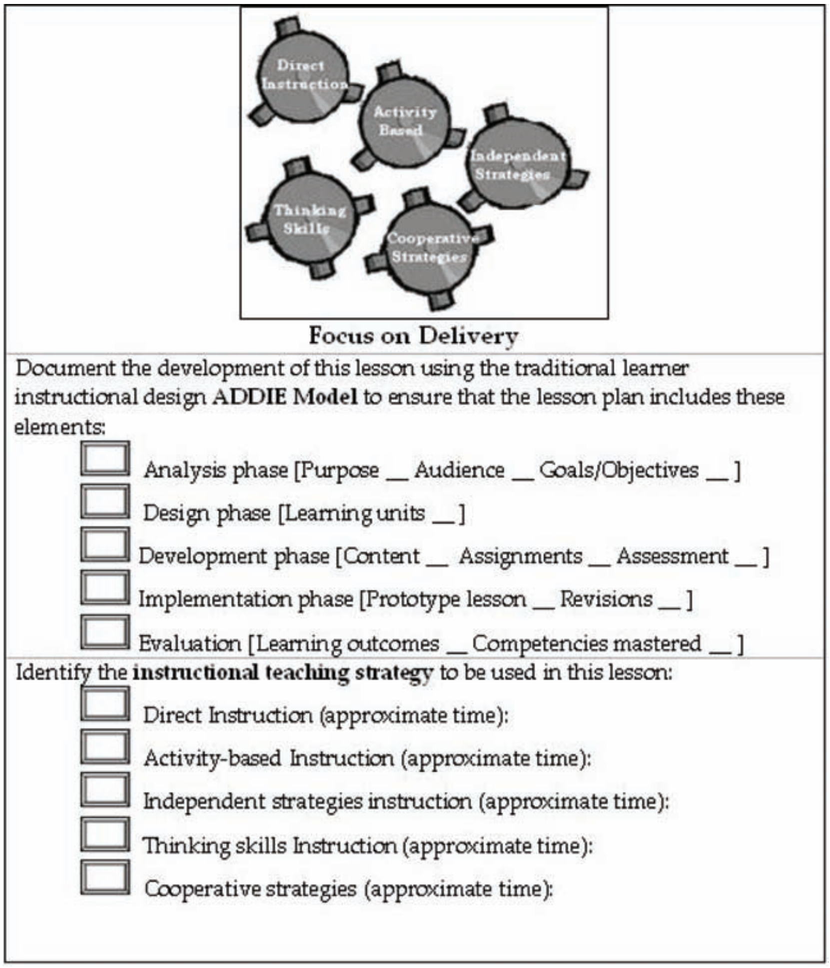
Chapter 10
Delivering Instruction to the Traditional Learner

Learning Objectives. The characterization of what constitutes a "good teacher" is probably as varied as the number of teachers in the classroom. Essential factors come into play, including the academic subject, the grade level and maturity of the learner, the preparation of the teacher, and others. Certain teachers are able to successfully impart even boring material while others render even the most appealing content unpalatable. Teacher preparation programs, for their part, pride themselves on transforming their charges into effective teachers by combining a firm grasp of subject knowledge with good teaching practice. This chapter offers the reader a look at the principles, practices and tools that make for an effective teacher of traditional students. Specifically, the reader will:

- Identify the Pillars of Education related to the traditional learner
- Consider effective principles and practices of teaching the traditional learner
- Recognize common learning styles found in the traditional classroom
- Become familiar with the variety of teaching and learning strategies appropriate for the traditional learner
- Become familiar with the methodologies for designing instruction for the traditional learner, including the ADDIE Model of Instructional Design

DOI: 10.4018/978-1-60566-824-6.ch010

Figure 1. Traditional lesson plan template (focus on delivery)



Lesson Plan Template. Refer to **Appendix A, Traditional Learner Lesson Plan Template** as this chapter discusses **Focus on Delivery** as depicted in Figure 1.

INTRODUCTION

Teaching traditional learners encompasses a broad range of activities from goal-setting goals to effective classroom presentations to student assessment. Teachers must formulate their course goals and learning objectives and must decide how their students will achieve them during the course analysis phase. Next, teachers design the course materials and development the modalities for delivery of the instruction. Implementation of the course is a lengthy process that includes delivery as well as assessment of the learning outcomes. Evaluation purposes are two-fold: to ensure student understanding and also to initiate course revisions. These elements of effective teaching are common to all instruction, to all learners, to all learning situations. For the traditional learner, however, there remain many unique considerations.

Traditional teachers must be able to offer a number of different modalities of teaching (verbal, written, kinesthetic, etc.) to address students with various learning styles. Successful students have been encouraged to think critically and apply the theories and concepts offered in class to real-life situations.

Effective traditional teaching begins well before the teacher enters the classroom. Actually, it begins before the teacher even becomes a certified educator. University and college teacher preparation programs remain focused chiefly on the traditional teacher. They groom their candidates via a series of courses that cover a generally accepted curriculum of fundamental teacher preparation courses (Table 1). Some of the most critical issues affecting education are represented in the four-year curriculum, and include the five pillars of education.

The Five Pillars of Education for the Traditional Learner

Philosophy, psychology, sociology, history, and leadership provide the conditions of teaching and learning in the traditional classroom. Regardless of the format of the instruction, all teaching and learning promotes certain common fundamental approaches to solving the problems of education, advancing and improving teaching in schools, cultivating fruitful relationships between scholars, and preparing students for real-world experiences. Instruction, by its very nature, is supported by five pillars. Specifically,

1. Philosophy answers the question “What are we teaching?”
2. Psychology addresses “How do we teach?”
3. Sociology involves “Who are we teaching?”
4. History encompasses “When (in the history of education) are we teaching?”
5. And, Leadership focuses on “Whom (sic) is responsible for successful learning outcomes?”

The Philosophy of Traditional Education. At the very foundation of education – at whatever level teaching is manifested in the classroom, corporate training room, or online – teachers are often asked to espouse their personal theory of teaching and learning. Articulating such an exclusive teaching philosophy reveals the methodologies, priorities and objectives that play out in classroom instruction and, ultimately, successful student learning outcomes. The question, “What are we teaching in the traditional classroom” depends upon answering the companion question “why do we bother teaching in the first place?” There are five accepted philosophies of education: perennialism, idealism, realism, experimentalism, and existentialism.

Perennialism is a very conservative and rigid philosophy of education based on the view that learning involves coming to terms with certain fundamental fixed truths. Historically, these truths were placed in the context of knowing God and finding truth through reasoning and revelation. Schools of colonial America, for example, existed primarily to teach reason and free will. Students were taught to reason through structured lessons and drills and revelation and interpreting by reading the bible.

Idealism is often described as a continuous self-improvement effort with the ultimate goal to achieve perfection. For some, idealism is a journey, not a destination since it cannot possibly be attained. Still, one popular view of education is based on the view that reality is within the learner’s mind and truth and goodness are enviable goals for a lifetime of learning. As a result, education exists to prepare the mind and hone intellectual processes.

Realism is the practical manifestation of philosophy based on the view that reality is what is observed by the individual. Truth is what can be sensed and observed in the physical world and goodness

Table 1. Representative elementary education pre-service curriculum

Elementary Education Pre-Service Curriculum	
	Pre-Service Core Courses
EDUC 0001	Schools and Society
EDUC 0002	Critical Issues Affecting American Education
EDUC 0003	Educational Psychology
EDUC 0004	Theories of Learning and Instruction
EDUC 0005	Special Needs in the Elementary Classroom
EDUC 0006	Special Learning Problems
EDUC 0007	Assessment/Educational Statistics
EDUC 0008	Instructional Design and Classroom Management
EDUC 0009	Curriculum Design and Development
EDUC 0010	Multimedia Design
EDUC 0011	Computers in the Classroom
EDUC 0012	Internet/Basic Web Page Design
	Elementary Education Curriculum
ELED 0001	Educational Assessment
ELED 0002	Technology Literacy for Education
ELED 0003	Electronic Media for Teachers
ELED 0004	Elementary Content Area Reading and Assessment
ELED 0005	Enhancing Instruction in Elementary Social Studies
ELED 0006	Enhancing Instruction in Elementary Math and Science
ELED 0007	Enhancing Instruction in Elementary Reading and Language Arts
ELED 0008	Elementary Field Experience I
ELED 0009	Elementary Field Experience II
ELED 0010	Supervised Student Teaching (13 credits)
ELED 0011	Student Teaching Seminar (2 credits)
	Total Credits: 69

is marked by the order found in the universe and the laws of nature. Schools, therefore, exist to disclose the foundations of the universe as well as the overt order of nature. Students are taught factual information independent of the mind and, in a very real sense, is the opposite of idealism.

Experimentalism believes in a constantly changing world. Reality is that which is experienced, therefore, the purpose of education is to present as many and varied experiences as possible to the learner. Truth is what works and goodness comes from accepting the results of scientific inquiry. Schools exist to discover and expand the experiences and students are encouraged to study social experiences past and present to solve real-world problems.

Finally, existentialism believes in a personal interpretation of the world. It is the individual who ultimately defines reality, truth and goodness. Teaching must be viewed through the eyes of the learner and, as a result, schools exist to aid them in coming to know themselves and their place in society.

Developing a personal philosophy takes considerable effort and may embrace a broad range of components. Most, however, agree that certainly basic elements are common to a comprehensive philosophy of education. Some questions to consider in a philosophy might include the following:

- How does learning take place?
- What are elements of effective learning environments?
- How should teaching be conducted to facilitate and maximize the learning process?
- What is the learner's role in the learning process?
- What is the role of the instructor?
- What are the main objectives of the instruction?
- What teaching strategies produce the most successful learning outcomes in the traditional or online classroom?
- How is success measured following a lesson or instruction?
- What are the long-term professional and personal goals of the educator?
- Is teaching important?
- What values should students take from the class?

In summary, educators are encouraged to refer to their personal philosophy of education often to remain focused on why they became teachers and what their long-term expectations are for themselves and their students. For the traditional teacher, it could be argued that perennialism and idealism are the best represented philosophies of education.

The Psychology of Traditional Education. How we teach is more than a simple description of interactions that might be perceived when visiting a classroom. In truth, educational psychology is a complex combination of many concepts embracing the various domains of learning, schools of educational thought, and resulting applications of teaching and learning in the classroom.

Domains of learning and the traditional student. As early as 1956, psychologist Benjamin Bloom divided what we know and how we learn into separate domains of learning. The cognitive domain centers on knowledge and the mind. Its three practical instructional levels include facts, understanding, and application. As discussed previously in Chapter Four, the knowledge level of the cognitive domain uses verbs such as define, identify, and list. The understanding level adds verbs that include describe, compare and contrast. The application level uses concepts to form new ideas and verbs such as explain, apply, and analyze. Teaching in this domain is typically accomplished by lecture or classroom presentation and evaluation consists primarily of subjective and objective assessments.

The psychomotor domain is tactile based and more physical in its outcomes. The psychomotor domain is steeped in a demonstration/ delivery while the student produces tangible results. Here in this domain, the instructional levels include imitation, practice, and habit. At the level of imitation, demonstration occurs under the close scrutiny of the instructor. Practice builds proficiency that may be conducted autonomously at the discretion of the teacher. The habit level is reached when the student performs the skill without instructor intervention at nominally twice the time that it takes the instructor or an expert to perform the same task. Answering the question, "How do we teach" in the psychomotor domain addresses factors including: Is speed a factor? Is there an array of equipment necessary to teach the lesson? Will the student be graded in an assessment other than a paper/pencil test? If the answer to any one of these three questions is in the affirmative, the psychomotor domain is most likely in effect.

The final province of educational psychology is the affective domain based upon aspects of learning that may be labeled as beliefs, values, or emotions. The three levels in this domain are awareness, distinction, and integration. Action verbs such as display, exhibit, and accept are most commonly used. The first two levels are cognitive (knowledge-based). The remainder of the levels is more affective in nature.

In summary, the traditional classroom is replete with examples of instruction in the psychomotor and cognitive domains. Some exploration of the affective domain surely seeps into the traditional classroom; however, most of the lessons on feelings, emotions, and values is delayed for later.

Schools of educational thought in the traditional classroom. Three schools are commonly accepted within education. Dembo (1991) describes a behavioral orientation in the classroom as one which demonstrates a particular propensity for external motivators (e.g., grades, gold star, etc.) and a teacher-controlled classroom environment. Behaviorists view the environment as key to learning. Stimuli and response produce environmental contingencies known as reinforcement which ultimately results in a repeat of the behavior (reward) or extinction of the behavior (punishment). Teachers who accept the behavioral perspective also accept that student behavior is a response to past and present environment and that all behavior is learned. For example, classroom troublemakers “learn” to be disruptive because they seek attention (reinforcement) from their teachers and peers. Withdrawn students learn that their particular environment does not reinforce social interaction, so they become reserved and unspoken. Behavior should always be analyzed in terms of its history of reinforcement. The definitive teacher responsibility, according to the behaviorist, is to construct an environment in which the probability of reinforcing “correct” or proper student behavior is maximized. This goal is best attained by careful organization and presentation of information in a carefully sequenced order.

The process of thinking and learning encompasses characteristic attributes of cognitive teachers. Cognitivists focus on the learner as an active participant in the teaching-learning process. Prior knowledge becomes a key to more effective learning and a firm grasp of how information is processed and structured in memory is paramount. Advocates of the cognitive school of education favor age-stage-based teaching strategies to help the learner develop their schemata for acquiring information. Jean Piaget and Jerome Bruner are arguably two of the most renowned cognitivists.

Piaget’s research establishes four stages of cognitive development experienced by all learners in basically the same order as they mature. Table 2 presents a recap of the four stages. An extensive discussion of cognitive development according to Piaget was presented earlier in Chapter 2 (table 2) for readers who desire a more thorough review.

The sensori-motor stage involves seeing, hearing, moving, touching, and tasting at the earliest stages of physical development. The preoperational stage is marked with ego-centric, physical activity because

Table 2. Stages of cognitive development

Stage	Approximate Age
SENSORIMOTOR	0 - 2 Years
PREOPERATIONAL	2 - 7 Years
CONCRETE OPERATIONAL	7 - 11 Years
FORMAL OPERATIONS	11- Adult Years

the child has yet to master more complex mental operations. The concrete operational stage is represented by "hands-on learning." The basic characteristics at this stage are the recognition of the logic and stability of the physical world. For example, elements can be changed or transformed and still preserve many of their original characteristics. Also, learners come to understand that changes can be reversed. Formal operations stage is characterized by abstract reasoning. Hypothetical reasoning considers alternative hypotheses, propositional reasoning deals with statements that describe tangible data, and combinatorial reasoning encourages the learner to dissect factors and re-combine them to solve new problems.

Finally (in terms of its arrival of the educational psychology scene), humanism places primary emphasis on self-learning. How a person feels about learning is as important as how the person thinks or even behaves. Behavior is described not from the viewpoint of the teacher (the perspective of the behaviorists) but rather from the vantage point of the student Abraham Maslow and Carl Rogers are especially well-respected humanists with their contributory concepts of self-actualization, cooperation, positive communications, and personalization of information.

In summary, the schools of behaviorism and cognitivism play the more important roles in the educational lives of the traditional learner. Certainly, humanism is present in schools, but not to the degree that the other two schools influence how we teach the traditional student.

Applications of learning in the traditional classroom. When it comes to various applications of learning strategies in the classroom, domains and schools of educational thought combine to produce many important modalities for teaching. For example, in the behavioral school of educational psychology, programmed instruction and computer-assisted instruction, in particular, are in widespread use for teaching the traditional learner. Programmed instruction works as a self-paced instructional package that presents a topic in a carefully planned sequence and requires the learner to respond to questions or statements by filling in blanks, selecting from a series of answers, or solving a problem. Immediate feedback occurs after each response and students proceed through the lesson at their own pace.

A close cousin to programmed instruction is computer-assisted instruction (CAI) that makes use of computer technology to control and monitor the instruction. The rapid integration of the personal computer in schools created a unique opportunity to use these machines for individualized instruction, specifically to enhance drill and practice, simulations, and didactic teaching.

Mastery learning emphasizes specific learning objectives and uses formative assessment and corrective instruction to achieve that goal. Mastery learning assumes that virtually all students can learn what is taught in school if their instruction is approached systematically, they are helped when they encounter difficulty, they are given sufficient time to achieve mastery, and there is some clear criterion of what constitutes mastery.

For the advocate of cognitive learning, traditional students are encouraged to actively use their intuition, imagination, and creativity in a discovery learning-based lesson. Encompassing the scientific model, students identify problems, generate hypotheses, test each hypothesis against collected data, and apply conclusions to new situations presented by the instructor. To successfully teach students thinking skills, the instructor must carefully plan the questions to be asked in order to address the target principles under consideration. Examples must be correctly ordered and reference materials and equipment must be readily available.

Humanism offers the traditional applications of the open classroom and cooperative learning. The development of the open classroom as a model for education was introduced in the 1960s. The concept quickly spread to elementary schools throughout the United States as the manifestation of humanism in the classroom. Subsequent research and investigations settled on a list of "themes" now commonly attributed to open education. They include the necessities for learning (instructional materials are in abundance and students are encouraged to move about freely in the classroom) within an environment of: humaneness and respect (with teachers who deal independently with behavior problems), self-diagnosis of learning events (students correct their own work), individualized instruction (with no text books or workbooks), individualized evaluation (with formal testing kept to an absolute minimum, and a focus on professional growth (teachers use resources external to the classroom).

In cooperative learning, students work together in small teams that remain stable in composition for many weeks. Traditional classrooms are often organized for cooperative experiences using group investigation, teams-games-tournaments (matching students of different abilities), student teams-achievement divisions (replacing the tournament format with stepped divisions to show improvement over time), and jigsaw (where students first learn, then teach a portion of a lesson to other group members). To be an effective cooperative learning experience, the lesson must demonstrate positive interdependence among the students, face-to-face interaction, individual accountability, necessary social skills, and the requisite mastery of group processes. Placing students in groups and telling them to work 'cooperatively' is a formula for failure unless they are taught the obligatory skills for working together.

In summary, master learning constitutes the primary vehicle for instruction for the traditional learner followed by discovery learning and the open classroom.

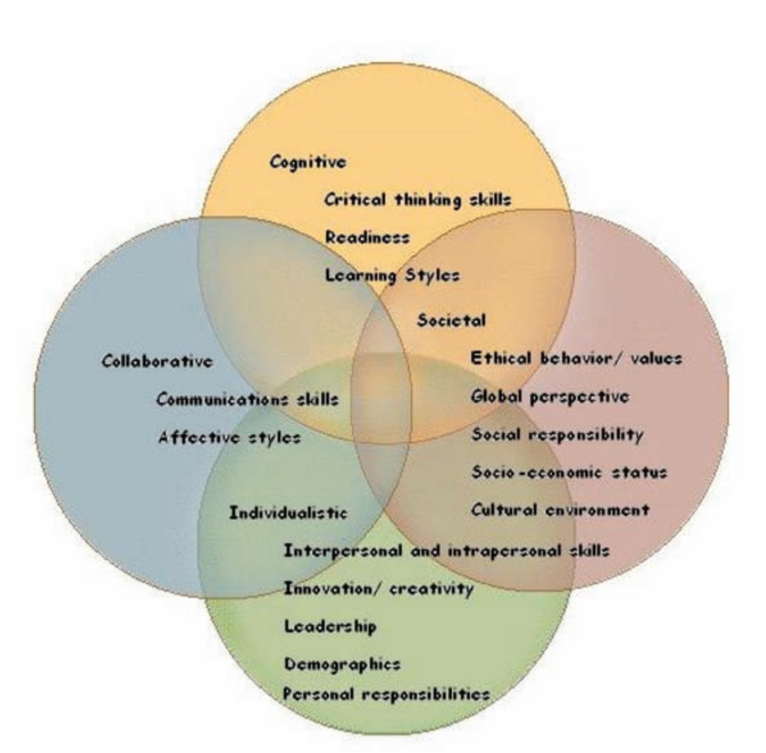
The Sociology of Traditional Education. Sociology addresses issues affecting the developers of educational systems (curriculum designers), the educators who implement these systems (teachers), administrators who manage them (principals, department heads, etc.), and those who take delivery of such systems (in this case, the traditional learner). This pillar of education examines the perspectives of each partner and their relationship to one another.

The past decade in particular has witnessed a revolution in education with respect to how we recognize and acknowledge individual differences in our students. Even the definition of "traditional students" has undergone considerable revision. The U.S. Department of Education's National Center for Education Statistics (NCES) defines non-traditional students as having one or more of the following characteristics: delaying enrollment into postsecondary education, attending part time, being financially independent from parents, having dependents, working full time while enrolled, being a single parent, or having a general educational development GED or high school equivalent certificate. In the past, the percentage of traditional students in public and for-profit colleges and universities was as high as 70 percent. Today, the numbers have been reversed with nearly 90 percent of undergraduates at such institutions fall outside this narrowing definition. (NCES, 2007). Non-traditional students comprise 57 percent of undergraduates at 4-year public colleges and 50 percent of undergraduates at private nonprofit colleges.

For the most part, educators have come to recognize the need to offer alternative modalities of teaching to meet the demands of the students of the 21st century and, as a result, many institutions are shifting from purely a campus-centered model of higher education to a more consumer-centered model (Howell, Williams, & Lindsay, 2003; Twigg & Oblinger, 1997).

For traditional students, teachers need to consider an abundance of characteristics that ultimately define the learner in the classroom. Figure 2 offers a pictorial representation of many of these characteristics, categorized as critical thinking, communications skills, ethical behavior/ values, global perspective, innovation/ creativity, interpersonal and intrapersonal skills, leadership, and social responsibility. In addition to these characteristics, demographics play a major role in the depiction of a traditional student. Age, sex, ethnicity, geographic location, family background and family responsibilities, socio-economic and cultural environment, and other factors impact teaching and learning in the traditional classroom.

Figure 2. Student characteristics



In summary, the following sociological characteristics define the traditional learner, who, in general terms:

- Maintains less control over their learning
- Has fewer experiences to apply to the learning situation
- Tends to be more extrinsically motivated in learning
- Exhibits less pragmatism when viewing the need for learning
- Views learning as their primary role
- Views learning as their primary area of life responsibility
- Lacks confidence in their own learning
- Demonstrates more of a willingness to accept change
- Reveals a greater degree of homogeneity
- Possesses more energy for learning

The History of Traditional Education. More than any of the pillars of education, history plays an integral role in the successful introduction, implementation, and evaluation of instruction. The historical perspective epitomizes how teaching of the traditional learner has matured over the years. Certainly, it has the longer chronicle than either adult learning or distance learning that will be covered in subsequent chapters. Let's examine a quick history of traditional education beginning in the Middle Ages with the influence of religion.

Education from the time of recorded history of the Jewish people, through the Middle Ages and Christianity, the Renaissance, the Protestant Reformation, the Age of Enlightenment, up through the 19th century, was influenced heavily by religion. In the 19th century, governments in the United Kingdom, Germany, France, Italy, and other European countries organized national systems of public education. The United States, Canada, and other countries in North and South America followed suit establishing their own versions of national education systems based largely on European models.

Education in America established itself soon after the landing of the Pilgrims. The first public school was established in 1635 in Boston, Massachusetts and took firm hold with the passage of the "Old Deluder Satan Act" of 1647 requiring towns of more than 50 families to hire a teacher for reading and writing. Often taught by ministers or religious, classes were held in the kitchens and barns. By the beginning of the 20th century, the general public began to demand more practical and useful curriculums, and in so doing, elevated teaching to a respectable profession.

The twentieth century has also been marked by the emergence of national school systems world wide. Compulsory elementary education has become nearly universal although evidence indicates that large numbers of children still do not attend school.

Schools, too, have evolved greatly throughout the history of education. The traditional classroom looks far different than it did in earlier centuries and the Classroom of the Future (COOF) is a concept adopted in many schools and school districts. Certainly, even if a traditional setting, instructional technology in general and computer specifically are in abundance. Special education classes at both ends of the spectrum serve both children with learning disabilities and those with gifted talents.

Finally, and perhaps most importantly, education is no longer a privilege for the affluent few who can afford to send their children to the best college or university. No longer are only boys and men taught in our schools. Women today represent over half of new university and college enrollments every year. The history of traditional education continues to show significant advancements in many areas.

In summary, the history of traditional education is one steeped in practice and convention:a history that goes back to the earliest recorded annals, a practice that is permeated by routines and procedures as old as the Middle Ages and as new as yesterday's legislation, and conventions that serve to overlap traditional education with both adult and distance learning. We will see more of that in the two chapters coming up.

The Leadership of Traditional Education. The Southwest Educational Development Laboratory (SEDL) recognizes six characteristics of leaders in a traditional educational setting (SEDL, 2008). They include: being visionary, believing that schools are for learning, valuing human resources, communicating and listening effectively, being proactive, and taking risks. As society continues to change at an increasingly faster pace and within a more global context, major institutions, including, must continue to seek out new ways to increase their flexibility and effectiveness. Most government, industry and business institutions turn towards education in such a climate of change to lead the way in preparing these new global citizens.

Table 3 presents the key elements of leadership in education; specifically, it outlines the accepted components of practice used by education leaders to build successful schools. Examine those components closely and pay particular attention to the strength of each component as it pertains to the traditional learner.

In summary, while all of these key elements are expected of the traditional leader, vision, curriculum and assessment, and governance and management align most closely to the desirable characteristics of the traditional leader.

Table 3. Key elements of leadership in traditional education

	Required to Some Degree	Particular Emphasis Important for the Traditional Education Leader
Vision		
Vision	√	√
Accountability	√	√
Staffing		
Administrative Personnel	√	√
Professional Personnel	√	√
Governing Personnel	√	
Funding		
Federal Funding	√	
State Funding	√	√
Local Funding	√	√
Finding Money	√	
Other Funding Ideas	√	√
Strategic Planning		
Taking Stock	√	
Setting Goals and Objectives	√	
Communication Plan	√	
Vision Statement	√	√
Tactical Planning		
Networking	√	√
Policy Development	√	√
Curriculum & Assessment		
Essential Skills	√	√
Assessment Tips	√	√
School Self-Evaluation	√	√
Community Support		
Community Involvement	√	√
Getting the Word Out	√	
Governance and Management		
Board Development	√	√
Leadership and Teams	√	√
Self-Assessment	√	√
Leadership Responsibilities	√	√
Professional Development Plan	√	√

EFFECTIVE PRINCIPLES AND PRACTICES OF TEACHING THE TRADITIONAL LEARNER

In 1999, the Senate ad hoc Committee on Teaching Quality, Effectiveness and Evaluation (British Columbia) published the minutes to an historic meeting that developed seven key principles (see Table 5) for effective teaching which, when combined exemplary practice, enable students to learn and to apply knowledge, skills and perspectives. These principles and examples of practice added much to the discipline of teaching the traditional learner including the design of courses and curriculum, mentoring students, and supervising instruction.

A few of the exemplary practices help clarify the purpose and scope of each principle. For example, one recommended practice includes the identification of key concepts or ideas and instruction that helps students to understand and apply these concepts (Principle 1). Organizing effective learning experiences that will meet intellectual goals and learning outcomes, both inside and outside the classroom is also a suggested practice (Principle 2). Communicating and interacting effectively attempts to balance collaborative experiences with individual student learning to advance course aims and outcomes and prepares the traditional learner to operate in a communications-rich world (Principle 3).

Reviewing student progress toward intellectual goals and established learning outcomes attends to Principle 4. Recognizing and accommodating different learning styles as well as demonstrating sensitivity to intellectual and cultural issues are especially important to the fifth principle of enhancing teaching effectiveness that advocates a respect for diverse talents and learning styles of students.

A global perspective helps students connect their learning experience to the world outside the classroom (Principle 6). Finally, reflection and regularly revised and updated course content, format, teaching strategies, and assignments apply practice to Principle 7.

From Table 4, it is obvious that, although effective teaching relies to some degree on each of the seven principles presented, four are more critical. Principle 2 demands that the teacher employ appropriate teaching strategies (we will discuss this point in more detail in the next section of this chapter). Communications (Principle 3) is critical with traditional learners as is the teacher's attention to the intellectual growth of learners (Principle 4) under their charge.

LEARNING STYLES FOUND IN THE TRADITIONAL CLASSROOM

Learning styles can be defined, classified, and applied in many different ways, reflecting the variety in which individual learners perceive, interact with, and respond to their environment. Learning styles can also be described as a set of factors, behaviors, and attitudes that facilitate learning when confronted by a given situation. A learning style is an individual's preferred method of learning. When an instructor's teaching style matches a student's learning style, that student typically experiences greater satisfaction and a more positive attitude toward learning (Gardner & Hatch, 1989). Unfortunately, in the typical traditional classroom, students are not exposed to exercises in which their particular learning styles surface. Most learners go through their formal education (often, even into graduate studies) without a firm grasp on exactly how they learn.

One well-known model of learning styles recognizes three basic learning styles (Rose, 1997). Other sources (Kolb, 1984; Coffield, Moseley, Hall, & Ecclestone, 2004; Stahl, 2002; and, Hudson, 1967)

Table 4. Key principles for the effective teaching of the traditional learner

	Required to Some Degree	Particular Emphasis Important for the Traditional Learner
Principle 1: Set clear goals and intellectual challenges for student learning	√	
Principle 2: Employ appropriate teaching methods and strategies that actively involve learners	√	√
Principle 3: Communicate and interact effectively with students	√	√
Principle 4: Attend to intellectual growth of students	√	√
Principle 5: Respect diverse talents and learning styles of students	√	
Principle 6: Incorporate learning beyond the classroom	√	
Principle 7: Reflect on, monitor and improve teaching practices	√	

identify numerous other learning styles. See Table 5 for a synopsis of the learning styles mentioned in this chapter.

Visual learners learn by seeing. Such traditional learners do best when they can observe the teacher's body language and facial expressions to fully understand the content being taught. They prefer sitting at the front of the class to avoid distractions. They conjure up images to represent concepts and construct new schemata for understanding from visual displays such as diagrams, illustrated books, classroom presentations, and multimedia videos. During a didactic lecture, visual learners often prefer to take detailed notes to embody the information presented by the teacher.

Auditory learners learn best from verbal lectures, classroom discussions, interpersonal communications, and listening to classroom peers. They seek to understand the underlying meanings of communications by attending to the tone of voice, pitch, speed and other fine distinctions. Written information has more meaning when it is vocalized; as a result, such learners often benefit from reading text aloud or using a recording device to replay the content.

Kinesthetic learners learn by manipulating objects. Hands-on lessons that actively explore the physical world are the key to successfully teaching the kinesthetic learner. Many who prefer this mode of instruction find it hard to sit still for extended periods and become easily distracted peripheral activities and secondary disruptions common in the traditional classroom.

The linguistic learner prefers to read, write and tell stories. Such learners are typically very good at memorization of names, places, dates and details. While the visual learner learns best by seeing and the auditory learner learns best by hearing, the linguistic learner learns best by verbalizing.

The logical/ mathematical learner has a preference for working with numbers. Such learners have a propensity for the quantitative, experimental, and graphical. They learn best when presented with patterns, relationships, experiments (based on hypotheses), and problem-solving.

Learners who prefer constructing knowledge with respect to buildings, designs, mazes, puzzles, maps, etc. are categorized as spatial learners. They learn best by drawing, building, and representing their ideas concretely. They are whole-part (i.e., general to specific) learners who need to see the big picture first before they can accept the details. They are non-sequential and do not learn from step-by-step instruction found in many traditional classrooms.

Table 5. Learning styles found in the traditional classroom

The ____________ learner…..	….Learns best by….		
		and comprises ___ of traditional learners	
Visual	Seeing	*65%	
Auditory	Hearing	*30%	
Kinesthetic	Touching	*5%	
Linguistic	Talking	**38-47%	
Logical/ Mathematical	Reasoning	**51-54%	
Spatial	Building	**20-25%	
Musical	Responding to sounds	**27-35%	
Naturalistic	Interacting	**26-44%	
Interpersonal	Sharing and comparing	**31-51%	
Intrapersonal	Learning alone	**20-54%	
Divergent	Experience	***11%	
Convergent	Interaction	***55%	
Accommodators	Trying new solutions	***59%	
Assimilators	Thinking about new situations	***4%	

Table 5 Notes: * Riklan (2004)** Estimates based on the studies of Mills (2001), Kirk (2008), and Gutierrez, Perri, and Quackenbush, (2006). Ranges are used to indicate variances in the study results. *** Peker, Murat & Mirasyedioğlu (2008)

The musical learner responds – most often to music, but just as often to sounds, melodies, pitches, rhythms, and order. When learning new information or developing academic skills, they benefit most from writing song lyrics, playing music to accompany their work, or developing multimedia projects. Their learning styles are consistent with those who work are singers, musicians, orchestra conductors, recording engineers, and even Web designers.

Naturalistic learners prefer to interact with their surroundings. Their favorite subjects are often animals, geography, and weather. They have a passion for the environment, categorizing and managing living areas, and studying that focuses on natural phenomenon and natural settings.

The interpersonal learner is a true team player. They learn best when they can share ideas and bounce those ideas off teachers and peers for comments and suggestions. Working with others manifests itself in team sports, group discussions, and team-building exercises. In the traditional classroom, new information and academic skills are acquired from playing cooperative games, group research projects, or working on assigned tasks in small groups. The interpersonal learner often grows up to work as counselors, teachers, politicians, coaches, business executives, and entertainers. They are particularly adept at understanding people, leading others, organizing, communicating, manipulating and mediating conflicts.

The intrapersonal learner likes to work alone and pursue individual interests. They are typically good at understanding their own motivations, focusing inwardly on feelings/dreams, following their own instincts, pursuing interests/goals, and being original. Working alone, individualized projects, and self-paced instruction (which often involves technology) are the most successful methods of teaching the intrapersonal learner. Psychologists, novelists, philosophers, and computer programmers often demonstrate a propensity for this style of learning.

The divergent learner takes experiences as a point of departure from which a single experience can be interpolated into numerous possibilities. They ask the tough questions: 'why' and 'how' and move quickly from detail to the big picture. Divergent learners are generally attributed with a variety of personality traits that separate them from the general population. Many of these traits contributed to academic achievement and effective leadership in the classroom. Unique personality traits, combined with external learning preferences and a global perspective make these learners particularly challenging to the traditional teacher.

Convergent learners, on the other hand, consider possibilities and attempt to test them to see if they work in practice. They like to ask 'how' about a situation, understanding how things work in practice. They revel in facts and seek to make decisions by continually taking apart barriers into their component parts. They prefer to work alone, with thoughtful deliberation and independent action. Convergent knowledge focuses on facts or principles and problems that have "right" and "wrong" answers. Hudson (1967) believed convergent learners tended to be more highly valued in school, because most assessment approaches focus on convergent skills. They learn best through interaction and computer-based learning is more effective with them than other methods.

Accommodators, as defined by Kolb, are advocates of the cognitive principle whereby learners change their personal representation of information when confronted with foreign situations or knowledge previously unfamiliar. Such learners seek to adapt to the new circumstances with a strong preference for doing rather than thinking. They like to ask 'what if?' and 'why not?' to support their action-first approach. In situations where a theory or plan does not fit the "facts," this person will most likely discard the plan or theory. This person tends to solve problems in an intuitive trial and error manner, relying heavily on other people for information rather than on one's own analytic ability. They do not like routine learning environments and will take considerable risks to try out new solutions to time-honored problems. They prefer hands-on and practical learning rather than lectures.

Assimilators are the most cognitive in their approach to learning. Such learners prefer to think before acting. They ask 'What more is there that I can or need to know before tackling a particular problem?' Assimilators lean toward an organized and structured approach to understanding because their first (and primary) tendency when confronted with new learning situations is to couch that knowledge in terms of what they already know. They prefer lectures for learning, with demonstrations where possible, and respect the knowledge and expertise of the teacher.

In summary, the traditional learner uses many learning styles in the classroom. From the list of styles identified as most appropriate for the traditional learner, it is suggested that the teacher consider lessons that target the visual, linguistic (verbal), logical (mathematical), interpersonal, intrapersonal, convergent, and accommodative styles of learning. Lessons should contain an instructional modality that favors seeing, talking, reasoning, and sharing, as well as learning alone, interacting, and trying new things.

TEACHING AND LEARNING METHODOLOGIES APPROPRIATE FOR THE TRADITIONAL LEARNER

Some of the most well-known teaching and learning strategies from research and the literature are identified in Table 6. Those strategies appropriate for teaching the traditional learner are indicated with a check

Table 6. Strategies for delivering instruction to the traditional learner

Instructional Strategy Category/Methodology	Appropriate for the Traditional Learner	Instructional Strategy Category/Methodology	Appropriate for the Traditional Learner
Activity Based Strategies		**Independent Strategies**	
Active Learning ***	√	Action Research	
Applied Learning		Character Education***	√
Chat Room Discussion		Cognitive Coaching*	√
Debate **	√	Distance Learning	
Field Trip**	√	E-portfolio	
Game**	√	Experiential Learning*	
Guided Reading**	√	Homework **	√
Guided Writing **	√	Hyper book	
Graphic Tools		Independent Reading	
Oral Presentation		Independent Study	
Panel Discussion **	√	Inquiry learning	
Podcast Presentation***	√	Instrumental Enrichment	
Practice**	√	Interactive Lesson	
Retelling		Learning Contract	√
Simulation		Learning Log/Journal	
Survey **	√	Memorization**	√
Web-based simulation		Multicultural Experience	
Cooperative Strategies		Note Making	√
Buddy System**	√	Portfolio	
Collaborative Teaching		Problem-Based Learning	
Community Links	√	Reading Response	√
Conflict Resolution		Reflection	
Cooperative Learning***	√	Report	
Discussion		Response Journal	
Discussion Board		Service Learning	
Interview		Small Group Discussion	
Literature Circles	√	Social Learning ***	√
Mentoring		Virtual Tour	
Peer Practice		**Thinking Skills Strategies**	
Peer Teaching		Accelerated Learning*	√
Round Table		Analyzing Bias/Stereotype	√
Threaded Discussion		Anticipation Guide**	√
Direct Instruction Strategies		Assessment Alternatives	√
Advance Organizer ***	√	Brainstorming	
Audio conferencing		Case Study	
Book Talks		Classifying **	√

continued on following page

Table 6. continued

Instructional Strategy Category/Methodology	Appropriate for the Traditional Learner	Instructional Strategy Category/Methodology	Appropriate for the Traditional Learner
Computer-assisted Instruction		Concept Clarification	√
Computer-based Instruction		Concept Mapping	√
Computer-managed Training		Critical thinking	
Conferencing		Differentiated Instruction***	√
Demonstration	√	Estimating ***	√
Direct Instruction	√	Experimenting	√
E-books		Expressing Another Point of View	
Expository Text Frames	√	Fair Test	√
Flash Cards	√	Graphing	√
Guest Speaker		IDEAL Problem Solving	
Guided Exploration***	√	Issue-Based Analysis	
Guided Reading/ Writing***	√	Lateral Thinking	√
Integrated Thematic Unit **	√	Learning Styles	√
Lecture***	√	Manipulatives***	√
Mnemonic Devices**	√	Map Making	
Multicultural Education		Media Analysis	
Practice and Drill**	√	Mental Calculation	√
Programmed Learning	√	Metacognitive Reflection	
Programmed Instruction		Mind Map	√
Prompt	√	Model Making**	√
Read Along/ Aloud	√	Multiple Intelligences**	√
Reciprocal Teaching		Oral Explanation ***	√
Seminar/Tutorial		Problem Posing/ Solving	√
Socratic Instruction**	√	Process Notes **	√
Story Mapping	√	Semantic Feature Analysis	√
Storytelling*	√	Statistical Analysis	
Task Cards **	√	Statistical Software	
Teaching for Understanding**	√	Technology in Education	√
Textbook	√	Think Aloud	√
Videoconferencing		Thinking Skills***	√
Visual Stimuli	√	Visual/Graphic Organizers	√
Visualization	√	Writing to Learn***	√
Word Cycle/ Sort/ Wall**	√		
Workbook/Work Sheets	√		

Table 6 Notes:
* Terms defined in **Glossary of Terms, Definitions of Selected Teaching and Learning Strategies**.
** Terms defined in Wikipedia
*** Terms defined in both resources

mark (√).Descriptions of these particular strategies work, where they have been identified, applied, and their results are followed with a single asterisk (*) and defined in the Glossary of Terms. Those strategies followed with a double-asterisk (**) can be found in Wikipedia should the reader wish to learn more about a specific strategy. Triple asterisk (***) identify words that are found in both resources.

Activity-based strategies are listed first. This category of strategies encourages students to learn by doing via authentic, real-life learning experiences that allow the student to participate in self-directed opportunities that encourage exploration, decision-making, problem-solving, and interaction with others. Other common terminologies that are often represented in this category include project-based learning, independent learning, and discovery learning. Students are asked to take more of a role in their own learning and acquire lifelong skills of collaboration and interpersonal cooperation.

Cooperative learning strategies help students to become active learners by promoting positive and collaborative group interactions, respectful listening behaviors, and argumentation skills. Cooperative learning teaches students the etiquettes necessary to interact successfully on an interpersonal basis and how to transfer those skills to effective interactions in a larger context. The key concepts of cooperative learning include: group collaboration for positive interdependence, individual accountability, interpersonal communication, trust, decision making, and conflict resolution. In addition, related skills such as face-to-face interviewing, information processing, and allocation of responsibilities in a group environment are also presented.

Direct instruction strategies are used in a constrained instructional environment that is directed by the teacher and encompasses a wide variety of instructional modalities that have been found to be most effective when the student does not already possess the content information or social skills required for independent learning. Such environments are also characterized as new knowledge and skills best introduced by the teacher using modeling techniques that the teacher can demonstrate and the student can imitate, or when it is necessary to communicate information known only to the teacher (i.e., sage on the stage). Over the years, direct instruction has adopted a variety of delivery formats that have varied depending on the degree of control required to deliver the instruction, the nature of the material to be learned, the available manners of presentation, and t he level of understanding demanded by the teacher to evidence mastery of the content.

Independent learning strategies offer students the knowledge and skills to become self-directed learners. Strategies in this category encourage students to enhance their decision-making skills while investigating topics with more intensity. Discovery learning is an example of a strategy that explores new topics and generates new thinking to solve perhaps more traditional problems. Independent learners seek to master time-management, self-control, and personal learning management skills to be successful. Inquiry learning, active research, and dynamic investigation are terms associated with independent learning strategies. In each, students learn to use a variety of research methodologies and resources, structure their research questions according to the scientific method, and pursue fruitful areas of investigation. Skills employed in this category often are transferable to a host of other academic disciplines as well as areas of personal interest.

Finally, thinking skill strategies involve adding to the learner's repertoire of organizational schemata for dealing with new information and heretofore unfamiliar encounters. Concept maps, mind maps, graphs, maps, charts, and visual organizers facilitate communication and the transfer of learning to unique situations. Experimenting, fair test, critical thinking skills, estimating, and inquiry-based research develops in the learner a methodology for defining problems, suggesting hypotheses, testing assumptions, and recommending solutions (i.e., the scientific method). Exposure to in thinking skills and strategies fosters a deeper understanding of one's ability to deal with new situations, offer complex solutions, make critical decisions, and enhance personal value as a contributing member of the community.

A close examination of Appendix A finds that many of the instructional teaching strategies identified in the Focus on Delivery are appropriate for the traditional learner. However, as might be expected, the majority of strategies for traditional learners lie in the categories of direct instruction (64.8%) and thinking skills and strategies (70.0%).

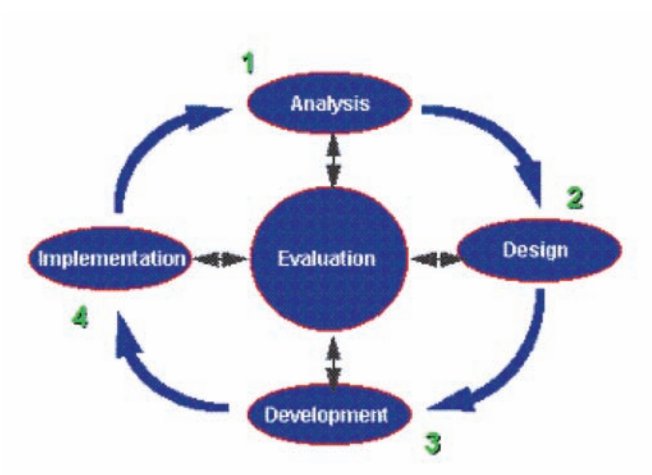
Methodologies for Designing Instruction for the Traditional Learner

Teaching the traditional learner is a complex, multifaceted activity requiring instructors to consider a host of factors that ultimately affect student learning outcomes. The ADDIE Model (Figure 3) represents five basic phases of instructional design and encourages teachers to consider a particularly coherent and well-accepted approach for designing traditional lessons that includes:

Analysis Phase. The analysis of lesson goals requires that the designer identify the learning problem, the learning objectives, the audience's needs, existing knowledge, and other relevant dynamics. Analysis also considers the learning environment (which often comes with constraints beyond the control of the instructor), the delivery options, and the milestones for implementing the course. Specifically, in the Analysis phase, the following components of the traditional lesson are considered:

- Propose of course
- Audience
- Goal
- Objectives
- Identify content
- Identify Environment and Delivery
- Instructional Strategies

Figure 3. ADDIE model for designing instruction for the traditional learner



- Assessment Strategies
- Formative Evaluation
- Constraints

Design Phase. A design phase follows a systematic process of specifying learning objectives and examines questions such as who will be responsible for the instruction, what resources will be needed to deliver the lesson, when will the instruction be delivered, where will the lesson be delivered, and how will the instructor know learning has occurred? In this phase of the ADDIE Model, the course designer:

- Identifies the learning units of instruction
- Selects content and strategies for each individual unit of instruction
- Prepares classroom instructions for the learning unit
- Names the menu items for each instructional component

Development Phase. The actual production (development) of the content and learning materials based on the aforementioned analysis and design efforts. In this phase of the traditional lesson, the course designer:

- Builds specific content items, assignments, and assessments (formative and summative) using the format of a traditional lesson plan (See Appendix A)
- Builds course structure to include
- Create course content

Implementation Phase. This phase of the model encompasses a critical acknowledgement of the unique learning characteristics of the traditional learner. During implementation, the plan is put into action and a procedure for delivering the lesson is created. Materials are delivered or distributed to students and the effectiveness of the training materials is evaluated. Traditional lessons are most often found in the classroom and employ more static learning materials such as text books, manipulatives, and workbooks. In addition, the following course of action typifies the implementation phase:

- Overview of course
- Expectations
- Initiate instruction
- Interaction
- Ask for feedback early and often

Evaluation Phase. Finally, the evaluation or assessment phase of the design process ensures that instructional objectives have been met and a process of continuous improvement is in place to continually update and revise the lesson. This phase consists of both formative (i.e., on-going) and summative (i.e., final) evaluation. Feedback of the traditional learner may take on a variety of forms such as Final Exams, Pre- and Post-tests, Rubrics, and authentic projects and attempts to answer the following questions:

- Did the students achieve expected learning outcomes?
- What was learned?

- How can the course be made even better?

In summary, it is highly recommended that instructors: (1) follow the ADDIE Model as presented in this chapter, and (2) consider using the lesson plan template provided in Appendix A when designing instruction for the traditional learner.

SUMMARY

In this chapter, we reviewed many of the techniques appropriate for teaching the traditional learner. To recap:

A. The Pillars of Education provide the conditions of teaching and learning in the traditional classroom.

Philosophies for the traditional learner. Perennialism and Idealism are best suited philosophies for traditional education.

Psychologies of the traditional learner.

- The domains of Psychomotor (physical activities) and Cognitive (centers on knowledge and the mind) represent the key province for traditional learning.
- The schools of Behaviorism and Cognitivism play the more important roles in the educational lives of the traditional learner.
- Master Learning constitutes the primary application for instruction for the traditional learner followed by Discovery Learning and the Open Classroom.

Sociological characteristics of the traditional learner. The traditional student can be characterized as a learner who demonstrates less control (over learning), fewer experiences, extrinsic motivation, less pragmatism concerning learning, less self-confidence, more willingness to accept change, and more energy for learning.

History of traditional education. The history of traditional education is one steeped in practice and convention steeped in the past and impacted by the challenges of the present.

Leadership of traditional education. The most desirable characteristics of the traditional leader tend to be vision, mastery of curriculum and assessment, and experience in governance and educational administration.

B. The examination of effective principles and practices of teaching the traditional learner fashioned the following principles carved from the five pillars of education. Of the seven principles examined in this chapter, the most important with respect to traditional learners include:

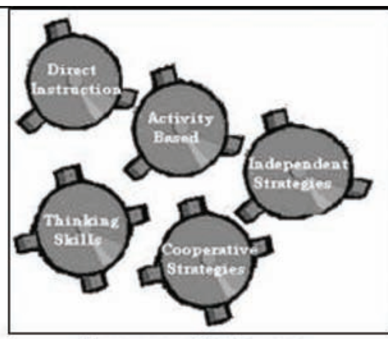
- Principle 2. Appropriate teaching strategies
- Principle 3. Communications
- Principle 4. Attention to the intellectual growth of learners

C. Learning styles found in the traditional classroom. From the 14 distinctive learning styles offered in the chapter, a full seven of them were deemed most proper for teaching in the traditional classroom. Specifically, traditional teachers should prepare lessons that target:

- Visual learners
- Linguistic (verbal) learners
- Logical (mathematical) learners
- Interpersonal learners
- Intrapersonal learners
- Convergent learners, and
- Accommodators.

D. Teaching and learning strategies appropriate for the traditional learner. Direct instruction and thinking skills strategies represent the majority of strategies for delivering instruction to the traditional learner. In these two categories are such modalities as lecture, programmed instruction, storytelling, workbook/work sheets, concept mapping, differentiated instruction, manipulatives, visual/graphic organizers, and technology.

Figure 4. Traditional learner lesson plan template (cumulative)



Focus on Delivery

Document the development of this lesson using the traditional learner instructional design **ADDIE Model** to ensure that the lesson plan includes these elements:

- [x] Analysis phase [Purpose ✓ Audience ✓ Goals/Objectives ✓]
- [x] Design phase [Learning units ✓]
- [x] Development phase [Content ✓ Assignments ✓ Assessment ✓]
- [x] Implementation phase [Prototype lesson ✓ Revisions ✓]
- [x] Evaluation [Learning outcomes ✓ Competencies mastered __]

Identify the **instructional teaching strategy** to be used in this lesson:

- [x] Direct Instruction (approximate time): **50 min**
- [x] Activity-based Instruction (approximate time): **50 min**
- [ ] Independent strategies instruction (approximate time):
- [ ] Thinking skills Instruction (approximate time):
- [ ] Cooperative strategies (approximate time):

E. Methodologies for designing instruction for the traditional learner.

The ADDIE Model offered five steps in designing instruction and provided a popularly accepted approach from analysis to implementation and evaluation. In addition, a practical template was provided in Appendix A to help the teacher develop the lesson components necessary for a successful student learning outcome. Some of the most important elements in a traditional lesson plan include lesson objectives and goals, direct instruction, practice (classroom and independent), and the assessment and follow-up.

In conclusion, this chapter on delivering instruction to the traditional learner is replete with terms, concepts, principles, and methodologies that should be considered when teaching traditional learners. Although the definition of effective teaching covers as many characteristics as there are teachers in the classroom, by following the pillars, principles, and methodologies suggested in this chapter, any teacher can more effectively present instruction to the traditional learner in the classroom.

CONCLUSION

Appendix A, Traditional Learner Lesson Plan Template A completed **Focus on Delivery** portion of the template (Figure 4) demonstrates how to develop a traditional classroom lesson on the Planets of the Solar System.

REFERENCES

Birmingham, U. C. E. (n.d.). *Student Characteristics Key Concept Map*. Birmingham City University. Retrieved June 2008 from http://www.ssdd.bcu.ac.uk/crumpton/student-characteristics.htm

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Should we be using learning styles. What research has to say to practice?* Learning and Skills Research Centre.

Dembo, M. H. (1991). *Applying Educational Psychology in the Classroom* (4th Ed.). New York: Longman Publishers.

Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. *Educational Researcher*, *18*(8), 4–9.

Gutierrez, D., Perri, K., & Quackenbush, A. (2006). Exploring the Multiple Intelligences of Community College Students Enrolled in Online Courses. *Journal of College Teaching & Learning*, *3*(11).

Howell, S., Williams, P., & Lindsay, N. (2003). Thirty-two trends affecting distance education: An informed foundation for strategic planning. *Online Journal of Distance Learning Administration, 6* (3). Retrieved December 1, 2003, from http://www.westga.edu/~distance/ojdla/fall63/howell63.html

Hudson, L. (1967). *Contrary Imaginations; a psychological study of the English Schoolboy*. Harmondsworth, UK: Penguin Publishers, Inc.

Kirk, D. (2008, June 17). Tips on Taking Back the Classroom and Becoming a More Effective Teacher. In *Advice for Teachers, Classroom Management, Teaching tools, Tips for Teaching*. Retrieved July 2008 from http://www.delaneykirk.com/classroom_management

Kolb, D. A. (1984). *Experiential Learning*. Englewood Cliffs, NJ: Prentice-Hall

Lavattelly, C. S., & Stendler, F. (1972). *Reading in child behavior and development*. New York: Hartcourt Brace Janovich

Mills, S. W. (2001, September 17). The Role of Musical Intelligence in a Multiple Intelligences Focused Elementary School. *International Journal of Education & the Arts*, *2*(4).

Peker, M., & Mirasyedioğlu, S. (2008). Pre-Service Elementary School Teachers' Learning Styles and Attitudes towards Mathematics. *Eurasia Journal of Mathematics . Science & Technology Education*, *4*(1), 21–26.

Riklan, D. (2004). *How to Immediately Determine Which of the Top 3 Learning Styles Will Work Best for You*. Retrieved on July 2, 2008 from http://www.selfgrowth.com/gwlesson3.html

Rose, C. (1997). *Accelerated Learning for the 21st Century*. New York: Delacorte Press. Southwest Educational Development Laboratory (SEDL), (n.d.). *Leadership Characteristics that Facilitate School Change, Characteristics of Leaders of Change.* Retrieved June 2008 from http://www.sedl.org/change/leadership/character.html.

Stahl, S. A. (2002). Different strokes for different folks? In L. Abbeduto (Ed.), *Taking sides: Clashing on controversial issues in educational psychology* (pp. 98-107). Guilford, CT: McGraw-Hill.

Twigg, C., & Oblinger, D. (1997). *The virtual university*. Washington, DC: Educom. U.S. Department of Education's National Center for Education Statistics Tables & Figures.(n.d.). Retrieved from http://nces.ed.gov/QuickTables/

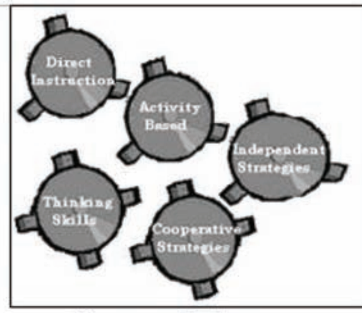
Chapter 11
Delivering Instruction to the Adult Learner

Learning Objectives. This chapter examines many of the characteristics and considers the overarching implications of teaching the adult learner. Many of the reflections parallel the previous chapter so the reader may compare and contrast the various modalities for delivering instruction to this particularly important category of learner. Specifically, the reader will:

- Identify the Pillars of Education related to the adult learner. They will be different than discussed in the previous chapter.
- Consider effective principles and practices of teaching the adult learner. Again, different principles and practices will be noted from those mentioned in Chapter Ten.
- Recognize common learning styles found in the adult-focused classroom.
- Become familiar with the variety of teaching and learning strategies appropriate for the adult learner. Major differences will also be noted here.
- Become acquainted with the methodologies for designing instruction for the adult learner, including the Backward Design Model

DOI: 10.4018/978-1-60566-824-6.ch011

Figure 1. Adult lesson plan template (focus on resources)



Focus on Delivery

Document the development of this lesson using the adult learner instructional design **Backward Design Model** to ensure that the lesson plan includes these elements:

- ☐ Identify Learner Outcomes
- ☐ Determine Acceptable Evidence
- ☐ Plan Learning Experiences and Instruction
- ☐ Create resources to engage the learner
- ☐ Revise and refine the lesson

Identify the **instructional teaching strategy** to be used in this lesson:

- ☐ Direct Instruction (approximate time):
- ☐ Activity-based Instruction (approximate time):
- ☐ Independent strategies instruction (approximate time):
- ☐ Thinking skills Instruction (approximate time):
- ☐ Cooperative strategies (approximate time):

Lesson Plan Template. Refer to **Appendix B, Adult Learner Lesson Plan Template** as the chapter discusses **Focus on Delivery** as depicted in Figure 1.

INTRODUCTION

There is no commonly accepted definition of an adult learner. The best that most educators are able to do (and still feel relatively satisfied with the attempt) is to recognize certain characteristics commonly attributed to adults. For example, adult students characteristically engage is multiple roles that affect both the amount and quality of time they devote to learning. Too, adults typically bring more life experiences to the classroom than traditional students. Experiences often provide a rich source for grounding their learning and for building a basis for new knowledge. Sometimes, these experiences interfere with learning and must be set aside, replaced with new schemata for acting on novel situations. Many adults find that formal education (especially returning to school after years spent in pursuit of career goals) serves as an especially uneasy transition point in their lives. As adults move through a series of stages such as education, insecurity and uncertainty is commonplace. Adult students frequently have established educational goals (especially when compared to their traditional counterparts). They are more likely paying for their education, focused on off-campus activities, and are likely to be peers (age-wise) or even older than their instructors.

Adult education constitutes those interested in teaching adult learners or who are already working with adults in an educational capacity and would like further certification and professional credentials. Studying adult education gives candidates further knowledge, training, skills, understanding and appreciation of adult education as its own unique area of practice and study. Although many of the philosophies, psychologies, and leadership traits for the adult educator are similar to those focused on the traditional learner, the history and sociology of adult learning is different.

Topics particular to adult education include administration, curriculum development, learning and teaching methods and adult education as it relates to social change, current trends and global context. Those interested in focusing on adult education at whatever level find themselves as adult English as a second language (ESL) teachers, continuing education teachers and professors, or teachers of adults seeking a high-school diploma. Others provide General Educational Development (GED) preparation, literacy skills, or find their vocation at jobs in adult education administration and curriculum development.

As with traditional teaching, effective adult education begins well before the teacher enters the classroom. University and college teacher preparation programs prepare their adult education candidates via a series of courses that cover a different curriculum of fundamental courses (Figure 2).

THE FIVE PILLARS OF EDUCATION FOR THE ADULT LEARNER

Recall from the previous chapter that philosophy, psychology, sociology, history, and leadership provide the overarching conditions for teaching and learning. In Chapter Ten, the discussion was centered on the traditional classroom. In this chapter, adult learners are the focus. As a reminder, the five pillars addressed the following critical questions:

- Philosophy and the question “What are we teaching?”
- Psychology and “How do we teach?”
- Sociology and “Who are we teaching?”
- History and “When (in the history of education) are we teaching?”
- And, Leadership and “Whom (sic) is responsible for successful learning outcomes?”

The chapter examines how the answers to these important questions differ between the traditional and the adult learner.

The Philosophy of Adult Education. Unlike traditional students whose purpose is to absorb knowledge for later (i.e., post-graduation) application, the adult learner comes to the classroom often with pre-established life and career goals before or at the onset of their education. Some of these goals may change as the direct result of the education underway as adults seek to re-assess and re-align their capacities and interests throughout the learning process. But nevertheless, adult learners are most likely seeking knowledge that will support their vocational interests or personal curiosities.

For the adult learner, a solid philosophy of education serves as a tool for improving practice; however, the gap between philosophy and practice can be a difficult chasm to hurdle. For adults, philosophy can explain results and processes and provide new insights into how theory can work in the real world. It

Figure 2. A pre-service curriculum for adult education

Required Courses (24 credits)		
EDUC 460	**Introduction to Adult Education** History, methods, organizations, programs, and challenges of adult education in the United States.	3 credits
EDUC 498	**Teaching the Adult Learner** Adult-oriented teaching situations are examined along with the various opportunities and challenges enabling and constraining those techniques to properly address the teaching of the adult learner.	3 credits
EDUC 506	**Program Planning in Adult Education** Study of theoretical foundations, policies, evaluation models, methods, and materials in planning adult education.	3 credits
EDUC 507	**Research in Adult Education** A capstone course that provides guided discussions, readings, and research and evaluation methods and trends as applied to adult education.	3 credits
EDUC 510	**Historical and Social Issues in Adult Education** Social and historical foundations of adult education in the United States and selected nations.	3 credits
EDUC 588	**Professional Seminar: Evaluation and Adult Education** A seminar designed for surveying research methods, and the writing of a master's paper. This is the capstone course—all other required courses must be taken prior.	3 credits
EDUC 538	**Lifespan Development and Learning** This course integrates learning theories and principles with advanced study of early childhood, elementary, middle, high school development, and adult learning in relation to educational practice.	3 credits
EDUC 511	**Adult Learning: Theories, Principles, and Applications** This course focuses on adult development and learning theories. Students will identify the stages of adult development and examine the concept of andragogy versus pedagogy.	3 credits

Elective Courses (9 credits)

Choose three elective credits from various courses shown below. The following courses are approved electives for this program:

Elective Courses		
EDUC 457	**Adult Literacy** Surveys adult basic and literacy education programs and best practices; applies recent research on adult and family literacy.	3 credits
EDUC 462	**Technology Use in Education** Skills and knowledge needed to direct the use of learning technologies in educational settings.	3 credits

can serve as a guide for practice and a venue for placing experiences in context of how the world operates. The question, "What are we teaching in the adult classroom" depends (as it did for the traditional learner) upon answering the question "why do we bother teaching adults in the first place?" For the adult learner, however, the accepted philosophies of education include two from the previous examination of traditional learning (Realism and Experimentalism) and three that are different: Liberalism (also referred to as "traditional" or "classical"), Progressivism, and Radicalism.

From the previous chapter it was noted that Realism indicates the existence of universal concepts and the nature of objects in the real world. In its most general form, realism asserts that objects in the external world exist independently of what the individual might think about them. For the traditional learner, the most straightforward manifestation of realism contends that humans learn to become directly aware of objects and their attributes by way of their interaction (or instruction) with the external world. For adult learners, however, realism as a philosophy of education expands to embrace more abstract concepts such as mistakes in perception, illusions brought on by conflict in observed information, or the manner in which we interpret, translate, or decipher new information. Thus, for adults, while objects may remain independent (i.e., real) in essence, the more mature adult intelligence is able to sort through otherwise conflicting explanations of what appears to occur in the real world, making realism a much more useful philosophy for the mature learner.

Experimentalism advocates a world in which experience and truth exist in a means of defining what works. Use of empirical or experimental methods determines the validity of new ideas and new knowledge. Experimentalists believe that the world (and therefore, knowledge of the world) is constantly changing. Reality is experienced by the learner. So the purpose of education is to suggest that truth is what works right now while demonstrating that schools exist to discover and expand social experiences and offer established methods for solving what will inevitably be previously undetected problems. For adults, realism as an educational philosophy makes sense. Since schools cannot possibly provide the adult everything there is to know about an ever-changing world, the best course would be to teach adults how to go about finding new information. Indeed, the adage, "it's better to teach the starving man how to fish than to give him a fish" rings true for the adult learner.

New to the list of adult-oriented philosophies of education is Liberalism. In educational circles, liberalism sees education as the development of the intellectual powers of the mind. Schools make a person literate in the broadest sense of intellect, morally, and spiritually. Some schools of higher education have as their motto, "to educate the mind, the heart, and the soul (Duquesne University, 2008).

Adults seek knowledge rather than just information and the role of the teacher is to serve as expert transmitter of knowledge, respected authority of the content, and master of the learning process. Didactic presentations, lectures, study groups, personal reflection, and critical reading and discussion are the most appropriate venues for the liberal classroom. And, general education, core curriculum, traditional knowledge, and the classics are the most important content areas in school. While much of what a liberal education has to offer is desirable for every learner, the shortfalls of a traditional-only education are readily apparent when examining the educational needs of the adult learner.

Progressivism advocates the transmission of culture and societal organization in an effort to promote social change. Education in this context offers the learner practical knowledge and promotes problem-solving skills that will be useful to reform society. The needs of adult learners as well as their interests and experiences are key elements in learning. Progressivism advocates lifelong education as the instructor guides the adult through experiences that are both educational and stimulating and contribute to the overall growth in learning. Problem-solving, experiential-based learning, democratic education, lifelong learning, a pragmatic knowledge base, mastery of needs assessment, and, a grasp of one's social responsibilities are worthwhile topics for a progressive education and, therefore, valuable to the adult learner.

Radicalism is a philosophy of education that supports fundamental, social, political, economic changes in society through education. Changing society and its structure is of paramount importance and towards that pursuit, equality with the teacher throughout the learning process is implied. The instructor becomes the instigator of change by suggesting the direction for learning while allowing the learner to choose the best path. As might be expected (and might serve the needs of the adult learner very well), the use of dialog, problem-solving, maximum interaction, and discussion groups of all shapes and sizes provide the typical formats for a radical lesson.

Developing a personal philosophy of education remains an important foundation for adult education as well as traditional. As a refresher, here are some questions to consider in any philosophy of adult learning (many as the same as with the traditional learner):

- How does learning take place and what is unique about the adult learner?
- What are elements of effective learning environments for adults?
- How should teaching be conducted to facilitate learning and take best advantage of the characteristics of the adult learner?
- What is the adult learner's role in the learning process?
- What is the role of the instructor of adults?
- What are the main objectives of the instruction when teaching adults?
- What teaching strategies produce the most successful learning outcomes in the adult classroom?
- How is success measured following a lesson or instruction?
- What values should the adult student take from the class?

In summary, educators of adults are encouraged to create their own personal philosophy of education. All too often, only traditional teachers are encouraged to consider this aspect of their teaching. Corporate trainers are seldom asked to consider philosophy, whereas higher education faculty often fails to appreciate the importance of considering the "what" of what they are teaching. If any aspect of teaching adults can be considered more important than any other, it may arguably be the philosophy of adult education. For the adult learner, realism and progressivism are key educational philosophies for consideration when designing instruction.

The Psychology of Adult Education. Adult learners come to class arguably with more fears and concerns than their traditional counterparts. A skillful teacher devotes a portion of nearly every class meeting suppressing these fears and concerns and developing a strong fundamental interest in the content being presented. The connection calls for each student's plans and experiences to be inextricably linked with the course material. An instructor needs a cache of diverse skills including the ability to reduce the natural competitive environment that occurs in nearly classroom while encouraging cooperative and discovery learning so attractive to the adult learner. The literature provides a host of classroom activities that improve the retention of adult students and enhance their motivation to learn, including: student introductions/ interviews; the formation of support groups; a clear and unambiguous course syllabus with all dates for papers due, examinations, and other required work; and, a display of instructor empathy marked by a flexible teaching style, an interpersonal relationship between instructor and student, and "adult to adult" interactions.

Domains of learning and the adult student. For the adult learner, the cognitive domain offers information to solve problems. It posits solutions and potential strategies while increasing the probability of success in any given educational activity. Adults seek cognitive approaches that focus on more than acquiring new knowledge. They wish to be engaged when learning, building on real life experiences and couched in the format of case studies, role playing, simulations, hands-on opportunities, and other interactive modalities. The ability to learn is critical for adults. The more adults understand about how to learn, the more they will be in control of their future and empowered to take action. They need to understand how to acquire knowledge and move that knowledge up the levels of learning as well as attaching value to it to ensure its use. They need to understand that there are some basic concepts and laws that govern learning, so they can use it for self-development, family, work, and everyday life.

Psychomotor learning is demonstrated by performing some physical or motor skill as a result of an education or training program. Learning objectives are framed to include observable demonstrations with actions and criteria that demand that the learner perform the stated skill(s) according to some accepted standard or precise measurement. In contrast with learning in the cognitive domain, the emphasis is upon the physical as opposed to the intellectual.

Adult courses characteristically help the learner develop attitudes and values, although few instructors consider what the attitudes and values offered in their courses might be. In addition, adults seek to move up the taxonomy in the affective domain by addressing its higher levels. Receiving and responding collectively refer to a readiness to learn and adults, in particular, feel a lacking at this level of the domain especially when re-entering the classroom after years of absence. Valuing involves to the actual development and application of the attitude or value. Again, adults may understand the values of society, but they look to education to understand how to apply those values in everyday life. Finally, organizing and consistency consider the development of an integrated set of unswerving attitudes and values used in dependable ways within a variety of different contexts and situations. Educators agree that one of the key reasons adults come back to the classroom is to address areas of their affective education that they have permitted (or been forced for whatever reasons) to lie dormant for years (Peterson, 2008; Smith, 2008). For example, accepting responsibility for personal behavior and recognizing the absence of self-discipline, self-assessment, and self-direction in one’s life are often cited as benefits of an adult education.

In summary, the adult classroom does well when infusing instruction pivoted in the affective and cognitive domains. The psychomotor domain has some application when teaching more behavioral-oriented content and perhaps more in the corporate training room than in formal education.

Schools of educational thought in the adult classroom. In the previous chapter, we examined the three schools of educational psychology. Readers walked through an eight-question checklist that helped them identify their own personal beliefs about learning. Please complete this exercise by referring to Table 2, Chapter Ten). Identify any personal inclination toward behaviorism, cognitivism, or humanism. Keep in mind,

- Behaviorists view the environment as key to learning. Stimuli and response act upon the environment to produce a reinforcement which ultimately results in a repeat of the behavior (reward) or extinction of the behavior (punishment). Instructors who accept the behavioral perspective advocate that behavior is a response to past and present environment and that all behavior is learned.
- Cognitivists focus on the learner as an active participant in the teaching-learning process. Prior knowledge is critical to effective learning and advocates of cognitivism view <u>how</u> information

is processed by the learner of paramount importance to teaching. The cognitive school of education has adopted the strategies of age-stage advocates such as Jean Piaget, Jerome Bruner, Lev Vygotsky, and others, to explain how learners cultivate approaches for acquiring information.
- Humanism places primary emphasis on individualized learning. Feelings are viewed as every bit as important when it comes to learning as how the student thinks (cognitive) or behaves (behaviorism). For the humanist, learning is always described from the viewpoint of the student and not from the teacher.

According to Tennant (1997), the influence of behaviorism on adult education is "most apparent in the literature on behavioral objectives." Behavioral objectives, as discussed in an earlier chapter, employ expressions that describe observable and measurable behavior. Behaviorism uses words such as list, match, describe, select, etc. to form the actions that will ultimately be taught and assessed by the instructor.

The use of behavioral instruction with adults is not without its critics. Much of the literature (Knowles, 1980; Cross, 1981; Donald, 1976) suggests that many of the behavioral approaches to adult education are inappropriate for certain types of adult learning. They fragment learning into many narrow categories and in so doing fail to address the whole; they are concerned only with the outcomes and not the process of learning; they cannot account for affective outcomes (e.g. values and emotions); and, they cannot account for changing learner needs.

Whether the learner is a child or an adult, the cognitivist assumes that learning is less about behavior and more about knowledge; specifically, the perception, reception, storage, and recall of information. Like the behaviorist, the cognitivist is interested in how the environment impacts behavior. Unlike the behaviorist, cognitivism looks for explanations of how the actual information encountered is processed. Particularly pertinent to adults, the cognitive model focuses on information processing and the inferences that can be made from observing the learner. For example, pictures and graphs are valuable clues to the schemata used by the learner to process information.

Piaget proposed his stages of cognitive development: sensori-motor, pre-operational, operational (concrete), and formal operations (abstract). Vygotsky offered his "zone of proximal development" as the difference between what a learner can do with help and what he or she can do without guidance. Erikson's Eight Stages of Psychosocial Development also adds to the education of the adult learner with his top three levels of development (intimacy vs. isolation, generativity vs. stagnation, and ego integrity vs. despair). Each of these cognitive theorists contributed directly to the advancement of andragogy.

Instead of simply broadcasting information to the learner, teachers of adults have an opportunity (and a responsibility) to guide their charges by structuring content to meld with how the adult processes information. Basically, adult educators who advocate for the cognitive approach to learning concentrate on three things: (1) organizing their content into manageable chunks by structuring information in small pieces to enhance the probability that the adult will successfully sort and organize the material and transfer that the information successfully from short-term to long-term memory, (2) building upon prior knowledge and creating processes where the adult can practice using the information in situations that integrate it with their prior experience, and (3) providing real-world context where the goal is to get the adult learner to retrieve information from long-term memory and apply it to real world problems.

Humanistic psychologists believe that how a person <u>feels</u> about learning is as important as how the person thinks or even behaves. They describe behavior not from the viewpoint of the teacher as do behaviorists or from the perspective of how information is processed as do cognitivists, but rather from the vantage point of the learner who is evidencing performance based upon new knowledge received from the instructor.

For adults, humanistic education concerns itself with the development of the whole person, emphasizing emotional and affective aspects of learning. Programs are designed to target highly motivated and self-directed students – a natural for the adult learner. Elevated motivation and self-management are characteristic of humanistic programs in which learners assume more of the responsibility for learning. Some advocates would say that a true humanistic program places 100 percent of the responsibility for learning in the hands of the student; however, it is safe to say that most educators would back off somewhat – refusing to release all liability for learning from the instructor.

Primarily, adults select learning activities that help them solve problems. To successfully solve problems, adults need teachers who are sensitive, self-actualized, and collaborative. They need teachers who understand that their charges bring to the classroom a wealth of practical experience and prior knowledge that should be considered.

In summary, the schools of cognitivism and humanism play the primary roles in the education of the adult learner. Behaviorism to a much less degree is appropriate for those adults whose focus may be on competency-driven training.

Applications of learning in the adult classroom. Behaviorism in adult education emphasizes control, behavioral modification, and learning through reinforcement and is more applicable to the training room than the (formal education) classroom. Behavioral contracts, for example, are effective tools for training the corporate adult, helping the instructor to reduce the impact of problems inherent in dealing with such a wide diversity of topics and learners. Characteristically, previous experience, mature interests, established learning styles, developed life patterns, assorted outside commitments, and a mixture of learning speeds all come into play. Didactic teaching common in the corporate training environment centers instruction on the “average” student (assuming they can successfully isolate such a learner) with the hope that those at the lower end will not get too far behind and that those at the upper end will not become bored with the instruction (Knowles, 1980).

Competency-based learning represents a second behavioral approach to adult instruction. It measures an adult’s performance against predetermined criteria to recognize acceptable performance. Progress is based on demonstrated performance against an established standard rather than on how well learners perform in comparison to their peers. Competency-based education and assessment were developed in response to the need to better assess adult achievement. It recognizes the importance of prior learning and rewards what individuals already know how to do. As a result, it is more compatible for use with adults than norm-referenced assessment. Assessment of competencies is also more frequent, provides regular feedback, and allows the adult learner to advance at their own pace.

Discovery learning is a learner-centered approach to education where students are encouraged to uncover new skill and knowledge and manage their own learning. The use of the scientific model is encouraged (especially for adults) because of its ability to explain data, capacity for analyzing and predicting possible solutions to problems, and consistency with other models for representing knowledge. In discovery learning, students identify problems, generate hypotheses, test each hypothesis against collected data, and apply conclusions to new situations. Experiential learning and individual assessment works together to enhance personal impact, an approach proven through decades of research to be highly effective with adult learners. The learning curve in the classroom is accelerated, improving individual as well as group effectiveness. By creating situations that simulate real-world interactions, discovery learning helps students achieve the benefits of experience without the risk of real-life errors.

Another cognitive technique, reception learning occurs when concepts, principles, and ideas are presented for understanding and students do not rely on discovery for their exposure. The more organized and focused the presentation, the more thoroughly the individual will learn. Teachers stress meaningful verbal learning over rote memory. Teachers continue to present material in a carefully organized, sequenced, and finished format and learning progresses deductively from general to specific. Ausubel (1960) grounds his principles of reception learning on his most famous contribution to cognitive educational psychology: the advanced organizer, the conceptual bridge between new material and a student's current knowledge.

Open education advocates certain "themes" commonly attributed to adult education in general. Humaneness, respect, and warmth describe the environment of the humanistic classroom. Teachers deal with what minor behavior problems are encountered with their adult learners by communicating with the student apart from the group. Students are encouraged to take an active role in diagnosing the learning event and assessing their own performance. Instruction is more individualized for the adult learner with less reliance on text books and didactic lecture. Teachers use assistance from outside the classroom working closely with colleagues to present a variety of learning modalities. Open education as broadly defined in the literature and research, has often not measured up to the original objectives and principles once thought critical to humanistic education (Giaconia and Hedges, 19 82).

The other, more popular, manifestation of humanistic education for adults is cooperative learning. It offers five basic elements: (1) positive interdependence, where students share common goals, divide the tasks, divide resources and information, assume responsibility for different roles, and, most importantly, receive their rewards based on group performance, (2) face-to-face interaction, so that the importance of helping others is stressed, (3) individual accountability so that each student develops a sense of personal responsibility to the group, (4) collaborative skills helping the adult gather the requisite skills to form viable working relationships, and (5) group processing, to evaluate their own progress and maintain effective working relations among members of the group.

In summary, discovery learning and cooperative learning represent the most appropriate venues for delivering instruction to the adult learnersince they represent the cognitive and humanistic psychologies of education, respectively.

The Sociology of Adult Education. Probably the most common anxiety for the teacher of adults occurs at the beginning of courses when they are confronted with a classroom full of learners, each of whom they must recognize cognitively before learning can be successful. Only with such an understanding is it possible to direct teaching to the specific needs and interests of the adult. So, the question posed here is, "Who is the adult learner?"

As already mentioned, the adult learner is an independent/ self-directed student. Teaching an adult as a child will not work. Introductions are recommended (use name tags if necessary to call each adult learner by name). Allow ample time for discussion during class. Become the guide on the side rather than the sage on the stage. Provide out-of-class resources (handouts, technology, etc.) so they may continue learning on their own after the formal session is over. Adults learn best when they do so at their own pace so allow for variances in the speed or rate of learning that best fits their individual learning styles.

The adult learner has considerable experience to contribute to the learning process. Teachers should provide opportunities for their adult learners to work together, share ideas and real-life experiences, and discuss pertinent content in large or small groups. Instruction should include information that accesses adult experiences and relates these experiences to the topic at hand. Adults should be encouraged to use their own unique experiences to provide possible solutions to problems and questions that are presented by the instructor. When an adult's experiences become a barrier to learning or when a bad experience interferes with learning, the instructor must take immediate, corrective action.

Adult learners are most likely to be interested in topics that relate directly to their particular situation, developmental stage in life, or personal preferences. This information is very valuable when assigning small groups, identifying opportunities for learning and assessing learning outcomes. As adult learners transition from one situational, developmental, or personal stage to another, they are more apt to want to learn than a counterpart who is at a more established period in their life. Learning is an excellent way to facilitate change in a learner's life.

Solving problems is of paramount importance to adults. Designing lessons that are problem-oriented rather than just information-focused encourages higher order thinking in the adult learner. Presentations should begin with problem identification, followed with opportunities to propose hypothetical solutions, measurements for testing those possibilities, and criteria for assessing whether a particular solution is the best one.

Adult learners seek out information that can be immediately applied – just-in-time training is extremely popular with adults. Focusing on content that adults can put to use soon after the instruction is delivered is critical. Students are often able to convey how they intend to use new knowledge and provide examples of how this information will benefit them in the short-term.

Finally, adult learners are intrinsically motivated. Offering primary reinforcement (e.g., gold stars, food, even grades) for learning is not as effective as an appeal to the learner as an adult. Recognition, concern, and respect of their values, time, and energies are usually much more successful.

Extensive research by numerous investigators offers various views at how to facilitate effective adult learning and the differences when compared to the traditional students (See Figure 3). As a result, the role of the adult educator is to provide opportunities for their students to become active learners by creating more compelling learning environments. Simply transferring knowledge from teacher to students through lectures is no longer good enough.

In summary, the following sociological characteristics define the adult learner. Adults...

- Tend to be practical learners
- Study to improve their status in a social setting
- Often moderate their academic pursuits in light of other responsibilities (jobs, family, etc.)
- Anticipate that their time in the classroom will be valued by the teacher
- Learn that which will help them solve problems in their daily lives
- Are often voluntary learners
- Embrace their decision to return to school as a life-changing opportunity
- Appreciate education
- Vary widely among ages, abilities, job experiences, cultural backgrounds and personal goals
- Have well developed personal identities
- Come to class with a vast array of personal experiences

The History of Adult Education. The history of adult education (at least in the United States) is one of escalating federal government involvement for well over 200 years. The nature and extent of this attention to the needs of adult learners has varied greatly during this period. But even from its earliest days, the government's ability to provide funds, establish policy, and set aside vast resources (e.g., land grants, GI Bill of Education for its military, etc.) has encouraged the development and expanded the growth of programs to assist adults in overcoming barriers to education. It was not until the early 1960's that the

Figure 3. Adult learner characteristics

Adult learners...

- Want to know why they should learn
- Characteristically come to the learning environment ready to learn
- Possess personal experiences that represent a valuable resource for additional learning and should be tapped whenever possible.
- Tend to focus on activities that impact their daily life, occupation, or current situation.
  Learn best when they practice, perform and work realistically with new knowledge, skills and attitudes.
- Learn easiest when they have some degree of familiarity with the content being taught
- Favor different senses for learning than traditional learners (e.g., visual, auditory, and kinesthetic learning styles).
- Are self-directed and can monitor their progress throughout the learning experience.

Johnson administration addressed adult literacy. The Economic Opportunity Act (August 20, 1964), Title II B of Public Law 88-452 created the first Adult Basic Education program as a state grant.

Following World War II (1944), the Servicemen's Readjustment Act —commonly known as the GI Bill of Rights, was heralded as one of the most significant pieces of legislation ever produced by the federal government—one that impacted the United States socially, economically and politically. By 1956, when the initial program ended, close to half the nation's 16 million veterans had either gone to college or received job training.

In 1984, former Mississippi Congressman Gillespie Montgomery revamped the GI Bill, which has been known as the "Montgomery GI Bill" ever since, assuring that the legacy of the original GI Bill lives on providing guaranteed education programs for a new generation of combat veterans.

Later, the Veterans Educational Assistance Program (VEAP) was offered to veterans who contributed portions of their military pay to participate in this adult education program. For contributions based on a $2 for $1 match by the federal Government, veterans continued to seek their educational goals through degree, certificate, correspondence, apprenticeship/on-the-job training programs, and vocational flight training programs.

In 2008, President George W. Bush signed into law the Post-9/11 Veterans Educational Assistance Act of 2008, eliminating the personal contributions and assuring that adult education would continue to receive a boost from the federal government.

The Elementary and Secondary Education Act (ESEA) increased federal oversight of adult education even while couching legislation that nominally addressed K-12 schools. The Elementary and Secondary Education Act, Public Law 89-10, was an extensive statute which funded primary and secondary education. As mandated in the Act, funds were authorized for professional development, instructional materials, and resources to support educational programs, and parental involvement promotion. The ESEA was originally authorized through 1970 when special emphasis was given to adult basic education. Later, the government reauthorized the Act every five years since its initial enactment.

In 1972, the ESEA improved the educational opportunities for adult Native Americans. In 1974, it expanded its scope to include institutionalized adults while increasing its cap on adult secondary education and providing for bilingual adult education. The most current reauthorization of ESEA is the No Child Left Behind (NCLB) Act of 2001 which, indirectly anyhow, guarantees the American citizen that its children will not be left behind. Government has an obligation to ensure every single citizen has the opportunity to learn how to read, write, and become functional adults regardless of perceived ability.

Meanwhile, the Adult Education Act, also known as the Workforce Investment Act (PL105-220), combined federally-funded job training programs into a "workforce development" system where adults can find a job or train for a new career.

In summary, legislation, government intervention, and adult education have been inextricably linked throughout the history of adult education in the United States. Certainly, educators cannot ignore the impact that government has exerted when it comes to the educational needs of the adult learner.

The Leadership of Adult Education. In an important investigation by Jean Fleming and Rosemary Caffarella from the University of Northern Colorado (2000), the authors of Leadership for Adult and Continuing Education reviewed findings from their study of the perceptions of leadership in the field of adult and continuing education. They found that leadership in adult education could be identified and organized according to four common themes: types of leadership, characteristics of leaders, actions of leaders, and beliefs and values of leaders.

Types of leadership found in the study included: (a) informal/formal, (b) organizational, (c) association, and (d) intellectual. Informal leadership often means taking charge of a group without being formally appointed into such a role, a style commonly evidenced in adult cohorts. Organizational leadership involves effective interpersonal communication, innovative strategic thinking, and ethical behavior, all the skills necessary to successfully lead and develop others. Association leadership examines the research that helps organizations prepare for the future (often looking at operations 20-25 years from now). Lastly, intellectual leadership focuses on theoretical models which integrate practice and research, unifying the field of adult education with this new epistemology.

Characteristics of leaders encompassed four themes. Adult leaders in education are collaborative and caring individuals with effective human relations abilities necessary to work closely with adult learners. They are energetic and committed. They evidence ethical and consistent behavior. And, they demonstrate their own degree of intellectual activity. They are lifelong learners. Adult leaders are visible. They take the lead on issues that transform the adult learner. Bartling and Bartlett (2005) also agreed that the profession of adult education is dominated by individuals who show characteristics associated with transformational leadership.

Leaders demand action – in both themselves and others. The Fleming and Caffarella paper found that adult leaders provide visibility for the field. They understand the "big picture" and can successfully and succinctly communicate the vision of the organization to clients and staff. The best adult leaders serve as advocates for social action and democratic ideals and contribute as teachers, mentors, facilitators, and role models. Of course, they are skilled managers and have general communications skills over and above what is necessary to lead an educational enterprise.

Perhaps the most interesting finding noted in *Leadership for Adult and Continuing Education* dealt with the beliefs and characteristics of leaders. Only one theme was identified: leaders are hold strong, positive beliefs on the need for and benefits from a program of lifelong learning.

Overall, five conclusions were derived from these findings. First, leadership in adult education maintains both a visible and hidden entity. Second, intellectual ability, scholarly production and teaching/mentoring are key elements of leadership in adult education. True leaders “walk the walk.” Third, adult education leaders are advocates; out-font spokesmen for the returns of a lifetime of learning. Fourth, patterns of beliefs and values of leaders in adult education remain unclear; there is still much about leading adult education that fall under the pretext of “art” rather than “science.” And, fifth, the lives of renowned adult educators confirm that the characteristics and behaviors of leaders described in the study are accurate characteristics that should be emulated by those considering a career in the field.

Figure 4 presents the key elements of leadership in education. Similar to the previous chapter that examined traditional learners, the table has been modified to now reflect traits important for those seeking to become leaders in adult education.

In summary, while all of these key elements (plus others identified in the Fleming and Caffarella paper) are expected of most any leader, strategic planning, intellectual capacity, advocation, and a “walk the walk” attitude are most closely associated with the desirable characteristics of the adult education leader.

EFFECTIVE PRINCIPLES AND PRACTICES OF TEACHING THE ADULT LEARNER

The Senate Committee on Teaching Quality, Effectiveness and Evaluation (British Columbia) presented in the previous chapter developed seven key principles for effective teaching. Chapter Eleven examined these principles within the scope of the traditional learner. Now it is time to view them for the perspective of the adult learner (See Figure 5).

Principle 1 encourages the teacher to set clear goals and intellectual challenges for student learning. Nothing could be more important for teaching the adult learner. Adult learners, as we have mentioned, are volunteers. Coercion (e.g., daily quizzes, final exams, and being called on in class) is usually unnecessary when teaching adults because motivation is intrinsic. Adults seek out learning opportunities that are clearly defined and intellectually stimulating.

Employing appropriate teaching methods and strategies that actively involve learners (Principle 2) calls for teachers to engage students in all aspects of the lesson, beginning even with the design of the learning process itself. Much success can be realized when surveying students before the course even begins as to their objectives for taking a course, their expectations for course content, and their goals for completing the course with a particular grade of application of the knowledge. Such teachers anticipate that their students will expect more than one modality for learning – and they strive to provide these different modes of learning. Those modalities that provide the adult learner a higher degree of control over the pace, start/stop times, teaching materials and methods, and topics for consideration are the most welcomed.

Principle 3: Communicate and interact effectively with students. Encourage teachers of adults to treat questions and comments with respect, acknowledge the many contributions students will make to the class, and promote a healthy debate regarding the design of the course and the manner of presenting

Figure 4. Key elements of leadership in adult education

	Required to Some Degree	Particular Emphasis Important for the Adult Education Leader
Vision		
Vision	✔	✔
Accountability	✔	
Staffing		
Administrative Personnel	✔	✔
Professional Personnel	✔	✔
Governing Personnel	✔	
Funding		
Federal Funding	✔	✔
State Funding	✔	✔
Local Funding	✔	
Finding Money	✔	✔
Other Funding Ideas	✔	✔
Strategic Planning		
Taking Stock	✔	✔
Setting Goals and Objectives	✔	✔
Communication Plan	✔	✔
Vision Statement	✔	✔
Tactical Planning		
Networking	✔	✔
Policy Development	✔	
Curriculum & Assessment		
Essential Skills	✔	
Assessment Tips	✔	
School Self-Evaluation	✔	✔
Community Support		
Community Involvement	✔	
Getting the Word Out	✔	✔
Governance and Management		
Board Development	✔	
Leadership and Teams	✔	✔
Self-Assessment	✔	✔
Leadership Responsibilities	✔	✔
Professional Development Plan	✔	

new information. Encourage variances to the syllabus (whenever possible without introducing confusion as to the established goals and objectives of the course) as well as challenges to any particular teaching style.

Respect diverse talents and learning styles of students. Principle 5 suggests using the adult student as a resource —to augment instruction and offer alternative learning styles. Use open-ended questions to draw out knowledge and experiences. And, provide as many opportunities as possible for dialogue between and among peers in the classroom.

Incorporate learning beyond the classroom (Principle 6) recommends that the teacher demonstrate immediately how new knowledge or skills can be applied to current problems or situations. Use participatory techniques such as case studies and problem-solving groups.

Figure 5. Key principles for the effective teaching of the adult learner

	Required to Some Degree	Particular Emphasis Important for the Adult Learner
Principle 1: Set clear goals and intellectual challenges for student learning	✔	✔
Principle 2: Employ appropriate teaching methods and strategies that actively involve learners	✔	✔
Principle 3: Communicate and interact effectively with students	✔	✔
Principle 4: Attend to intellectual growth of students	✔	
Principle 5: Respect diverse talents and learning styles of students	✔	✔
Principle 6: Incorporate learning beyond the classroom	✔	✔
Principle 7: Reflect on, monitor and improve teaching practices	✔	

In summary, the underlying principles when teaching adult students suggest that adults tend to learn best when they are presented with clear goals. New knowledge is important, for sure, but adults thrive in a classroom where they are given the opportunity to interpret and communicate themselves. Learning through discovery sets the pace for learning and instructors are regarded as coaches and mentors to facilitate learning. The teacher of adult learners (as was the case with traditional learners) must employ appropriate teaching strategies and, simultaneously, respect the diverse talents and learning styles of their charges. Finally, for adults, learning beyond the classroom cements the knowledge presented in class and concurrently tests the learner's understanding and ability to apply what has been delivered in real life surroundings.

LEARNING STYLES FOUND IN THE ADULT CLASSROOM

Learning styles for traditional students were discussed in detail in the previous chapter. It is highly recommended that readers review the definitions, factors, behaviors, and attitudes attributed to each of these learning styles before continuing with the examination of how they apply to adult learners.

When considering the traditional learning styles applied to adults, Mihall and Belletti (1999) found that over a 3 day period of time the rate of retention for adult learners varied considerably. The study discovered that adults retain 50 percent of what they see and hear, 30 percent of what they see alone, 90 percent of what they do, and 20 percent of what they hear alone.

A. F. Gregorc, however, outlined four learning styles that are more appropriate when considering the adult learner. His research honed in on: concrete sequential, abstract sequential, abstract random, and concrete random (Gregorc, 1984). In a follow-on work, Gregorc and Butler (1984) found that all individuals possess some natural ability in these four dimensions of learning; however, most possess natural ability in one more than the others. Their findings would prove very valuable when teaching adults.

For example, concrete sequential individuals learn best when instruction is grounded in the material, hands-on world. Such learners think methodically, orderly, sequentially, and predictably (Gregorc, 1982).

Abstract sequential learners mentally summarize, compare and contrast, and classify knowledge using their highly developed analytical abilities. They prefer well-structured assignments and detailed lesson planning and reject overly restricted learning environments.

Abstract random individuals prefer nonlinear and non-traditional learning. They work well with people and are therefore more prone to be creative and emotional.

Finally, concrete random learners are the most intuitive and insightful. They navigate between fact and theory much more readily than their other counterparts. They have no apprehension when it comes to taking risks and exploring solutions.

Thanks to Thompson, Orr, Thompson, and Part (2002), we have research that explored the characteristics of the adult learner, factors that contribute to maximum retention in adult learners, and the most effective adult training methods (using the Gregorc model). Table 1 illustrates the most prominent learning styles for adult learners in the academic areas of trade and industry (T&I), business education, adult education, and health occupations. Other adults in the study reflected preferences in academic and related areas.

It is noteworthy here to recognize that the adults who responded representing the academic areas (shaded) as well as those related areas both were predominantly concrete sequential or bimodal (students who preferred more than one style of learning). There was not much distinction between the two major categories of adult learners.

In summary, the adult learner, like the traditional learner, employs many different learning styles in the classroom. Kinesthetic, logical/ mathematical, spatial, musical, naturalistic, and interpersonal strategies are the preferred styles of choice for the adult learner. Also, the concrete sequential and bimodal dimensions of Gregorc are favored among adults. Lessons should be designed to engage the adult whenever possible in activities that are grounded in the material, hands-on world. Adult learners should be challenged with methodical, orderly, sequential, and predictable learning objectives.

TEACHING AND LEARNING METHODOLOGIES APPROPRIATE FOR THE ADULT LEARNER

Figure 6 presents the most well-known teaching and learning strategies from research and the literature. Similar to how these were presented and discussed in the previous chapter, those strategies appropriate for teaching the adult learner are indicated with a check mark. As before, descriptions of these particular strategies work, where they have been identified, applied, and their results are followed with a single asterisk (*) and defined in the Glossary of Terms. Those strategies followed with a double-asterisk (**) can be found in Wikipedia should the reader wish to learn more about a specific strategy. Triple asterisk (***) identify words that are found in both resources.

As a reminder, activity-based strategies encourage students to learn by doing via authentic, real-life learning experiences. They encourage exploration, decision-making, problem-solving, and interaction with others. Cooperative learning strategies help students to become active learners by promoting positive and collaborative group interactions, respectful listening behaviors, and argumentation skills. Direct

Table 1. Frequency and percentage of learning style in specific academic program areas

Learning Styles	T & I	Business Education	Academic	Adult Education	Health Occupations	Related Areas	n	%
Concrete Sequential	16 (29.0%)	12 (40.0%)	8 (38.0%)	3 (15.7%)	5 (26.3%)	2 (20.0%)	46	29.9
Abstract Sequential	1 (1.8%)	0	1 (4.8%)	0	1 (5.3%)	0	3	1.9
Abstract Random	4 (7.3%)	1 (3.3%)	3 (14.3%)	4 (21.0%)	0	1 (10.0%)	13	8.4
Concrete Random	7 (12.7%)	3 (10.0%)	2 (9.5%)	1 (5.3%)	1 (5.3%)	1 (10.0%	15	9.7
Bimodal	25 (45.4%)	12 (40.0%)	6 (28.6%)	9 (47.4%)	12 (63.2%)	6 (60.0%)	70	45.5
Trimodal	2 (3.6%)	2 (6.6%)	1 (4.8%)	2 (10.5%)	0	0	7	4.6
Total	55	30	21	19	19	10	154	100

instruction strategies are used in traditional classrooms when the student does not already possess the content information or social skills required for independent learning. Independent learning strategies offer students the knowledge and skills to become self-directed learners and enhance their decision-making skills. And, thinking skill strategies foster a deeper understanding to deal with new situations, offer complex solutions, and make critical decisions.

(when compared to traditional learners in the previous chapter) are appropriate for the adult learner. The strategies that do apply to teaching adults are predominantly in the categories of Activities-Based Strategies (57.1%) and Independent Strategies (51.7%) and correspond with the characteristics of adult education (specifically, performance-based, independent, cooperative) discussed throughout this chapter.

METHODOLOGIES FOR DESIGNING INSTRUCTION FOR THE ADULT LEARNER

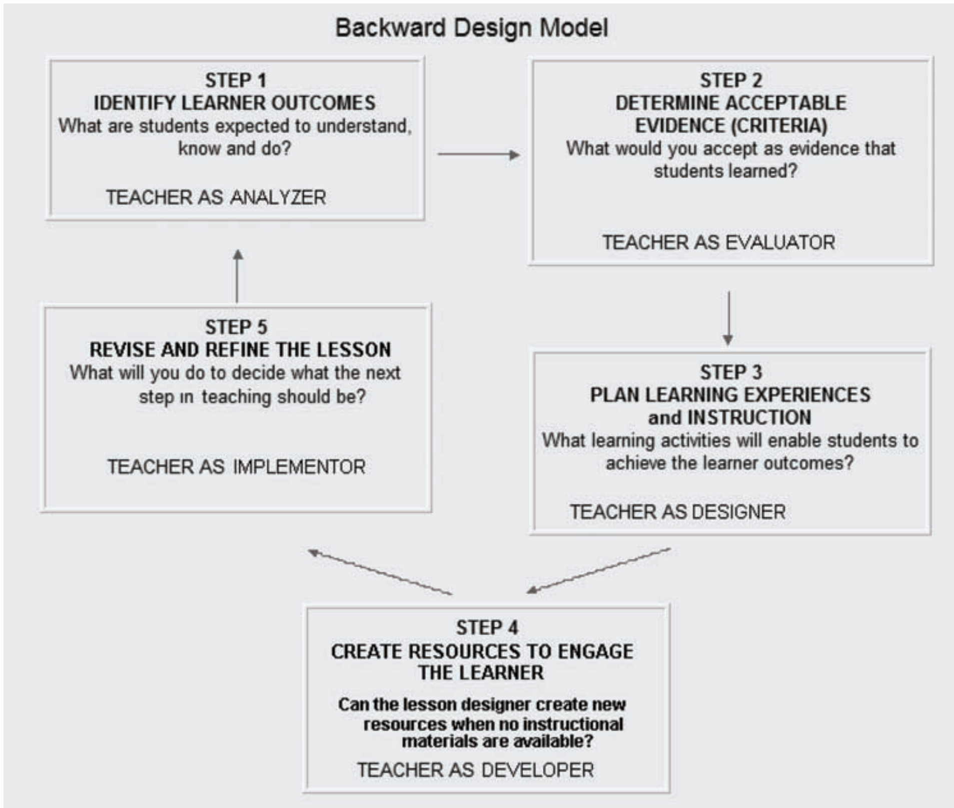
The Backward Design Model (BDM) is the intellectual property of Grant Wiggins and Jay McTighe. In their book, Understanding By Design (1998), the authors suggest that learning experiences (and therefore, course design) should be planned with the final assessment in mind. Beginning with the end in mind, teachers are able to avoid the universal problems of planning by first defining the learning experiences without considering the outcomes. Many teachers discover at the end of the lesson that some students performed poorly on the final assessment and they are not certain why. There are five stages to backward design (See Figure 7).

Stage 1. Identify Desired Results. In the first stage of the backward design process, teachers are asked to consider lesson objective that can withstand the test of time. Authors of the model call this “enduring understanding.” Enduring understanding is defined as topics that possess value beyond the classroom, embody the heart of the discipline, demand discovery of abstract or often misunderstood ideas, and offer the potential for engaging students.

*Figure 6. Strategies for delivering instruction to the adult learner. * Terms defined in glossary of terms, definitions of selected teaching and learning strategies. ** Terms defined in Wikipedia. *** Terms defined in both resources*

Instructional Strategy Category/Methodology	**Appropriate for the Adult Learner**	**Instructional Strategy Category/Methodology**	**Appropriate for the Adult Learner**
Activity Based Strategies		**Independent Strategies**	
Active Learning ***	✔	Action Research ***	✔
Applied Learning *	✔	Character Education	
Chat Room Discussion		Cognitive Coaching	
Debate **	✔	Distance Learning	
Field Trip		E-portfolio	
Game		Experiential Learning*	✔
Guided Reading		Homework	
Guided Writing		Hyper book	
Graphic Tools		Independent Reading	✔
Oral Presentation *	✔	Independent Study	✔
Panel Discussion **	✔	Inquiry learning ***	✔
Podcast Presentation		Instrumental Enrichment *	✔
Practice**		Interactive Lesson	
Retelling		Learning Contract	
Simulation ***	✔	Learning Log/Journal ***	✔
Survey		Memorization	
Web-based simulation		Multicultural Experience	
Cooperative Strategies		Note Making	
Buddy System**		Portfolio ***	✔
Collaborative Teaching ***	✔	Problem-Based Learning ***	✔
Community Links		Reading Response	
Conflict Resolution ***	✔	Reflection ***	✔
Cooperative Learning		Report **	✔
Discussion	✔	Response Journal	✔
Discussion Board		Service Learning ***	✔
Interview	✔	Small Group Discussion ***	✔
Literature Circles		Social Learning	
Mentoring ***	✔	Virtual Tour	
Peer Practice ***	✔	**Thinking Skills Strategies**	
Peer Teaching *	✔	Accelerated Learning	
Round Table *	✔	Analyzing Bias/Stereotype	
Threaded Discussion		Anticipation Guide	
Direct Instruction Strategies		Assessment Alternatives	✔
Advance Organizer		Brainstorming ***	✔
Audio conferencing		Case Study ***	✔
Computer-assisted Instruction		Classifying	
Computer-based Instruction		Concept Clarification	
Computer-managed Training		Concept Mapping	
Conferencing ***	✔	Critical thinking ***	✔
Demonstration		Differentiated Instruction	
Direct Instruction		Estimating	
E-books		Experimenting	
Expository Text Frames		Expressing Another Point of View	✔
Flash Cards			
Guest Speaker	✔	Fair Test	
Guided Exploration		Graphing	
Guided Reading/ Writing		IDEAL Problem Solving *	✔
Integrated Thematic Unit		Issue-Based Analysis *	✔
Lecture		Lateral Thinking	
Mnemonic Devices		Learning Styles	
Multicultural Education ***	✔	Manipulatives	
Practice and Drill		Map Making	✔
Programmed Learning		Media Analysis	
Programmed Instruction		Mental Calculation	
Prompt		Metacognitive Reflection *	✔
Read Along/ Aloud		Mind Map	
Reciprocal Teaching ***	✔	Model Making	
Seminar ***	✔	Multiple Intelligences**	✔
Tutorial *	✔	Oral Explanation ***	✔
Socratic Instruction		Problem Posing/ Solving	
Story Mapping		Process Notes	
Storytelling		Semantic Feature Analysis	
Task Cards		Statistical Analysis	✔
Teaching for Understanding		Statistical Software	
Textbook		Technology in Education	✔
Videoconferencing		Think Aloud	
Visual Stimuli		Thinking Skills	
Visualization		Visual/Graphic Organizers	
Word Cycle/ Sort/ Wall		Writing to Learn	
Workbook/Work Sheets			

Figure 7. Backward design model for designing instruction for the adult learner



Key questions become the focus for the designer at this stage as the lesson is infused with an understanding of the student and how the lesson will extend their knowledge about a particular academic content and broaden the experiences that produce an enduring understanding. The instructor pinpoints the evidence that will be used to determine whether the learner have indeed understood the content.

At this stage, the questions focus on the extent of which the idea, topic, or process resides at the heart of the discipline. It discerns the primary ideas and understandings of the lesson. And, it isolates questions that will ultimately deepen inquiry and discussion in the classroom.

Stage 2: Determine Acceptable Evidence of Learning. The second stage in the Backward Design Model is to define the forms of assessment that will ultimately demonstrate mastery on the part of the learner. The student must acquire the knowledge, understanding, and skill to perform satisfactorily on the assessment, regardless of the tool chosen for the evaluation. Wiggins and McTighe define three types of assessment. A performance task is a real-world challenge in the effective use of new knowledge or skills under instruction. For adults, authentic assessments assess different abilities in contexts that closely resemble actual situations in which those abilities will be used. Performing a task, proficiency by demonstration, use of analysis/ synthesis/ application, student-structured, and direct evidence each falls into the category of a performance task.

The second type of assessment is criterion-referenced assessment. Quizzes, test, prompts, etc. are prime examples. Criterion-referenced assessment is the process of evaluating the learning of students against a set of pre-specified criteria and is often contrasted with norm-referenced assessment that evaluates student learning by comparing each learner against the performance of their peers. *Criterion-referenced assessment* also refers to testing against an absolute standard or benchmark. For adults, assessments are often based on achieving specific skills or concepts, either in the work place on in the classroom.

The third brand of assessment is self-assessment. Evaluating student performance using self-assessment requires the learner to collect their own evidence of learning outcomes. For many educators, classroom observations, teacher-student dialogues, portfolio presentations, and the like portfolios are attractive alternatives to more traditional assessment methods.

In the end, the assessor seeks answers to questions such as "What is evidence of in-depth understanding of the content?" "What indications are appropriate measures for determining the extent of student learning?" And, "what kinds of evidence will guide the instruction?" For users of the Backward Design Model, these questions and the answers they provide define successful learning outcomes for the adult learner.

Stage 3: Plan Learning Experiences and Instruction. In stage three of the Backward Design Model, instructors develop the activities that will lead to student understanding. Activities should examine facts, generate analysis, promote inquiry, and establish connections. Understanding should be demonstrated throughout the lesson (formative assessment) and not just at the end (summative assessment). One of the most important contributions to course design offered by Wiggins and McTighe is their "W.H.E.R.E.T.O." questions that serve to guide the lesson designer who are encouraged to consider each of the following questions (Brown, 2008).

- Does the designer recognize <u>where</u> is the learner headed and how the lesson will facilitate that journey?
- How can the lesson designer <u>hook</u> learners and make them want to succeed?
- How can the lesson designer ensure that the learner is properly <u>equipped</u> to experience and explore key ideas of the lesson?
- Has the designer built in ample opportunities for the learner to <u>rethink</u>, <u>rehearse</u>, <u>refine</u> and <u>revise</u> their understanding of the lesson?
- How will lesson designer <u>evaluate</u> the student's work?
- How can the designer <u>tailor</u> the lesson to the needs, interests, and learning styles of the adult learner?
- How can the designer <u>organize</u> the lesson for peak effectiveness?

Stage 4: Create Resources to Engage the Learner. Designing lessons requires a delicate balance between identifying and selecting resources that are appropriate for the adult learner and recognizing when such resources are unavailable.

When existing resources exist, this stage of the model suggests that the lesson designer appraise the resources for their pedagogical strengths and weaknesses. Choose appropriate resources based on the previous three steps of the model. Promote an environment for teaching and learning that takes full advantage of these available resources. Assimilate those materials that specifically address a definable adult learning style.

When existing resources are absent, the lesson designer is encouraged to create personalized instructional materials. Text-based, visual-based, and web-based materials enhance personal student productivity and facilitate lesson results with distinctive content specifically addressing lesson objectives.

Stage 5: Revise and Refine the Lesson. Teachers are obligated to adopt a model for instructional design that incorporates constant feedback, uninterrupted evaluation of teaching strategies, and an ongoing process of revision that provides continuous improvement of the lesson. For teachers of adult learners, course feedback is obtained through a host of tools. Most common are online surveys, electronic or hard-copy questionnaires, email requests for anecdotal student feedback, and verbal and written responses supported by a variety of media.

Designers should adjust instructional strategies according to students' interaction with the content, the instructor, and their peers. They should attempt to validate content accuracy and completeness, teaching methods, technologies used, and communication approaches and revise as necessary. Finally, feedback is a continuous process for evaluating instruction. To be successful, the process must remain dynamic, not static.

It is highly recommended that instructors: (1) follow the Backward Design Model as presented in this chapter, and (2) consider using the lesson plan template provided in Appendix B when designing instruction for the adult learner.

SUMMARY

In this chapter, we reviewed many of the techniques appropriate for teaching the adult learner. To recap:

A. The Pillars of Education provide the conditions of teaching and learning in the adult classroom.

Philosophies for the adult learner. For the adult learner, Realism and Progressivism are the key educational philosophies for consideration when designing instruction.

Psychologies of the adult learner.

- The adult classroom does well when infusing instruction grounded in the affective and cognitive domains.
- The schools of cognitivism and humanism play the primary roles in the education of the adult learner.
- Discovery learning and cooperative learning represent the most appropriatevenues for delivering instruction to the adult learner.

Sociological characteristics of the adult learner. The adult student can be characterized by the following sociological characteristics. Adults tend to be practical learners. They study to improve their status in a social setting. They moderate their academic pursuits with other responsibilities (jobs, family, etc.), learn that which will help them solve problems in their daily lives, tend to appreciate educational opportunities, and vary widely among ages, abilities, job experiences, cultural backgrounds and personal goals. They bring to the educational classroom a wider array of personal experiences.

History of adult education. The history of adult education is one linked by legislation and government intervention (at least in the United States).

Leadership of adult education. Strategic planning, intellectual capacity, advocation, and a "walk the walk" attitude are most closely associated with the desirable characteristics of the adult education leader.

B. the underlying principles when teaching adult students is noticeably different than the traditional student. Adults tend to learn best when they are presented with clear goals (Principle 1 from the Senate Committee on Teaching Quality, Effectiveness and Evaluation, British Columbia). Adults prefer classrooms that afford them an opportunity to interpret and communicate themselves (Principle 3). Adult learners expect to be challenged with lessons that employ appropriate teaching strategies (Principle 2) as well as those that respect their diverse talents and learning styles (Principle 5). Learning beyond the classroom (Principle 6) expands the learner's understanding and ability to apply what has been delivered in real life surroundings. The bottom line when examining the most effective principles and practices of teaching the adult learner – use as many of the principles offered as possible to provide as many different modalities for learning as possible.

C. Learning styles found in the adult classroom. Again, there is no secret for the adult educator. Learning styles will be more diverse in the adult classroom as teachers seek to employ kinesthetic, logical/ mathematical, spatial, musical, naturalistic, and interpersonal strategies for their adult learner. The examination of the concrete sequential and bimodal dimensions of Gregorc also proved valuable as the chapter established the importance of student engagement and activities grounded in the real world.

D. Teaching and learning strategies appropriate for the adult learner. Contrary to traditional learning styles where more was better, when it comes to teaching and learning strategies for adults, fewer were found to be appropriate for the adult learner. Activities-based strategies (which focus on discussions, presentations, and active learning) as well as independent strategies (which call for more independent, group, and interpersonal learning environments) are more in line with the practical characteristics of adult education.

E. Methodologies for designing instruction for the adult learner.

The Backward Design Model offered five stages for designing adult instruction, examining the more natural flow of lesson development for the adult learner by creating lessons first by considering the desired results, then creating the learning experiences and instruction. It was recommended that educators of adult students follow the BDM to analyze, design, and develop their lessons using the template provided in Appendix B to ensure the necessary considerations have been measured and the required elements of a successful adult-focused lesson are infused in the instruction.

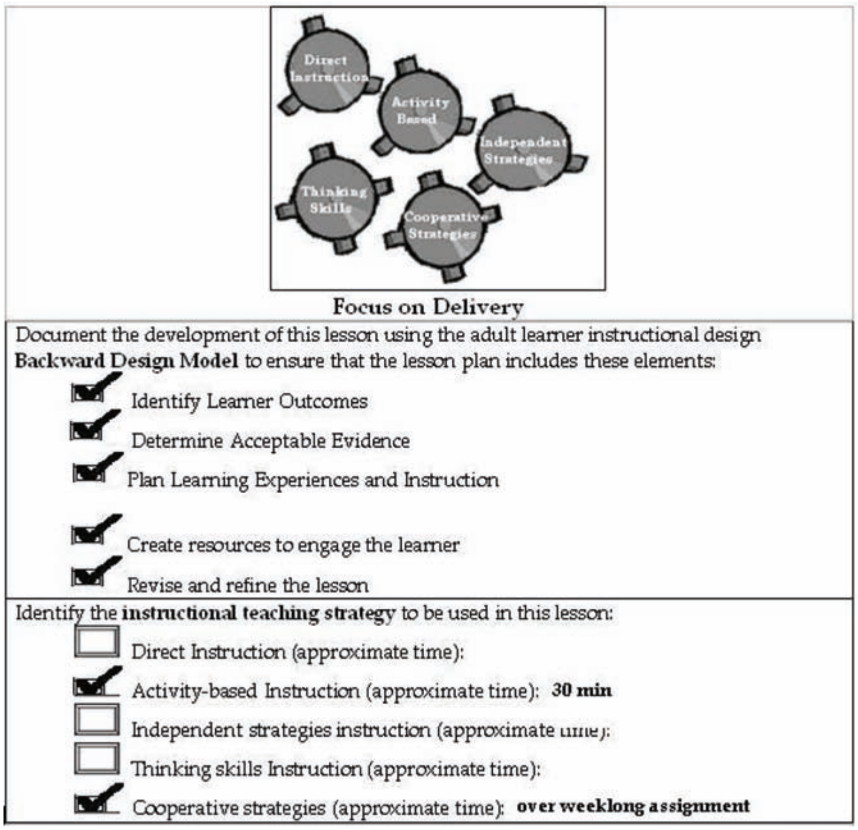
This chapter focuses on delivering instruction to the adult learner. As an integral component of an *Engine for Designing Technology-based Instruction for the Traditional, Adult, and Distance Learner*, the reader was introduced to the Pillars of education related to the adult learner. The chapter considered the effective principles and practices of teaching the adult learner and went on to recognize common learning styles found in the adult-focused classroom. It reviewed teaching and learning strategies appropriate for the adult learner and helped the reader become familiar acquainted with the methodologies for designing instruction for the adult learner.

The final installment of Part V will examine a process for developing an overall strategy for technology-based course development and management for the distance learner.

CONCLUSION

Appendix B, Adult Learner Lesson Plan Template A completed **Focus on Delivery** portion of the template (Figure 8) demonstrates how to develop an adult learner-oriented lesson on the Planets of the Solar System.

Figure 8. Adult learner lesson plan template (cumulative)



REFERENCES

Bartling, F. P., & Bartlett, K. R. (2005). *Conference Proceedings presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education*, University of Wisconsin-Milwaukee, WI, September 28-30, 2005.

Brown, J. L. (2008). *Designing Teaching and Learning Activities*. ARTSEDGE — the National Arts and Education Network. Retrieved July 2008 from http://artsedge.kennedy-center.org/content/3649/

Cross, K. P. (1981). *Adults as Learners*. San Francisco, CA: Donald, J. G. (1976). Contracting for Learning. *Learning and Development, 7*(5), (ERIC Document Reproduction Service No. ED 126 810). Duquesne University (n.d.). *Mission and Vision Statement.* Pittsburgh, PA: Author. Retrieved July 2008, from http://www.duq.edu/

Fleming, J. E., & Caffarella, R. S. (2000). Leadership for Adult and Continuing Education. In *the 2000 AERC Proceedings, Adult Education Research Conference*. Retrieved July 2008 from http://www.adulterc.org

Gregorc, A. F. (1982). *An adult's guide to style*. Columbia, CT: Gregorc Associates.

Gregorc, A. F., & Butler, K. A. (1984). Learning is a matter of style. *Vocational Education Journal*, *59*(3), 27–29.

Knowles, M. S. (1975). *Self-Directed Learning*. New York: Cambridge, The Adult Education Company.

Knowles, M. S. (1980). *The Modern Practice of Adult Education From Pedagogy to Andragogy*. Englewood Cliffs, NJ: Cambridge Adult Education.

Knowles, M. S. (1986). *Using Learning Contracts*. San Francisco, CA: Jossey-Bass Inc., Publishers.

Mihall, J., & Belletti, H. (1999). *Adult Learning Styles and Training Methods, FDIC ADR Presentation Handouts*. Retrieved July 2008, from http://www.justice.gov/adr/workplace/pdf/learstyl.pdf

Peterson, D. (n.d.). *Introduction to Adult Learning and Continuing Education*. Retrieved July 2008 http://adulted.about.com/od/intro/p/introprofile.htm

Smith, D. D. (n.d.). *Adults & Continuing Education: Many Adults Plan to Return to School Every Year, but Most Never Do*. Retrieved July 2008 from http://continuingeducation.suite101.com/article.cfm/adults_continuing_education

Tennant, M. (1997). *Psychology & Adult Learning*. New York: Routledge.

Thompson, D. E., Orr, B., Thompson, C. & Park, O.K. (2002). Preferred Learning Styles of Postsecondary Technical Institute Instructors. *Distance Learning Association, University Libraries, Virginia Tech. 39*(4) Summer.

Wiggins, G., & McTighe, J. (1998). *Understanding by design*. Alexandria, VA: Association for Supervision and Curriculum Development.

Chapter 12

Delivering Instruction to the Distance Learner

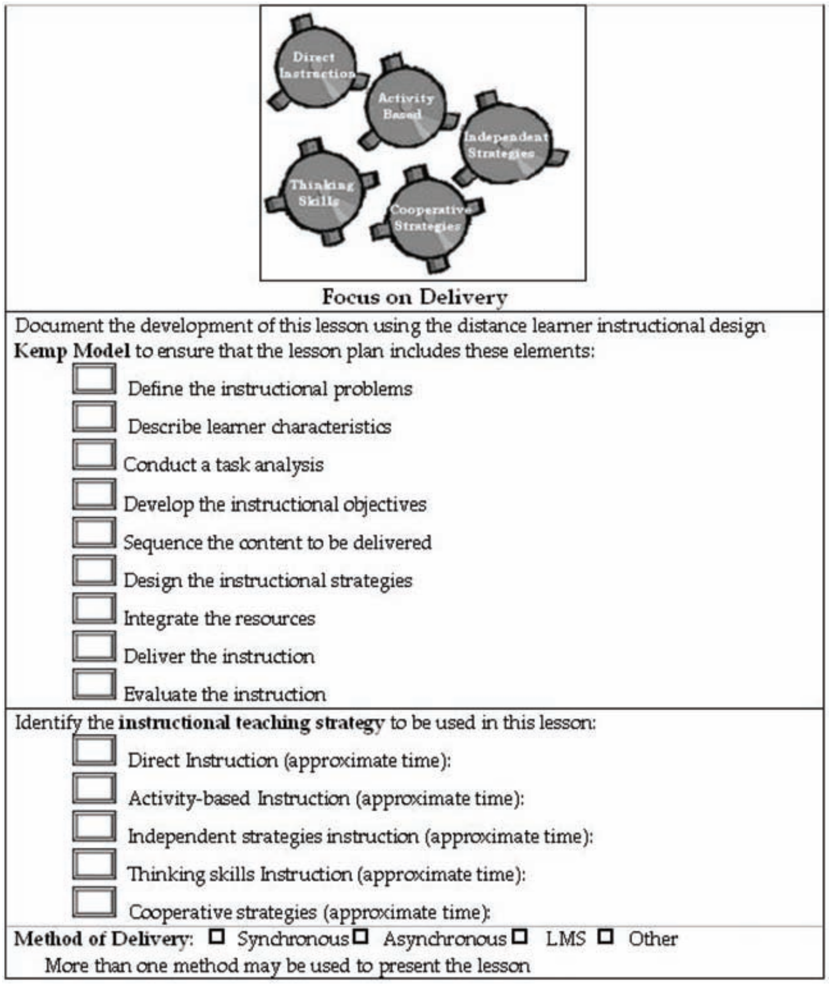
Learning Objectives. During the 1960s and 1970s, a number of alternatives to traditional higher education developed in the United States as a direct result of numerous social upheavals. National trends that included the rapidly rising costs of traditional education, curiosity with informal and nontraditional education, increasingly mobile populations, growth of career-oriented predilection, the quickening pace of new technologies (and, therefore, the need for learning new skills), and general public dissatisfaction with educational institutions brought about a mounting interest in distance learning.

This chapter is the culmination of Part V of this text and deals with state-of-the-art alternatives for teaching at a distance. The organization of the chapter parallels the previous examinations of traditional and adult learning and encourages the reader to:

- Identify the Pillars of Education related to the distance learner
- Consider effective principles and practices of teaching the distance learner
- Recognize common learning styles found in the distance classroom
- Become familiar with the variety of teaching and learning strategies appropriate for the distance learner
- Become familiar with the methodologies for designing instruction for the distance learner

DOI: 10.4018/978-1-60566-824-6.ch012

Figure 1. Distance lesson plan template (focus on delivery)



Focus on Delivery

Document the development of this lesson using the distance learner instructional design **Kemp Model** to ensure that the lesson plan includes these elements:

- ☐ Define the instructional problems
- ☐ Describe learner characteristics
- ☐ Conduct a task analysis
- ☐ Develop the instructional objectives
- ☐ Sequence the content to be delivered
- ☐ Design the instructional strategies
- ☐ Integrate the resources
- ☐ Deliver the instruction
- ☐ Evaluate the instruction

Identify the **instructional teaching strategy** to be used in this lesson:

- ☐ Direct Instruction (approximate time):
- ☐ Activity-based Instruction (approximate time):
- ☐ Independent strategies instruction (approximate time):
- ☐ Thinking skills Instruction (approximate time):
- ☐ Cooperative strategies (approximate time):

Method of Delivery: ☐ Synchronous ☐ Asynchronous ☐ LMS ☐ Other
More than one method may be used to present the lesson

Lesson Plan Template. Refer to **Appendix C, Distance Learner Lesson Plan Template** as the chapter discusses **Focus on Delivery** as depicted in Figure 1.

INTRODUCTION

Distance education is hardly a new phenomenon. Its beginnings are rooted well over one hundred years ago in the extension models of Oxford and Cambridge. In the mid-1960s, the United States developed the Correspondence Education Research Project that investigated the effectiveness of the infant correspondence study programs in American higher education. Before that, military training during and after World War II was firmly grounded in mail-order courses especially for follow-on education after basic training. Into the 1970's, ground-breaking programs such as the University without Walls project at Sierra University promoted student-centered learning apart from the traditional classroom campus environment. Using a technology-based modality of the times, Chicago's 'Sunrise Semester' (circa

1959) offered film-based classes as its instructional media. Coastline Community College and Dallas Community College were early innovators of educational television earning them a reputation as one of the first "virtual colleges", with over 18,500 students at their peak enrollment.

Online courses have become very popular, particularly in higher education. In the 2003 Sloan-C Online Learning Survey Report, it was found that "Over 1.6 million students took at least one online course during Fall 2002." Enrollments in online classes expanded rapidly since 2000, but growth slowed in 2006. Recent increases are being attributed to the rising cost of gasoline. Pricing policies for online courses vary by campus, but most classes cost as much as, or more than, traditional ones. One Florida Community College reported a 24.5 percent increase in summer semester online enrollment in 2008 (New York Times, July 11, 2008). While most universities and colleges have established training programs to prepare their faculty to teach online, school systems are just beginning to address this need.

Although the demands for teaching online are minimal, many otherwise excellent classroom teachers continue to fall short. When considering qualifications, it is assumed by many that teachers already possess the skills and competencies of the traditional environment. For that reason, many institutions require their online teachers to first evidence competency as a traditional classroom instructor. Other common pre-conditions for online teachers include first hand experience as an online learner. Most institutions seek instructors who have themselves taken online courses – and, naturally, possess evidence of their own successes as an online learner. Also, online teachers must demonstrate a comfort level with the hardware and software tools that will be provided as the course platform. Blackboard, WebCT, Desire2Learn, CyberLearning Labs, Intralearn, Angel, Moodle, and others allow institutions to provide online environments for distance, on-campus and hybrid learning.

To be an effective online instructor, the teacher must exhibit a flexible teaching approach and a willingness to experiment and condone experimentation among their students. Online teachers must enjoy one-on-one interaction in lieu of classroom lecturing or even group presentations. And, they must be comfortable in front of a computer for several hours every day. Some unsuccessful online teachers have difficulty establishing a routine, remaining online for extended periods, and complying with the personal demands on their time (students often expect teachers to respond immediately to emails). Technical issues thwart many would-be instructors who fail to appreciate that technology is vulnerable to problems and can misdirect and confound instruction if backups and alternatives are not previously considered. Online teachers must be flexible and accommodating.

While there are no commonly accepted standards regarding online teaching skills, the National Educational Technology Standards (NETS) established by International Society for Technology in Education (ISTE), have offered some skills and competencies for all teachers that focus on technology. For example, NETS suggest that all teachers be proficient in the use of the basic interpersonal elements of online courses: email, threaded discussions, real-time conferencing, chat rooms, etc. All teachers should be able to recognize the characteristics of successful distance learners and describe techniques for effective online teaching (see Table 1). Quality, strategies, and legal and ethical issues with respect to technology-based courses are also of paramount importance. A typical curriculum of competencies over and above the traditional pre-service teacher courses is shown next.

Table 1. representative pre-service curriculum for at-a-distance teachers

Online Teacher Education Pre-Service Curriculum	
EDUC 700	**Online and Blended Applications for e-Learning** This course prepares learners to lead and manage instructional challenges in a variety of online settings in educational institutions, corporations, the military, and health care and government agencies.
EDUC 701	**Assessment in E-Learning** Covers what is needed to become an excellent online course designer while developing electronic record keeping systems and methods for evaluating discussion postings and group projects. Familiarizes the candidate with assessment tools that could make or break an online course.
EDUC 702	**Instructional Design for E-Learning** Prepares the online teacher to create distance-based e-courses that work efficiently. Topics include understanding how people learn, online pedagogies, best practices, and effective and engaging learning experiences. The course also addresses hybrid learning environments, the use of a variety of media, and effective evaluation of online course design.
EDUC 703	**Creating Collaborative Communities in E-Learning** Concepts, methods and research for creating and facilitating a collaborative online community of practice. The course presents a structure for facilitating and building an e-learning community and is designed for K-12 educators, technical college and community college instructors, university instructors, curriculum consultants, and corporate trainers who want to become highly qualified in facilitating online learning in hybrid or fully online courses.
EDUC 704	**Asynchronous Communication Technologies in E-Learning** Practice using asynchronous communication technologies to facilitate and explore online questioning skills, conflict resolution, netiquette, and collaborative learning through problem solving scenarios, simulations, and online discussions. Investigate time management strategies and pitfalls to avoid when designing and facilitating online class activities and explore various assessment tools to analyze and evaluate student participation in online discussions.
EDUC 705 (6 cr)	**E-Learning Practicum** Practicum in teaching online with a cooperating online instructor. Application of online pedagogy and technology evaluated through observation, discussion and reflections. Completion of a professional development plan and an e-portfolio of evidence of attainment of online learning standards.
21 credits	

THE FIVE PILLARS OF EDUCATION FOR THE DISTANCE LEARNER

Chapter Twelve completes the examination of philosophy, psychology, sociology, history, and leadership as the encompassing conditions for teaching and learning. The discussion of the pillars of education began with the traditional classroom. In the last chapter, adult learners were the focus. In this final chapter of Part V, Focus on Delivering Instruction, the five pillars continue to address the following critical questions:

1. Philosophy answers the question “What are we teaching?”
2. Psychology addresses “How do we teach?”
3. Sociology involves “Who are we teaching?”
4. History encompasses “When (in the history of education) are we teaching?”
5. And, Leadership focuses on “Whom (sic) is responsible for successful learning outcomes?”

Philosophy of Distance Education. Truly, more than either of the previous target learners (traditional or adult students), the distance educator must posses a variety of special talents. The distance educator must be an <u>integrator of knowledge and action</u>. While teaching, research, and service are the main responsibilities of every faculty regardless of the target learner, the distance educator must ensure that students are active, engaged, and empowered. Instruction must be designed to play to the strengths of a diverse array of learners. Online learners must feel that their work, their ideas, and their voices matter. They must believe that their input is respected and mistakes will be treated as learning opportunities. Finally, online learners seek a sense of intellectual community and collective inquiry that stimulates them to produce their best work.

It is important for faculty to exhibit their role as master of technology as well as expert in the content areas by helping students gain knowledge and communicate effectively during the teaching-learning process.

The distance educator must be a relationship-builder. Essential to successful learning, getting to know online students requires special attention to the skills of building rapport, special online teaching techniques, and a more highly developed student-centered approach using available technologies. With the right technology-based tools, every distance student can be successful given the wide array of opportunities for delivering instruction available for the distance educator. These opportunities should be authentic and relevant to the task of constructing new knowledge and integrating prior experiences. Students should be able to access an assortment of materials developed with the understanding that online learners have an even wider assortment of differing learning styles technology is most effectively employed when it addresses as many of these styles as possible. Students should be afforded access to the same suite of services available to the traditional and adult learner including, but not limited to, tutoring, advising, counseling, disability services, library, etc. An online student should have the ability to access and utilize this services as much as a face-to-face student.

To facilitate distance learning, the instructor must also possess the skills of an instructional designer. Unique to the designers of online instruction is the need to foster communications and collaboration while providing the necessary instruction. The successful distance educator accomplishes this task by explaining the importance of collaborative group work, forming heterogeneous groups (based on gender, age, ethnicity, learning styles, abilities, and experiences), and infusing team-building activities to form a sense of community. They provide clear instructions and guidelines regarding assignments, evaluations, and deadlines. Successful distance educators provide a course management system that offers tools such as group asynchronous discussion boards, live chat, and interactive whiteboards.

For the traditional learner, we examined five accepted philosophies of education: Perennialism, Idealism, Realism, Experimentalism, and Existentialism. For the adult learner, the philosophies of education included Liberalism, Progressivism, and Radicalism along with Realism and Experimentalism from traditional learning. The new paradigm of distance educator combines its own unique traits of integrator, master of technology, relationship-builder, and perhaps for the first time, instructional designer to address still a third set of philosophies that include: Tech-ology, Social Technology, Instrumentalism, Radical Instructional Design (RID).

Tech-ology refers to "the ability to judge the universal impact, shared values, and social implications of technology use and its influence on teaching and learning." (Tomei, 2005). Tech-ology is a contraction of "tech" (technology) and "ology" (the study of); therefore, this particular philosophy of distant learning addresses the study of technology as a viable, autonomous content area unto itself. Many related issues necessarily come to mind when considering the effect of technology on the distant learner, the school, the community, and society as a whole. Multicultural issues, for example, include an increasing disparity of computer access between the wealthy and poor; the availability of information between the computer "haves' and have-nots," and legal and ethical behavior when using information obtained using technology. Use of the internet, distance learning in the community, impact of technology on society, ethical use of technology, abuses of technology, and copyright and fair use laws are other examples of content topics appropriate in the philosophy of tech-ology.

An understanding of how technology shapes and is shaped by society is based on two principles. First, technology serves as an agent of social change. Technological systems have produced phenomenal increases in the form, function, and speed of communications. Technology has also provided an abundance of products and services – upgrades to existing commodities and the introduction of newer items on an almost daily basis. Second, societies influence the course of technological development. Social Technology requires individuals to make increasingly more complex consumer decisions based on information that is literally up-to-the-second. The active, informed and effective participation of a social partner is precipitated on information about matters and issues, knowledge of how the political system works, familiarization with the processes of participation (i.e., voting), the skills to render rational decisions about those matters and issues, and finally, action based on those decisions. Social Technology brings to bear the technological innovations that aid in such processes. Information and knowledge is acquired via collaborative technologies, Skills are mastered and enhanced through literacy and decisions rendered with the aid of decision-making technologies. Actions are implemented through social technologies that are infused and integrated into everyday life.

Instrumentalism (from a John Dewey interpretation) is the view that concepts and theories (and in this case, technologies) are merely useful instruments whose worth is measured not by whether they correctly depict reality, but by how effectively they serve as an aid humans in solving their problems. Instrumentalism as a philosophy of distance education would suggest that technology that falls under the control of the instructor would serve as an essentially “good” tool for learning. Instrumentalism as an educational philosophy offers a common notion that technology is fundamentally neutral, and it is only “good” or “bad” in the hands of a “good” or “bad” teacher. The QWERTY and Dvorak keyboard fiasco serves as an excellent example. The Dvorak keyboard configuration was found to be infinitely superior to the QWERTY configuration. History recognized that the initial QWERTY configuration was actually derived to slow the typist in order to avoid the inevitable tangling of mechanical keys in the days of the manual typewriter. Still, since most typists learned (and are still learning) to type using the QWERTY configuration, the Dvorak configuration fell by the wayside despite its superiority. Technology in general and distance learning specifically remains the casualty of the “but we’ve always done it that way” mentality among educators as well as corporate leaders.

Radical Instructional Design (RID) holds that technology is perhaps the last feasible key to better schools and better education. Technology encourages the removal of traditional barriers to crucial school reform and has certainly shown itself as an exemplar for changing the paradigms of how we teach. Its advocates profess a call for the end of mass schooling as we know it and the unequivocal embrace of recent technological innovations. Distance learning is considered the vanguard a new educational system that depends less on a bricks and mortar school and more on a just-in-time delivery of instruction. Distance learning reduces the dependency on synchronous instruction and opens the personal timetable to convenience-store learning. The mantra continues that education in the 21st century is now to teetering on the brink where we really have no choice. Education either takes the lead in distance learning or resigns itself to a society that will lose its economic competitiveness in an increasingly global marketplace.

In summary, distance educators are encouraged to embrace a philosophy of education that shifts the view of teaching and learning away from the conventional means of delivery and focuses instead on the possibilities unfulfilled by technology to date. For the distance educator, a healthy dose of Tech-ology, Social Technology, Instrumentalism, and Radical Instructional Design in varying proportions based on the demands of learners represents the most appropriate philosophies of education.

Psychology of Distance Education. Many distance educators feel the opportunities offered by their medium vastly outweigh any challenges that might be imposed by teaching online. Many instructors find that the intensity of preparing to teach at a distance improves their own mastery of the content and increases their consideration for their students. The psychology of distance education calls for reaching a wider (and certainly more diverse) student audience. By its very nature, teachers are called to meet the needs of learners who are unable to physically attend classes. Innovative tools must be brought into play to realistically assess the amount of content that can be effectively delivered in the course. Also, diversify of the course pace and activities are needed to avoid long lectures. Online (synchronous and asynchronous) discussions and student-centered exercises are recommended.

A well-designed distance education course includes measurable and clearly defined learning outcomes derived for a specifically targeted distance education delivery system. Learning management systems directly impact learning outcomes and the technologies infused into the instruction should be recognized for their strengths and shortfalls. There will be common learning outcomes appropriate across delivery systems whether traditional or online. And, there will be objectives unique to specific media. Adjustments are required to ensure instructional quality. So we again examine the domains of learning and schools of educational thought – this time with the distance learner in mind.

Domains of learning and the distance education learner. Research on distance education has attempted to determine whether learners are as successful when studying a variety of subjects online versus face-to-face. Much of this research has centered on an examination of knowledge-based skills and competencies in the cognitive domain, performance and manipulative skills in the psychomotor domain, and attitudes, emotions, and feelings in the affective domain.

Bloom, Krathwohl, and others (1964) began their investigation into the domains of learning at the cognitive level. Distance education (at least in the form that we know it best in the 21st century) made its technologically-based debut in earnest in the 1990's. With such a relatively stunted period during which investigations have explored the success of distance education, early researchers have been able to establish with some degree of confidence that distance education is suitable for teaching a wider range of subjects than at least first imagined.

Initially, distance education was viewed as appropriate only to convey knowledge and factual information at the comprehension or understanding level. Manipulative skills (psychomotor) and values and attitudes (affective) were thought to be beyond a delivery media that did not include face-to-face contact.

In more recent years, with the advent and subsequent exploitation of multimedia-based technologies, distance educators have come to demonstrate noteworthy successes in all three domains of learning. Distance education has been shown to challenge learners with instruction at the higher level of understanding by using a combination of media that presents instructions in a variety of ways that address an assortment of different learning styles. For example, distance learners who prefer visual/spatial media have photo sharing websites, desktop publishing, multimedia authoring (HyperStudio), video conferencing, and concept mapping tools and diagrams (InSpiration & KidSpiration) as well as personal technologies such as digital cameras and presentation software (Power Point). Verbal/linguistic distance learners who prefer speaking, writing, reading, and listening would enjoy e-books, interactive books on CD-ROM, and other text-based software. And, naturalist learners, who learn best through the interactions with the environment including outdoor activities, field trips, and involvement with plants and animals, are best served by audio and video and digital cameras (to record natural world, field trips), word processing (for journaling), database and spreadsheet software (for organization and tracking observations), and desktop presentation software (for communicating the results of their research).

Affective skills are delivered at a distance through written correspondence, audible technologies such as audio, video, and computer conferencing (e.g., webinars); video technologies such as television, cable TV, closed circuit, and satellite television; and, collaborative technologies such as chat rooms, discussion groups, and online forums. Sparkes (1982) argues that there appears to be no apparent reason why distance education should not be used to teach values and to arouse emotions. Technology, in the form of video-based television and audio-based radio, and video-based motion pictures has long been recognized as the chief means for delivering emotion-charged productions.

Distance learning employs a host of technologies that can guarantee successful learning outcomes. From the perspective of psychomotor skills, distance learning seems able to address two key components of what makes for successful instruction in this domain. Most motor skills are learned via demonstration. Video, with its inherent capabilities for fast-forwarding, stop-action, and replay, has been found to be more effective than face-to-face demonstrations. Other technologies including hypertext books, graphics presentation software, and computer-assisted instruction are also effective distance delivery modes for learning psychomotor skills.

Practice is the key component to effective psychomotor instruction at a distance. CAI, online tutorials, simulations, conferencing, television, and educational software are all possible venues for delivering distance-based lessons in the psychomotor domain.

Since the advent of distance education in its most rudimentary forms (but more especially since the introduction of multimedia-based computer technology in the 1990’s), it has become clear that distance learners can learn any educationally-appropriate content material via distance education technology.

In summary, the delivery of distance learning instruction seems equally effective in any of the three domains: cognitive, affective, and psychomotor domains. Distance education offers the most flexibility when compared with traditional or adult-focused instruction and it seems likewise successful in formal, technical, vocational, or professional education.

Schools of educational thought in the distance education classroom. In the Chapter Eleven, three schools of educational psychology were presented: Behaviorism, Cognitivism, and Humanism. Readers here are encouraged to examine (or review) the checklist (See Table 2, Chapter 10) that helped identify personal beliefs about learning. As a brief summary,

- Behaviorists view stimulus, response, and reinforcement and the impact of the environment as the necessary ingredients for successful learning.
- Cognitivists prefer models for representing how learning occurs. The age-stage models of Piaget and Erikson are popular depictions of the teaching-learning process. So are the more illustrative contributions of Vygotsky and the information processing model. Cognitivists embrace how information is processed of paramount importance.
- Humanism view learning as a discrete process, expressed from the viewpoint of the student rather than the teacher.

Effective online learning employs a combination of behavioral, cognitive, and humanistic psychology in order to create a learning environment that results in mastery of basic concepts and facts, an ability to analyze and synthesize information, and an environment in which self-direction and personal experiences are infused into a curriculum.

Behaviorally, a properly designed online course consists of a series of observable and measurable behaviors that are determined by outcomes and reinforcements. The behavior of the distance learner will be determined by what he or she perceives to be the consequences of actions; in other words, by the reinforcements built into the online lesson. For the behaviorist, the acquisition of knowledge is discernible by specific responses (i.e., correct answers on an online examination). Behaviorism has value in an online course designed by the instructor who utilizes a strategy for creating categories and organizing principles so that the student is provided with a structure for accessing the knowledge presented. For example, a behaviorist approach can be used in developing multiple-choice or true-false tests, particularly when it is important to be able to identify images, etc. or to be able to organize facts and figures. Websites supporting distance education should be organized in a way that encourages the learner to recognize the classifications and categorizations of new knowledge, to place new concepts into a framework of understanding, and then to make connections, comparisons and distinctions.

An emphasis on behaviorism has its advantages in a distance learning environment. When designing distance learning, it is desirable for objectives and expectations to be stated early. Distance students tend to be self-motivated and self-directed. However, most retain one of the chief characteristics of adult learners; that is, they insist on specific guidance from the instructor when it comes to course expectations and assessment policies. Clear, well-defined objectives help the distance learner realize instructor expectations when, in fact, the student may never meet their teacher face-to-face.

Reinforcement of certain types of instruction can also be facilitated in a well-designed distance learning environment. Reinforcement is the key for the behavioral teacher. In distance learning courses, learners usually interact with technology both in the vicinity and at a distance. Students often work at their own pace and expect immediate feedback to reinforce their learning. A properly designed online course assesses student mastery of the content material as the learner moves through the instruction. Frequent feedback provided to reinforce the learning and remedial instruction provided when mastery is not achieved. Distance learning using learner-instructor and learner-learner interactions via technology is encouraged as yet another venue for reinforcement and feedback.

A pure behaviorist approach has its set of drawbacks in a distance learning environment and these shortfalls should not be overlooked. For example, a behaviorist approach assumes a right or wrong answer. Correct responses elicit positive reinforcement and incorrect answers are met with negative reinforcement or virtual punishment. A distance course presented exclusively following the behavioristic approach to teaching ignores the unobservable higher-level critical thinking skills and problem-solving strategies of the learner. While this is as true in the face-to-face environment as the distance learning environment, there is a tendency when designing distance instruction to focus on the types of learning that can be readily assessed by technology such as drill-and-practice, matching, multiple choice, true/false, and fill-in-the-blank questions. Particular attention must be paid by the distance teacher not to rely entirely on behavioral principles when designing course instruction which leads to a discussion of the cognitive school of educational psychology and its contributions to distance education.

Cognitively, recall from previous discussions that instruction focuses on how knowledge is received, processed, stored, and retrieved. Cognitivism offers the widest array of opportunities for designing distance learning. For distance learning applications, it is important to recognize that distance instruction is most successful when it attempts to take the greatest advantage of the range of technologies available whether the instructor is teaching synchronously or asynchronously.

Asynchronously, the use of hypertext on a web-based learning management system (e.g., Blackboard, WebCT, Moodle, etc.) allows the learner control over the Flow and sequence of instruction. Information is connected and accessed in a linear fashion that allows the instruction to be tailored to the learner‘s needs. It also allows the learner to become lost in cyberspace if the lesson is not designed with a particular objective in mind. The vast web of information available on the Internet provides multiple, often confusing, viewpoints, appropriate as well as unacceptable ideas for consideration, and multiple, sometimes bewildering modes of representation. Cognitive principles of social networking and collaborative learning can be strengthened in a distance learning environment where the instructor includes opportunities for the exchange of ideas to replace the natural, face-to-face interaction that normally takes place in a traditional classroom. Technologies such as email, discussion boards, instant messaging, chat rooms, and conferencing are all available to facilitate teacher-student and student-student collaboration. The less personal nature of collaboration in a distance environment (when compared to a traditional classroom), may actually be advantageous to some distance learners who are uncomfortable speaking up in a classroom environment or who avoid the somewhat confrontational nature of social interaction. Asynchronous interaction can often lead to more thoughtful and accurate communication between the participants as learners are asked to consider their comments and critiques before offering them to the virtual learning community.

Synchronously, teachers and learners interact with each other in “real time.” For example, two-way audio or video conferencing offer students the ability to see and hear an instructor who might provide appropriate behavior modeling, demonstrations, and instruction of abstract concepts. Video techniques for distance learning are often characterized by their transmission media, such as videotapes, satellites, television cables, computers, and microwave. Each of these media, in turn, is often described according to the direction of its video and audio signals; for example, one-way video, two-way video, one-way audio, and two-way audio. Synchronous instruction requires the simultaneous participation of all students and instructors. The chief advantage of synchronous instruction is the immediacy of the interaction that occurs in “real time.” Further examples include interactive telecourses, teleconferencing and web conferencing, and Internet chats.

Humanistically, educators stress the importance of the individual and attention to specific human needs. Among its major assumptions are that human nature is inherently good, individuals function best in a free and autonomous environment with as few restrictions as possible, and learners are capable of making major personal choices when it comes to their own learning. The human potential for growth and development, as seen by the humanist, is virtually unlimited and self-concept plays a critical role in growth and development. Learners lean toward self-actualization which impacts teaching and learning directly whether in the classroom or online. Learning is defined within the parameters of each learner. Instructors do not teach if students do not learn. Finally, learners possess the ultimate responsibility for learning.

For the distance learning environment, humanistic lessons should focus on practical problem solving that explores a wide range of skills, abilities, and attitudes. The environment should allow each learner to proceed at a pace best suited to the individual and offer learners a host of tools to continuously assess their progress. Teachers should provide considerable if not continuous feedback as part of the learning process keeping in mind that the learner’s previous experience is an invaluable resource for future learning and self-mastery a necessary prerequisite for understanding.

In summary, all three schools of educational psychology offer opportunities for enriching the distance learner. Behaviorally, distance teachers should employ technologies that focus on observable and measurable behaviors as specified in course learning outcomes. Cognitively, distance teachers should take advantage of a wide range of technologies to instruct asynchronously (using email, discussion boards, instant messaging, chat rooms, and conferencing) or synchronously (via interactive telecourses, teleconferencing and web conferencing, and chatrooms). Finally, Humanistic lessons should focus on practical problem solving that explores a wide range of skills, abilities, and attitudes using technologies such as web-based collaborative environments.

Applications of learning in the distance education classroom. Distance learning courses must be carefully planned to meet the needs of students who may or may not share more diverse learning styles than traditional and adult learners. Distance learning programs are most effective when they include consistency applied principles of learning. Characteristics of quality distance education teaching and learning include applications that promote online discourse, allowing for group collaboration and cooperative learning experiences at a distance. A quality distance education experience surpasses the simple transmission of knowledge and encourages the learner to take a more active role in the learning process. It provides for multiple levels of interaction between teacher-student and student-student while remaining learner-centered. Active learning, opportunities for knowledge construction, and use of higher level thinking skills (analysis, synthesis, and evaluation) are encouraged. Finally, a well-designed distance education experience focuses on real-world, problems and uses technologies that engaged the learner in practical developmental experiences.

Programmed instruction. Programmed Instruction (PI) works as a self-instructional, text-based package that presents a topic in a carefully planned sequence and requires the learner to respond to questions or statements by filling in blanks, selecting from a series of answers, or solving a problem. Immediate feedback occurs after each response and students work at their own pace. Since programmed instruction is a text-based media, its only application in a distance learning environment is to provide self-paced reading material for the learner. Programmed instruction can be effectively incorporated into books, teaching machines, or computers.

Computer-Assisted Instruction (CAI) is more flexible for the distance educator as it makes use of computer technology as its primary instructional media. Personal computers in general and multimedia system in particular account for the rapid implementation of computerized instruction in schools since the mid-1990's. Individualized instruction has taken on new meaning with the incorporation of video, audio, and web-based tools in CAI lessons. But similar to programmed instruction, CAI is an attempt to use fairly outdated technology to present information, give learners an opportunity to practice what they have been taught, and provide additional instruction when required. CAI programs serve three basic functions and remain well suited when applied to distance education as drill and practice, simulations, and tutorials. The predominant use of CAI has been with drill and practice activities in the basic skills areas to improve speed or accuracy. Educational software can be infused into a distance education course to provide drill and practice for repeated exercise and individual feedback on a designated learning objective. Simulation programs imitate an actual experience and provide students with opportunities to learn specific high-level skills or improve decision-making or problem solving processes. Again, for distance education applications, they are excellent for simulating activities that either cannot be done in real life because they are too expensive, dangerous or time consuming or can only be done in a traditional classroom. Finally, tutorials are particularly well designed to teach new knowledge at a distance and are perhaps the best medium to match a student's prior performance with individualized content material, level of difficulty, and rate of the presentation.

Jerome Bruner was influential in fashioning one of the most popular and successful applications of cognitive learning theory: discovery learning. Discovery learning is an inquiry-based learning method used most often in problem solving situations where the learner is asked to draw upon his or her own experience and prior knowledge to discover the truths that are to be learned. It is a personal, internal, constructivist learning environment and, by its very nature, is an excellent vehicle for hosting a distance learning lesson. The idea that students are more likely to remember concepts they discover on their own has worked its way into nearly all the problem-based learning strategies. Distance teachers have found that discovery learning is most successful when students have prerequisite knowledge and undergo some structured preparation for exploring the topics presented. However, few educators attempt to refute the supposition that modern technology can now provide the robust virtual environment for distance students to explore.

The goals for a cooperative learningclass are not the same as those for a traditional lecture class. It is not about imparting as much information as possible in a 50-minute block of instruction as it is ensuring that the learner develops social and collaborative skills. It is reasonable to expect that students become more efficient in social interaction and group work as they gain experience in a cooperative setting. To be considered cooperative learning (whether it is taught face-to-face or online), a lesson must exhibit five basic elements: (a) positive interdependence, so that students share common goals, divide the tasks, share resources and information, assume responsibility for different roles, and, most importantly, receive their rewards based on group performance, (b) personal interaction, so that students can discuss the nature of the task, decide how best to approach the assignment, and explain to one another how to solve the problem, (c) individual accountability, so that each student develops a sense of personal responsibility to the group, (d) collaborative skills, with working relationships becoming a requisite skill before cooperative learning can produce successful learning outcomes, and (e) group processing, where each student provides and receives feedback on their contribution to the group.

Looking at the distinct nature of distance education when compared to either traditional or adult education, cooperative learning offers the distance teacher a host of techniques that can be effectively matched to certain instructional technologies for more effective online learning. For example, roundtables can be used to brainstorm ideas and to generate a large number of responses to a single question or a group of questions using online discussion forums. One-minute papers asks students to comment on specific questions and, using an electronic drop box or email attachment, the paper is transmitted to the instructor and/or shared with peers. Send-a-problem can encourage groups to discuss and review material, suggest potential solutions, or relate results using online chat rooms. At least a dozen other strategies are identified in the literature to achieve a successful cooperative learning objective. They each have applications in distance education using the latest in innovative technologies.

In summary, nearly all traditional methodologies for teaching have potential application in distance education. Discovery learning and cooperative learning offer the best chances for employing the technologies that will ultimately promote successful distance learning.

The Sociology of Distance Education. The World Wide Web has unquestionably expanded the reach of distance learning from its early demographics as a homogeneous, mostly older, mostly affluent, location-restricted, professionally-oriented, intrinsically motivated learner to one that is heterogeneous, younger, self-motivated, and reactive to technological change. The first profiles of the distance learner reflect foundations from its earliest beginnings as correspondence and mail-order home study programs when most learners were non-traditional adults with occupational, social, and family commitments. The current profile of the online distance learner is much less exact with characteristics that can better be described as emerging, accepting of change, technologically astute, socially networked, professionally challenged, and younger.

Demographics of the distance learner. Profiling the distance learner may no longer be as easy as it once was, but recognizing those who constitute successful online learners have evolved from considerable research and investigation into the art of teaching and learning at a distance. eLearners Advisor (2008) provided significant data regarding the distance learner. For example, their findings indicate that 81.3% of online learners are 18-45 years old with the majority (54.8%) in the 26-45 age group. Nearly half (46.9%) have completed some college, 15.7% have completed a bachelors degree, and 30.3% have a high school degree. While pursuing distance education programs, 37.3% were seeking a bachelors degree, 26% an associate degree, and 27% a masters degree.

From a social networking perspective, distance learners accept socializing with classmates, building relationships and networking, and participating in independent projects or research as a vital part of education. Most (93%) are comfortable in an online learning environment and most feel confident in their abilities to regulate their own learning. A majority of online learners (89%) are secure with their writing skills and their ability to communicate at a distance versus 15% who prefer face-to-face communications.

From a sample of approximately 162,000 prospective students, e-Learners Advisor (2008) matched the characteristics of distance learners with that of the general population. Compared to the general population, e-learners are more likely to have children present in the home; earn $40,000-$75,000; be female heads of households; own and use a computer, the Internet, and at least two-three additional electronic devices; evidence career improvement ambitions; own recreational vehicles; and, participate in individual and team sports.

Characteristics of the distance learner In addition to being computer-users, many students of the Net Generation use a variety of technologies on a daily basis – many of which their instructors have never used. Still, certain characteristics of distance learners have surfaced as indicators and predictors of success in an online course. The Illinois Online Network (2007) identified the characteristics of a successful distance learner shown in Table 2.

In summary, the distance learner can be defined by the following sociological measures. The distance learner is no longer easy to recognize as a particular sector of the learning community but is likely to:

- Be in the 26-45 age group
- Have completed some college
- Feel comfortable in an online learning environment
- Feel secure with their writing skills
- Be female
- Explore career improvement ambitions via distance
- Evidence self-motivation and self-discipline
- Remain committed to distance learning

In summary, the typical "distance learner" is not typical at all but rather a member of a wide definition of sociological characteristics that have less to do with typical demographics than it does with their higher level of professionalism, commitment to education, and desire to succeed.

The History of Distance Education. Any history of distance education is, by definition, a short

Table 2. Tips for being a successful online learner (adapted from Illinois Online Network, 2007)

Tips for Being a Successful Online Learner (with minor modifications by the author)
1. Contribute your life, work, and educational experiences.
2. Communicate through writing.
3. Evidence self-motivation and self-discipline.
4. Verbalize problems when they arise.
5. Commit to 5 to 10 hours per week per course.
6. Meet the minimum prerequisites for the program.
7. Employ critical thinking and decision making skills.
8. Ensure access to the right technology.
9. Think through ideas through before responding.
10. Recognize that high quality learning can take place outside the traditional classroom.
11. Participate in all aspects of the course.
12. Take the program and any personal role in the learning process seriously.
13. Find a private, quiet space to study.
14. Advocate for distance learning.
15. Log on to the course and make significant contribution every day.
16. Take advantage of the anonymity. Remain non-judgmental with peers.
17. Be polite and respectful.
18. Apply new learning to everyday situations whenever possible.

chronicle of events when compared with the history of teaching and learning in general. In fact, the history of education is one that parallels the development of educational learning theory in the twentieth century.

Distance education cut its teeth in the precepts of behaviorism and its reliance on stimulus → response → reinforcement (S → R → R) as the definitive equation for learning. Text materials included questions for providing immediate feedback to the student on the content presented in previous pages. Each question was followed by several possible answers. Adjacent to each answer or on the top of the subsequent page was concealed the correct answer along with an explanation and/or further remedial instructions. Behaviorism was the underlying educational psychology for distance education from the late 19th century well into the 1950's.

Cognitive teachers view the learner as an active participant in the teaching-learning process. Those who adhere to this psychology of learning believe that teachers are more effective if they seek out the student's prior knowledge before the lesson begins and has a measure of understanding regarding how the student processes information. Advanced distance learning technologies have come to employ cognitive principles in the design of more contemporary lessons. Audio, video, and multimedia technologies have expanded distance education in the cognitive domain.

Certainly, humanistic principles have had their impact on distance education. The humanist teacher believes that feelings are every bit as important as the environment or cognition when in comes to successful learning outcomes. Too, technologies of the new millennium have incorporated humanistic concepts to promote teaching and learning at a distance.

Taylor (1995) identifies four generations of distance education based on the predominant media that served as the instructional strategy. The first generation of distance education (Pre-1980) was primarily print-based and served the correspondence model of teaching at a distance. The second generation (late 1970 through the 1980's) encompassed the multimedia model of distance education and employed rapidly-developing instructional technologies at the outset of the personal computer age. It included educational software, computer-based courseware, computer-managed learning systems, and computer assisted instruction as well as videotapes, audiotapes, and one-way voice and video.

The third generation, the tele-learning model, covers the historical development of distance learning from the early 1990's into the new millennium and is based on the use of advanced information-communications technologies including various forms of broadcast communications, audiographic communication systems, conferencing and broadcast television/radio with the initial entry into two-way audio and video-teleconferencing.

The flexible learning model, depicted as the fourth generation of distance education, is currently underway (2000 – present) combining the benefits of high quality interactive multimedia with the enhanced connectivity and access to an increasingly extensive range of teaching-learning resources offered by the delivery of instruction using the Internet.

Recently, Taylor introduced a fifth generation of distance education offering extensive technological and pedagogical resources to students, teachers, and institutions. Whereas the previous generations depended on analog signals from telephone lines and early Internet technologies for data transmission, Internet2 and the proliferation of network providers affords the instructor unlimited access to a delivery system whose per/session costs are minimal.

A summary of the characteristics of the various models of distance education relevant distance teaching and learning are shown in Table 3.

In summary, the history of distance education is characterized by its constant state of change. An instructional strategy that began from the necessity of teaching large numbers of students from vastly geographically separated areas to one that today is bringing the classroom into the home. Distance education is better supported by theory, research, and the literature than ever before; yet, more investigation is needed to ensure that distance learning is successful. The historical view of distance education is a flood of new ideas and innovative technologies balanced against a slow acceptance of change by educators across the board. As with technology in general, distance education has often promised more than it is capable of delivering, for a variety of valid and unsubstantiated reasons. In today's educational environment, distance education is taking more of a conventional role as another instructional strategy in an instructor's bag of teaching techniques. The new modality of teaching is no better or worse than the traditional classroom or the adult classroom. Only continued investigation and pioneering applications can help predict how education will ultimately meet the challenges of constantly changing learning theories in light of these evolving technologies.

The Leadership of Distance Education. Pioneering leadership traits are essential to the success of distance learning. Most traditional universities have, over the years, built layers upon layers of bureaucracy that often thwart a distance education initiative. Distance education demands leaders with a degree of knowledge in a variety of areas such as academic and administrative policies and regulations, financial aid, copyright issues, data gathering, accreditation, accessibility and the disabled, intellectual property rights, faculty issues, and finally, the costs and budgetary influences associated with a teaching apart from traditional campus resources. Leaders must be able to work within the hierarchy while persuading peers and colleagues to champion the program. They must be motivators, facilitators, advocates, and

Table 3. Models of distance education: A conceptual framework

Models of Distance Education and Associated Delivery Technologies	**Characteristics of Delivery Technologies**				
	Flexibility			**Highly Refined Materials**	**Advanced Interactive Delivery**
	Time	**Place**	**Pace**		
Generation – Model Title **Primary Delivery Mode(s)**					
First Generation - Correspondence Model					
Print	Yes	Yes	Yes	Yes	No
Second Generation - Multimedia Model					
Print	Yes	Yes	Yes	Yes	No
Audiotape	Yes	Yes	Yes	Yes	No
Videotape	Yes	Yes	Yes	Yes	No
Computer-based learning (eg CML/CAL)	Yes	Yes	Yes	Yes	Yes
Interactive video (disk and tape)	Yes	Yes	Yes	Yes	Yes
Third Generation - Tele-learning Model					
Audio teleconferencing					
Video conferencing	No	No	No	No	Yes
Audiographics	No	No	No	No	Yes
Broadcast TV/Radio	No	No	No	Yes	Yes
Audio teleconferencing	No	No	No	Yes	Yes
Fourth Generation - Flexible Learning Model					
Interactive multimedia	Yes	Yes	Yes	Yes	Yes
Computer mediated communications	Yes	Yes	Yes	No	Yes

fiscal stewards with an entrepreneurial vision of learning that may or may not be shared by the wider academic community

As before, Figure 2 presents the key elements of leadership in education. It has been revised to illustrate the components that are particularly important for leaders in distance education.

In summary, all of the key elements enumerated in Figure 2 are expected of the distance education leader. Unlike the traditional and adult education environment, the distance educator must possess a wider range of leadership skills and competencies to succeed.

EFFECTIVE PRINCIPLES AND PRACTICES OF TEACHING THE DISTANCE LEARNER

Unlike the previous two modalities of teaching and learning, distance education must incorporate both pedagogical and technical skills to successfully deliver courses. Instructors need to garner an awareness of online teaching skills, techniques, and curriculum design. They must be aware of the major design parameters that make online courses different and possess (or acquire) the collaborative skills inherent in the online environment based on asynchronous and synchronous tools. Most online teachers develop their online instructional strategies for teaching over many years of traditional teaching, eventually using the techniques from their own face-to-face teaching in their own online or hybrid courses, blending online with face-to face segments of their courses.

Distance learning courses must be carefully planned to meet the unique and varying needs of students (Principle 1 of Key Principles for the Effective Teaching of the Distance Learner, Figure 3). Courses

Figure 2. Key elements of leadership in distance education

	Required to Some Degree	Particular Emphasis Important for the Distance Education Leader
Vision		
Vision	✔	✔
Accountability	✔	✔
Staffing		
Administrative Personnel	✔	✔
Professional Personnel	✔	✔
Governing Personnel	✔	✔
Funding		
Federal Funding	✔	✔
State Funding	✔	✔
Local Funding	✔	✔
Finding Money	✔	✔
Other Funding Ideas	✔	✔
Strategic Planning		
Taking Stock	✔	✔
Setting Goals and Objectives	✔	✔
Communication Plan	✔	✔
Vision Statement	✔	✔
Tactical Planning		
Networking	✔	✔
Policy Development	✔	✔
Curriculum & Assessment		
Essential Skills	✔	✔
Assessment Tips	✔	✔
School Self-Evaluation	✔	✔
Community Support		
Community Involvement	✔	✔
Getting the Word Out	✔	✔
Governance and Management		
Board Development	✔	✔
Leadership and Teams	✔	✔
Self-Assessment	✔	✔
Leadership Responsibilities	✔	✔
Professional Development Plan	✔	✔

are most effective when they are consistent within an educational program. Distance learning courses should be periodically reviewed and evaluated to ensure quality, uniformity within the curriculum, currency, and adherence to established student learning outcomes. An assessment plan should be in effect that measures effectiveness, continuity, and sustainability of the learning process.

It is important for faculty who are engaged in the delivery of distance learning courses to take advantage of appropriate professional developmental experiences. Outcome assessment activities must

Figure 3. Key principles for the effective teaching of the distance learner

	Required to Some Degree	Particular Emphasis Important for the Traditional Learner
Principle 1: Set clear goals and intellectual challenges for student learning	✔	✔
Principle 2: Employ appropriate teaching methods and strategies that actively involve learners	✔	✔
Principle 3: Communicate and interact effectively with students	✔	✔
Principle 4: Attend to intellectual growth of students	✔	✔
Principle 5: Respect diverse talents and learning styles of students	✔	✔
Principle 6: Incorporate learning beyond the classroom	✔	✔
Principle 7: Reflect on, monitor and improve teaching practices	✔	✔

be fully integrated into the various components of the course and learning activities organized around observable learning outcomes. Faculty must ensure that incentives and rewards within a distance learning course are clearly defined and understood by the learner (Principle 3). Online programs should provide appropriate support services to distance students on par with those provided its on-campus students. Students at a distance should have the same measure of accessibility to library and learning resources appropriate to the courses or programs delivered via technology. Timely and reliable technical support is vital to the success of any distance learning program (Principle 4).

The medium chosen to deliver courses online should reflect the best alternative for the content to be addressed and not simply the available learning management systems offered to the instructor by the institution. The instructor should consider accessibility, adaptability to different learning styles, and sensitivity to time and place limitations of the students (Principle 5).

Finally, the institution should implement policies and processes which ensure that the instructional effectiveness of each distance learning course is evaluated periodically (Principle 7). Also, it is important to provide the appropriate experiences outside the virtual classroom for learners engaged in the distance learning experience (Principle 6). And, online instructors should be encouraged to employ a range of meaningful learning opportunities in their online environment characterized as active, constructive, collaborative, intentional, and reflective (Principle 2).

In summary, it is again obvious that effective distance education relies to a greater degree than the previous modalities for teaching learning discussed in previous chapters on all seven principles presented.

LEARNING STYLES FOUND IN THE DISTANCE EDUCATION CLASSROOM

As we have discussed in previous chapters, learning styles represent the many ways in which learners perceive, interact, and respond to the variety of instructional situations in which they find themselves.

It can also be described as the way a person understands, stores, and recalls information. Certainly, not all students learn the same way and not all teachers teach the same way. In Chapter Ten, we examined the various styles most appropriate for the traditional learner. In Chapter Eleven, different styles were attributable to the adult learner. In this chapter, as was the case with the pillars, principles, and practices of teaching at a distance, learning styles come together to offer the distance educator a unique view of how to construct technology-based distance courses for the breadth of styles brought to bear by distance learners at all levels of education and training.

When considering distance education, it is important to note that while learning styles are narrowly defined as preferences and habits of learning, distance learners are often more capable of expanding their grasp beyond any one particular style when it comes to using technology. Distance students embrace new strategies that enable them to be effective when taught by methods that are otherwise not compatible with their traditional mode of learning. To assume that an instructor must teach to one particular learning style does not take into account the reality that distance learners are often taught best using one method of instruction early in a program and another after the student has gained some competence in the technologies employed in the course.

The burden of matching instructional strategies to individual learning styles has, in the past, been incorrectly placed on the shoulders of the learner to adapt to the teacher's delivery modality. In distance learning, the impetus is placed squarely in the hands of the teacher. Many distance learning programs (at least at the post-secondary level) offer their students a self-inventory test (See Figure 4) that helps them establish their primary learning styles.

Every learner is different with their own preferred strategies for understanding, storing, and recalling new material. Table 7 demonstrates the wide array of recognized learning strategies that are tested before accepting a student as a distance learner. At least four different learning style theories are evidenced above, including Gardner's Multiple Intelligences, Grasha-Riechmann's Student Learning Style Dimensions, Memletics Learning Styles, Gregorc's learning and working styles, and Litzinger, Lee, Wise, and Felder's Psychometric Study of the Index of Learning Styles.

The skills likely to be encountered when teaching a course at a distance encompass the widest range of learning styles seen so far. To the traditional styles associated with Gardner's multiple intelligence (Visual, Auditory, Kinesthetic, Linguistic, Logical/ mathematical, Spatial, Musical, Naturalistic, Interpersonal, and Intrapersonal) are added the adult learning styles (Concrete Sequential, Abstract Sequential, Abstract Random, Concrete Random).

To this already considerable list of styles come the truly distance-specific learning modalities of the active and reflective learner, sensitive and intuitive learner, visual and verbal learner, and the sequential and global learners as well as the participant/ avoidant, collaborative/ competitive, independent/ dependent learner. All these styles are submitted for consideration when delivering instruction to the distance learner in the hopes that the instructor can categorize potential online students as suited for distance learning.

TEACHING AND LEARNING METHODOLOGIES APPROPRIATE FOR THE DISTANCE LEARNER

A definite trend in the discussions pertaining to distance learners has emerged. In the previous examinations of pillars, principles and practices, and learning styles, it became apparent that distance education addresses the fundamentals of both traditional and adult education. Too, when scrutinizing teaching and

Figure 4. Selected self-inventories of distance learning styles

Web Site	Skills Tested	URL
Learning Disabilities Pride	Visual Auditory Kinesthetic	http://www.ldpride.net/learningstyles.MI.htm#Learning%20Styles%20Explained
Learning Disabilities Resource Community	Visual learner Auditory learner Kinesthetic learner Linguistic learner Logical/ mathematical learner Spatial learner Musical learner Naturalistic learner Interpersonal learner Intrapersonal learner	http://www.ldrc.ca/projects/miinventory/miinventory.php
NC State University	Active and reflective learners Sensing and intuitive learners Visual and verbal learners Sequential and global learners	http:// www.engr.ncsu.edu/learningstyles/ilsweb.html
Learning Styles Online	Visual Aural Verbal Physical Logical Social Solitary	http:// www.learning-styles-online.com/inventory/
Austin Community College	Probably suited for distance learning Think very carefully about signing up for distance learning Better suited for traditional classroom courses	http://dl.austincc.edu/students/SelfAssess.html
Penn State University	Visual Auditory Tactile	http://www.personal.psu.edu/bxb11/LSI/LSI.htm
Long Leaf	Participant/ Avoidant Collaborative/ Competitive Independent/ Dependent	http://www.longleaf.net/teachingstyle.html
The Learning Web	Concrete Sequential Abstract Sequential Abstract Random Concrete Random	http://www.thelearningweb.net/personalthink.html

learning methodologies, a majority of the strategies presented in Figure 5 are appropriate for teaching the distance learner and carry the check mark used to suggest consideration of the respective technologies. Descriptions of these particular strategies work, where they have been identified, applied, and their results are followed with a single asterisk (*) and defined in the Glossary of Terms. Those strategies followed with a double-asterisk (**) can be found in Wikipedia should the reader wish to learn more about a specific strategy. Triple asterisk (***) identify words that are found in both resources. Specific strategies based on technologies have been highlighted for additional attention.

In summary, independent strategies (100%), as might be expected, run the gamut of the technologies recommending that each of the instructional strategies on the list has a potential for being used in a distance learning environment. Likewise, the other categories of activity-based, cooperative, and direct instruction all offer a majority of their strategies for consideration with thinking skills (92%) as the second most appropriate strategy in the distance learning environment.

METHODOLOGIES FOR DESIGNING INSTRUCTION FOR THE DISTANCE LEARNER

A methodology for designing instruction is a guideline by which a teacher creates the instructional components of the course. Models help conceptualize this process and simplify the complexities of content that can be applied in a variety of situations. Regardless of which model the course designer adopts, each attempts to answer the following questions:

- Who will receive the instruction? (characteristics of the learner)
- What should the student learn or be able to do? (learning objectives)
- How is the content or skills best learned? (methodology for teaching and resources)
- How will the learning be assessed? (evaluation)

The Kemp Model describes an approach that considers a multitude of factors that present themselves when designing instruction. Figure 6 illustrates a process that is iterative, encourages constant revision, and is continuous. For the distance educator, the Kemp Model is ideal for creating successful learning experiences and promoting the transfer of learning from teacher to learner across the expanse of time and location. It provides a road map to guide instructors through analysis, design, development, implementation, and evaluation to the goal of a successful learning experience.

The designer addresses nine independent elements that must be considered, but not in any particular order. The nine elements are: identify instructional problems and specify goals for designing an instructional program, recognize example learner characteristics that will influence instructional decisions, isolate subject content and analyze task components related to stated goals and purposes, specify the instructional objectives and sequence content within each instructional unit for logical learning, design instructional strategies so that each learner can master the objectives, plan the instructional message and develop the instruction, and develop an evaluation scheme. Each will be discussed in more detail beginning with the Instructional Problem although, as was previously stated, the process of design can begin with any of the elements.

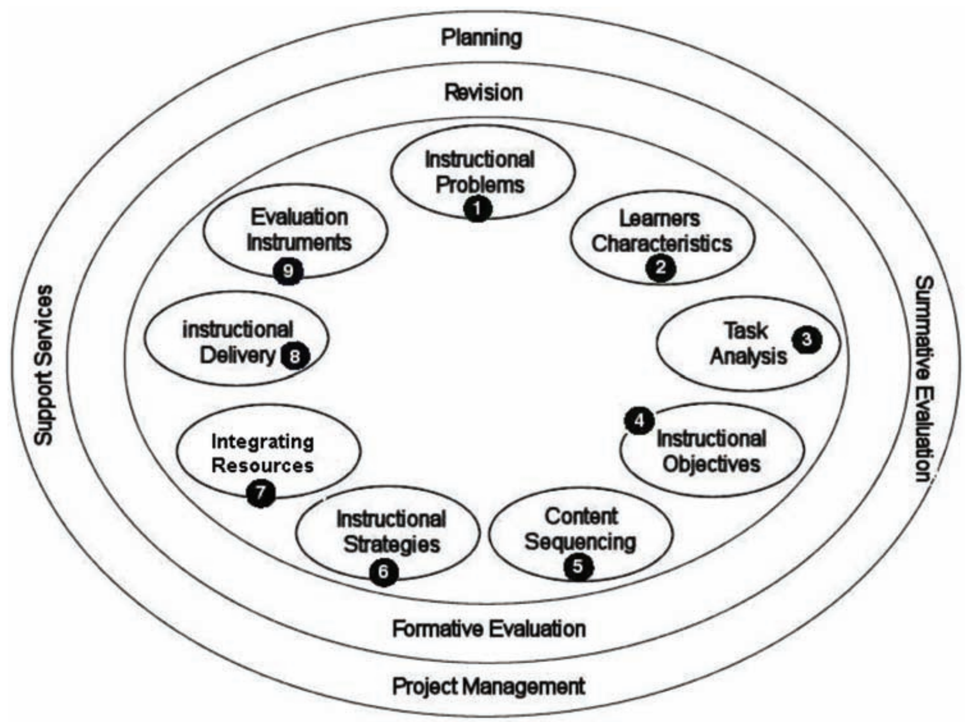
Preparation Phase of Lesson Design

Defining the Instructional Problems. Distance learning instructors should pay particular attention to the analysis of the goals, objectives, and tasks associated with each lesson. Three instructional design tools are available to help to identify and define the instructional problem. First, a needs assessment is a tool used by a number of professionals to identify problems related to instruction. For example, a health

*Figure 5. Strategies for delivering instruction to the distance learner. * Terms defined in glossary of terms, definitions of selected teaching and learning strategies. ** Terms defined in Wikipedia. *** Terms defined in both resources*

Instructional Strategy Category/Methodology	Appropriate for the Distance Learner	Instructional Strategy Category/Methodology	Appropriate for the Distance Learner
Activity Based Strategies		**Independent Strategies**	
Active Learning ***	✔	Action Research ***	✔
Applied Learning *	✔	Character Education***	✔
Chat Room Discussion	✔	Cognitive Coaching*	✔
Debate **	✔	Distance Learning ***	✔
Field Trip (Virtual) **	✔	E-portfolio ***	✔
Game (Virtual Gaming) **		Experiential Learning*	✔
Guided Reading**	✔	Homework **	✔
Guided Writing **	✔	Hyper book *	✔
Graphic Tools ***	✔	Independent Reading	✔
Oral Presentation *		Independent Study	✔
Panel Discussion **	✔	Inquiry learning ***	✔
Podcast Presentation ***	✔	Instrumental Enrichment *	✔
Practice**	✔	Interactive Lesson *	✔
Retelling		Learning Contract	✔
Simulation ***	✔	Learning Log/Journal ***	✔
Survey **	✔	Memorization**	✔
Web-based simulation	✔	Multicultural Experience	✔
Cooperative Strategies		Note Making	✔
Buddy System**	✔	Portfolio ***	✔
Collaborative Teaching ***	✔	Problem-Based Learning ***	✔
Community Links	✔	Reading Response	✔
Conflict Resolution ***		Reflection ***	✔
Cooperative Learning***	✔	Report **	✔
Discussion		Response Journal	✔
Discussion Board ***	✔	Service Learning ***	✔
Interview		Small Group Discussion ***	✔
Literature Circles	✔	Social Learning ***	✔
Mentoring ***	✔	Virtual Tour *	✔
Peer Practice ***		**Thinking Skills Strategies**	
Peer Teaching *		Accelerated Learning*	✔
Round Table *		Analyzing Bias/Stereotype	✔
Threaded Discussion ***	✔	Anticipation Guide**	✔
Direct Instruction Strategies		Assessment Alternatives *	✔
Advance Organizer ***	✔	Brainstorming ***	✔
Audioconferencing ***	✔	Case Study ***	✔
Book Talks		Classifying **	✔
Computer-assisted Instruction *	✔	Concept Clarification	✔
Computer-based Instruction *	✔	Concept Mapping	✔
Computer-managed Training *	✔	Critical thinking ***	✔
Conferencing ***	✔	Differentiated Instruction***	✔
Demonstration	✔	Estimating ***	✔
Direct Instruction	✔	Experimenting	✔
E-books ***	✔	Expressing Another Point of View	✔
Expository Text Frames		Fair Test	
Flash Cards		Graphing	✔
Guest Speaker	✔	IDEAL Problem Solving *	✔
Guided Exploration***	✔	Issue-Based Analysis *	✔
Guided Reading/ Writing***	✔	Lateral Thinking	✔
Integrated Thematic Unit **	✔	Learning Styles ***	✔
Lecture***	✔	Manipulatives***	✔
Mnemonic Devices**	✔	Map Making	
Multicultural Education ***	✔	Media Analysis	
Practice and Drill**	✔	Mental Calculation	✔
Programmed Learning	✔	Metacognitive Reflection *	✔
Programmed Instruction	✔	Mind Map	✔
Prompt		Model Making**	✔
Read Along/ Aloud		Multiple Intelligences**	✔
Reciprocal Teaching ***		Oral Explanation ***	✔
Seminar ***	✔	Problem Posing/ Solving	✔
Tutorial *	✔	Process Notes **	✔
Socratic Instruction**		Semantic Feature Analysis	✔
Story Mapping	✔	Statistical Analysis	✔
Storytelling*		Statistical Software *	✔
Task Cards **	✔	Technology in Education *	✔
Teaching for Understanding**	✔	Think Aloud	✔
Textbook	✔	Thinking Skills***	
Videoconferencing ***	✔	Visual/Graphic Organizers	✔
Visual Stimuli	✔	Writing to Learn***	✔
Visualization			✔
Word Cycle/ Sort/ Wall**	✔		
Workbook/Work Sheets			

Figure 6. Kemp model for designing instruction for the distance learner



professional might develop a needs assessment for an online course for social workers to determine the essentials of a senior citizens drug distribution program.

A goal analysis produces more detailed information on a specific topic than a needs assessment. However, a goal analysis requires a specific starting point in contrast to a needs assessment. Goal analysis is a very useful tool to help the distance educator define the goals for one or more benchmarks or standards.

Performance assessment examines the activities, exercises, or problems that are required by the learner in demonstrating competency within a lesson. Some performance tasks are designed to have students demonstrate their understanding by applying their knowledge to a particular situation. These authentic tasks can be used to define the instructional problem and subsequently build the lesson.

Describing Learner Characteristics. The distance teacher, unlike the traditional instructor, may need to conduct an audience analysis more than once during a particular course delivery; online students are more apt to add and drop course than their traditional counterparts. One study typical of the retention rates of online versus face-to-face classes found that online student withdrawal rates range from 7% to 10% for fall and spring terms; whereas, withdrawal rates for face-to-face sections taught by the same instructor range from 0% to 3% (Hayes, 2007). Still, at the outset of the course design, it is best to use this information about learners to determine the best strategies with respect to content delivery and technology infusion.

There are three types of learner information appropriate for the distance educator. First, customary information about each learner. (e.g., grade, age, ethnic group, sex, mental, emotional, physical, or social problems, socioeconomic level, academic motivation, educational and ability level, and general learning preferences). Second, the knowledge, skills, or attitudes learners already possess prior to taking this unit of instruction (e.g., prior knowledge, skills, and attitudes). Third, a contextual analysis that will help the designer consider variations in teaching strategies and technologies. For example, changing similarities and differences among learners since the last time the course was taught, the differences between general characteristics and specific prior knowledge of the learners as a population, instructional strategy variables that may be influenced by learner characteristics, etc.

Conducting the Task Analysis. According to Jonassen, the task analysis process is the single most important component in the instructional design process. In this step, the designer should clarify the outcomes of instruction, decide which outcomes should be further analyzed, develop the requirements of those outcomes, create an instructional sequence, and determine the learning requirements of those component tasks. The task analysis process consists of five distinct functions: (1) classifying tasks according to learning outcomes, (2) identifying tasks and generating a list, (3) selecting and prioritizing tasks and choosing those that can be delivered online, (4) synthesizing by breaking them down into their component elements of tasks, goals, or objectives, and (5) defining the sequence in which instruction should be delivered to best facilitate learning.

Development Phase of Lesson Design

Developing the Instructional Objectives. Specifying instructional objectives hinges on the instructor's ability to define, qualify and quantify what the learner is expected to do or demonstrate at the end of the instruction or unit. The instructional objective provides a focus for instruction, guidelines for learning, and targets for evaluation. It conveys instructional intent to the learner (and others) and provides for the evaluation of instruction. Two types of objectives, behavioral and domain-focused, move the designer past the preparation phase of Kemp's Model to the development phase.

The behavioral learning objective (BLO) was a contribution of Robert Mager and is based on the behavioral school of educational psychology. BLOs are more precisely described and more accurately assessed than other types of instructional objectives. Behavioral objectives require the student to demonstrate mastery of a particular content and consist of three key elements: Condition, Behavior, and Criteria.

The condition specifies the circumstances and materials given to an individual to prompt the expected learning outcome. Each behavioral objective must describe the conditions under which the performance is to occur. Conditions may include what the learner will be allowed to use (e.g., references placed on library hold or a chapter in the text book) and under what conditions the learner is expected to perform the behavior.

A behavior should describe the intended results rather than the means of achieving those results and the learner's performance must be directly observable and measurable. To write a behavioral objective, the teacher must be able to either directly or indirectly observe the actions. Sometimes, in distance learning courses, that can present a challenge as the instructor and the learner are seldom in the same physical location together. The newest technologies, however, shown in Tables 4 and 7 introduce tools that actually promote observable objectives. The BLO must also be measurable. For the distance learner, most of whom are adults, criteria for success must be presented using precise terminology. Performance criteria defines how well the behavior is to done and to what standards the learner's performance will be compared.

Finally, the behavioral learning objective must include the criteria for success. That is, the degree to which the behavior must be performed to constitute acceptable performance. It is not always necessary or practical to include the degree in an objective; however, the more information included in an objective the better it will communicate the desired outcome. The degree can include criterion such as speed, accuracy, and quality.

Sequencing the Content. Posner and Strike (1976) examined three different methods for sequencing content. Distance educators may use either of these schemes to sequence an entire course or to sequence the objectives for an individual lesson. Appropriate sequencing can make the difference between an easy to comprehend lesson and difficult to comprehend lesson. Careful consideration of content and the learner will help identify appropriate sequencing strategies that can enhance learning and motivation. After conducting the analyzes from the previous steps, consider sequencing by the learning styles discovered in your student population, apparent relationships found in the content material, or concepts that characterize the instruction to be presented.

Sequencing instruction based on learning styles encompasses the theories of Gardner' (Multiple Intelligences), Grasha-Riechmann (Student Learning Style Dimensions), Memletics Learning Styles, Gregorc (Learning and Working Styles), and Litzinger, Lee, Wise, and Felder (Psychometric Study of the Index of Learning Styles) all previously discussed in this chapter. In addition, however, sequencing by learning style could also reflect the scaffolding of skills, competencies, and prerequisites in the order demanded for mastery of a particular subject. Instruction can be ordered so that one learned skill facilitates the next or when one learned skill is used to teach another. Familiarity and prior knowledge is another schema for sequencing instruction moving the learner from the known to the unknown, simple to complex, or interest level (intrinsic to extrinsic). Finally, learning style can aid in sequencing instruction based on learner development; for example, using Piaget's stages of development to order instruction from sensori-motor to pre-operational, concrete, and in due course, formal operations.

Sequencing by relationships suggests ordering instruction by connections such as spatial relations (coordinates, direction, orientation, etc.), physical relations (e.g., parts of the body), chronology (time, founding dates, history, etc.).

Sequencing instruction by concepts brings in the idea of grouping similar things or events, propositional notion, laws, rules, and conventions, and logical extensions.

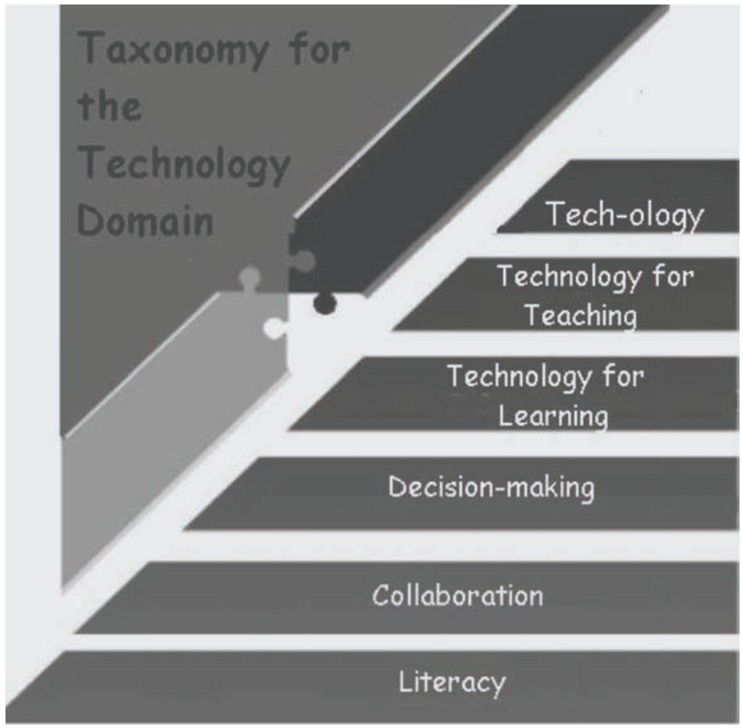
Designing the Instructional Strategies. In this step, distance educators integrate technology-based and non-technology-based activities. The Taxonomy for the Technology Domain (introduced in detail in Chapter Seven, Taxonomies: The Technology Domain and the Distance Learner) provided the six levels of technology infusion used to teach at a distance (refer to Figure 7). Chapter Seven also offered a host of action statements and intellectual activities appropriate for each of the respective levels.

Determining which instructional strategy is most appropriate for the distance learning course depends on many factors including the technology incorporated into the lesson, the nature of the content material, the learning styles to be implemented, and the technical competency of the designer.

The Technology. Three innovative formats for delivering technology-based lessons online were presented in this book. Text-based resources included student workbooks, hard-copy exercises and activities, handouts, assessment instruments, remedial content, and enrichment activities. For delivering instruction, the hyper book was recommended as a text-based instructional resource combining word processing skills with practical exercises and activities to guide the student through a *cognitive* learning experience.

Visual-based materials, including Power Point presentations, were proposed for classroom instruction. They also work extremely well as an online environment. The interactive lesson, explained in detail in

Figure 7. The taxonomy for the technology domain



Chapter Eight, favored *behavioral* learning experiences using the strengths of visual-based classroom presentations with the distance teacher controlling the sequence of the instruction while the student controls the pace. Interactive Lessons are particularly well-suited for teaching at a distance.

Web-based materials combine features and resources of the Internet to produce a more *humanistic* approach to learning by integrating sites specifically selected to focus attention on content important to the learner. The virtual tour concentrates on the strengths of fourteen different "front doors" to provide distance-based instruction.

The Nature of the Content Material. Jean Piaget et al (1995) isolated the formation of concrete thinking beginning at age seven and abstract thinking at age eleven. Understanding the importance of these gateways to higher order thinking is critical to the success of any technology-based lesson. *Concrete* instruction is characterized as sequential, highly teacher-controlled, containing as many hands-on exercises as technically possible. *Abstract* learning, on the other hand, thrives in a less structured environment with more student control and personal exploration. Technology offers effective formats for both types of learning in an online environment.

Competency. Designer skill and technical experience is the final factor in the delivery of the distance lesson. A technically *easy* lesson might involve text-based material, perhaps a few visual-based slides in a classroom presentation, and a minimal number of Internet sites for student exploration. A more technically *challenging* lesson incorporates imbedded hyperlinks, software utilities for modifying images and graphics, a growing numbers of web sites. A technically *difficult* lesson requires skill in creating bitmapped images, complex charts and tables, and multimedia web sites.

Integrating Resources. In this step of the Kemp Model, distance educators create supplementary learning activities using technology to augment the lesson. *Initiating activities* prepare students to learn by creating interest in the subject matter. *Developing activities* provide the majority of projects in the lesson and present new material for student understanding and learning. Selection of appropriate activities is based on student needs, interests, and lesson objectives. *Concluding activities* offer closure by allowing students an opportunity to apply what they have learned. Not all initiating, developing or concluding activities must include technology, but they must be deliverable in an online environment. Figure 8 presents some example activities in each category.

Readers were urged to pay attention to how the verbs matched with possible technologies as they read Chapter Six. Now is the time in the delivery of the instruction that these statements and activities are coupled with the content to successfully teach the online lesson.

Delivery Phase of Lesson Design

Delivering the Instruction. Programs and courses taught online must be part of a comprehensive curriculum that demonstrates effective integration of academic content and instructional technology. The same content as delivered on campus, coupled with some allowable variations accounting for the technology used, should be offered. The rigor and breadth of the course delivery is expected to be similar, taught by qualified faculty, and meet the same academic rigor under which all programs or courses are delivered at the respective institution.

Courses taught at a distance must provide for appropriate participation and interaction between and among faculty and students using collaborative tools such as chat rooms, discussion groups, email, and electronic forums. Student outcomes must reflect similar quality and include evaluative components that assess student performance appropriate to the method of delivery.

The distance educator must seek to match the pedagogy of teaching online with the mode of delivery, the content presented, and the diversity of student learning styles as much as possible. The syllabi and course materials should closely parallel that of the traditional classroom, again, with variations to take full advantage of the technology used to deliver the course.

Finally, distance instructors are obligated to take whatever steps are necessary to ensure that the student enrolled in the course is the student actually completing the work. Verifications may include proctored examinations with careful checking of identification, individual presentation of projects or other means of ensuring integrity of the program, although requiring the physical presence of the learner for such evaluations can compromise the purpose of taking an online course and, for some geographically separated students, be impossible. Instead, online instructors often integrate digital video presentations, web cameras, and geographically convenient professional testing centers to establish their assessment plan.

Evaluation Phase of Lesson Design

Evaluating the Instruction. Assessment may be defined as “any method used to better understand the current knowledge that a student possesses.” (Dietel and Knuth, 1991). Assessment can be as simple as a subjective judgment of student performance or as complex as a standardized achievement test. The concept of “current knowledge” implies that what a student knows is always changing and therefore

Figure 8. Developing online classroom activities

Initiating Activity (Online)

Activity. Before beginning the first lecture in the Sociology 4000 online course, learners will adopt the role of counselor to another classmate. The "counselor" will generate a set of questions to ask the client so that they can help identify any apprehensions with taking a course at a distance. "Counselors" will use appropriate communication skills to clarify the information with their "clients."

Learning Objective:

- "Counselors" will produce a questionnaire that asks pertinent questions about the "client's" learning styles and preferences when it comes to taking a course for credit online versus face-to-face.
- "Counselors" will compile the results of the survey individually by client and then will work together in small groups of 2-3 in an assigned chat room to compile their findings and generalize their recommendations.
- "Counselors" will report their individual and group findings using a short (2-3 min maximum) video clip, post the video on UTube, and send the link to their video to the instructor all other students in the distance course as an email.

Primary Skill:
Counseling techniques, technology-supported collaboration.

Developing Activity (Online)

Activity. Online learners in Finance 3100 will successfully navigate the Internet and employ research skills to select their "dream home." They will also research housing costs.

Learning Objective:

- Learners will find and navigate a recommended Internet site to locate information.
- Learners will print a copy of an Internet page.
- Learners will be able to decode the Internet Multiple Listing Services (MLS).

Primary Skill:
Counseling techniques, technology-supported collaboration.
Secondary Skills:
Learn through research, Lifelong learning

Learning Activity Description:

1. Ask the learners to compose a home buying needs list.
2. Distribute a list of web-based Home Guides to each learner.
3. Ask learners to choose a home based on their needs instead of wants.
4. Each learner will go to www.realtor.com on the Internet. Using the mouse, click "Find a Home." Learners may search for a home in any other. Select the state in which the learner wishes to search. Then select a region.

Have the learner conduct a search for the home and print out a virtual tour of a home. Student should print the listing(s) of homes that interest them and meet their needs. The prices should be listed with the homes. Ask the learners to compare the prices of their homes.

Concluding Activity (Online)

Activity. Learners in the online Photography 1100 course will produce a class photo album (using the ePortfolio format introduced in class) of subject matter content, collaboration exercises, and interpersonal relationships established during the semester.

Learning Objective:
The learners will demonstrate organizational, communication, and observational skills by creating and laying out the design of a class photo album complete with audio, video, and written reflections.
Primary Skill:
Portfolio creation, multimedia design

Learning Activity Description:
The overall design of this activity encourages online learners to reflect on their own practices, learn new skills and incorporate those new skills into the practice of building memories and creating electronic portfolios. They will then observe the impact of the class portfolio on members of the course and record their observations.

teachers are to make assessments about their students' achievements repeatedly throughout the course, online or otherwise.

Instructional technology in general, as well as the elements of technology-based materials and lessons introduced in this chapter, has identical reasons for undergoing the scrutiny of formal evaluation. The purposes of assessment are many, depending in large measure on the designers of the evaluation. Administration uses assessment to set standards and policies, direct resources, establish goals, and monitor the quality of education. Learners gauge their strengths and weaknesses, measure school accountability, and make informed educational and personal career decisions. And, teachers advocate assessment for individual diagnosis and prescription, curriculum revision and modernization, determination of student mastery, and to establish fairness in grading.

Part VI of this text delves into assessment in much greater detail for traditional, adult, and distance learners. Specifically, Chapter Fifteen focuses on appropriate assessment tools and techniques for the distance learner.

In summary, it is highly recommended that instructors: (1) follow the Kemp Model as presented in this chapter, and (2) consider using the lesson plan template provided in Appendix C when designing instruction for the distance learner.

SUMMARY

In this chapter, we reviewed many of the techniques appropriate for teaching the distance learner. To recap:

A. The Pillars of Education provide the conditions of teaching and learning in the online classroom.

Philosophies for the distance learner. <u>Tech-ology</u>, <u>Social Technology</u>, <u>Instrumentalism</u>, and <u>Radical Instruction Design</u> are the philosophies of choice for distance education.

Psychologies of the distance learner.

- <u>Cognitive, affective,</u> and <u>psychomotor</u> domains are play an important role in the delivery of distance learning.
- As well, all three schools of <u>Behaviorism</u>, <u>Cognitivism,</u> and <u>Humanism</u> contribute to the delivery of distance-based instruction. Added to these schools was a discussion of both asynchronous and synchronous delivery modalities.
- Primary applications for instruction include <u>programmed instruction</u> (non-technical), <u>computer-assisted instruction</u> (technology-based), and <u>discovery learning</u>.

Sociological characteristics of the distance learner. With an expanding population of distance learners, the sociological characteristics of these students is very important to any discussion of teaching and learning. In Chapter Thirteen, it was found that the distance learner encompasses the widest definition of demographics but is most closely aligned to the adult learner. Most are comfortable with online learning and most are secure in their writing and communications skills.

History of traditional education. The history of distance education is most easily characterized by its state of flux as the discipline continue to mature and the instructional strategies employed by teachers continues to come under closer scrutiny by research and the literature.

Leadership of traditional education. As with the previous pillars, characteristics of the distance leader tend to take in all the key elements of leadership discussed in this book. Vision, staff, funding, strategic and tactical planning, curriculum and assessment, community support, and management all describe the effective distance learning leader.

B. If a pattern appears to be emerging, it continues here with a look at the principles of effective teaching with respect to distance learners. Here, there is also merit in considering all seven principles when delivery instruction at a distance. Specifically,

- Principle 1. Set clear goals for the distance learner
- Principle 2. Appropriate teaching strategies
- Principle 3. Communications
- Principle 4. Attention to the intellectual growth of learners
- Principle 5. Respect talents and learning styles of the distance learner
- Principle 6. Incorporate learning beyond the classroom
- Principle 7. Continue to improve teaching practices

C. Learning styles found in the distance classroom. Distance students embrace new strategies that enable them to be effective when taught by methods that are otherwise not compatible with their traditional mode of learning. The widest range of learning styles offered in the chapter was found to be appropriate for distance education.

D. Teaching and learning strategies appropriate for the distance learner. As expected, independent strategies were found to be the most recommended instructional strategies. Other categories of activity-based, cooperative, and direct instruction all offer welcomed choices for consideration with thinking skills the second most appropriate strategy in the distance learning environment.

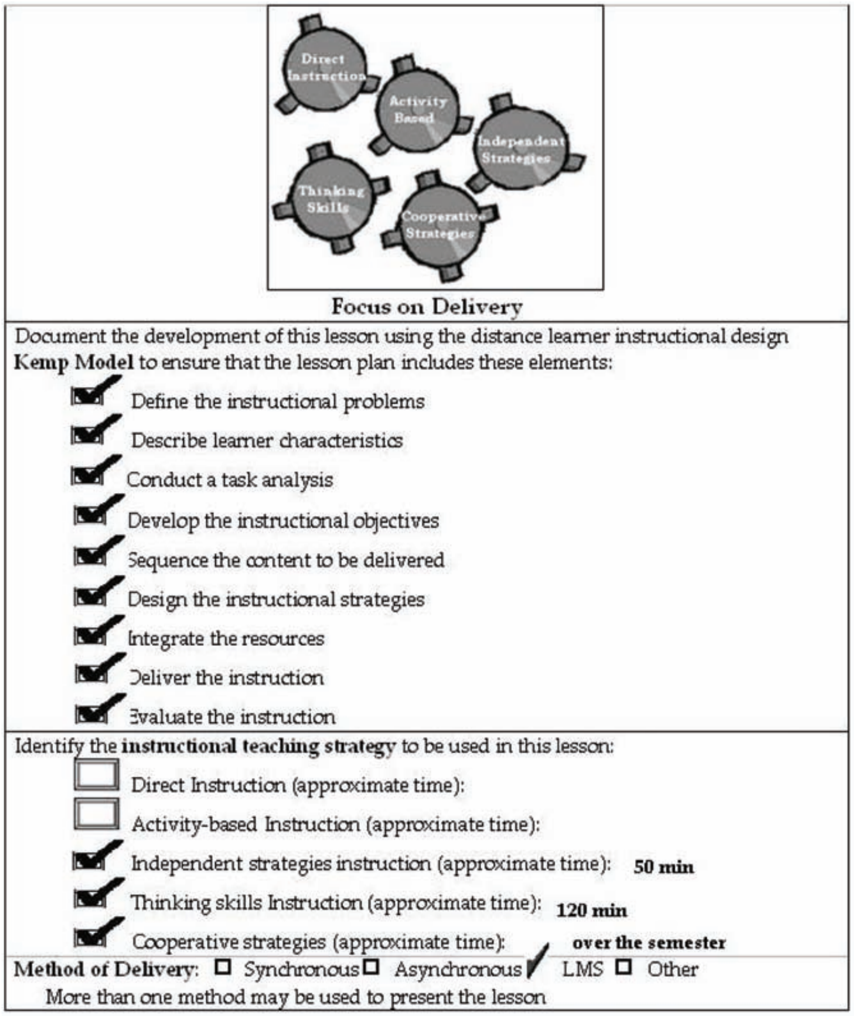
E. Methodologies for designing instruction for the distance learner. The Kemp Model along with the lesson plan template provided was highly recommended for designing instruction for the distance learner.

In conclusion, a study of delivering instruction to the distance learner produces the broadest inventory of tools for teaching and learning so far. It seems that all the domains of learning may be brought into play to effect sound instruction. All three schools of educational psychology have something to contribute to distance education. The distance learner is more difficult to characterizer than either the traditional or adult student. Learning styles are teaching strategies are more likely to need the close attention of the lesson designer since so many strategies are available for consideration. Finally, the Kemp Model of instructional design offers a 9-step approach for designing distance-based instruction that just might be the answer to ensuring that the designer gives due consideration to all the many elements that go into making an effective and successful distance course.

CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on Delivery** portion of the template (Figure 9) demonstrates how to develop a distance learner-oriented lesson on the Planets of the Solar System. The author in this particular example is using a variety of technology-based resources.

Figure 9. Distance learner lesson plan template (cumulative)



Focus on Delivery

Document the development of this lesson using the distance learner instructional design **Kemp Model** to ensure that the lesson plan includes these elements:

- [x] Define the instructional problems
- [x] Describe learner characteristics
- [x] Conduct a task analysis
- [x] Develop the instructional objectives
- [x] Sequence the content to be delivered
- [x] Design the instructional strategies
- [x] Integrate the resources
- [x] Deliver the instruction
- [x] Evaluate the instruction

Identify the **instructional teaching strategy** to be used in this lesson:

- [ ] Direct Instruction (approximate time):
- [ ] Activity-based Instruction (approximate time):
- [x] Independent strategies instruction (approximate time): **50 min**
- [x] Thinking skills Instruction (approximate time): **120 min**
- [x] Cooperative strategies (approximate time): **over the semester**

Method of Delivery: ☐ Synchronous ☐ Asynchronous ✓ LMS ☐ Other

More than one method may be used to present the lesson

REFERENCES

Bloom, B., Krathwohl, D., & Masia, B. B. (1964). *Taxonomy of Educational Objectives: Handbook II, The Affective Domain.* New York: David McKay Co.

Hayes, S. K. (2007), Principles of Finance: The Design and Implementation of an Online Course. *MERLOT Journal of Online Learning and Teaching*, *3*(4), December.

Jonassen, D. H., Hannum, W. H., & Tessmer, M. (Eds.). (1989). *Handbook of Task Analysis Procedures*. New York: Praeger.

Litzinger, T. A., Lee, S. H., Wise, J. C., & Felder, R. M. (2007). A Psychometric Study of the Index of Learning Styles. *J. Engr. Education*, *96*(4), 309-319. Reliability, factor structure, and construct validity of the Index of Learning Styles. *The Memletics Learning Style Inventory* (n.d.). Retrieved March 19, 2008 from http://www.memletics.com

Sparkes, J. (1982). Pedagogic differences between media. In A. Q. Bates, (ed.) The *Role of Technology in Distance Education*. London: St. Martin's Press.

Strike, K. with Posner, G. (1976). A categorization scheme for principles of sequencing content. *Review of Educational Research*, *46*(4), 665–690.

Taylor, J. C. (1995). Distance education technologies: The fourth generation. *Australian Journal of Educational Technology*, *11*(2), 1–7.

Tips for Being a Successful Online Learner (2007). Illinois Online Network (http://illinois.online.uillinois.edu), Illinois Online Network University of Illinois. Retrieved August 2008 from http://www.uwsp.edu/natres/rwilke/eetap/Tips.htm

Tomei, L. A. (2005). *Taxonomy for the Technology Domain*. Hershey, PA: Idea Group Inc Publishing.

Section 5
Focus on Outcomes

The final three chapters in the ***Engine for Designing Technology-Based Instruction*** delve into the assessment of traditional, adult, and distance learning.

Chapter 13: Methodologies for Assessing the Traditional Learner begins the examination with a look at characteristics of conventional assessment for the traditional learner. Indeed, many of these initial traits are descriptive of evaluations of subject learners at any level. These include, for example, matters of: (1) validity (does the assessment measure what it is intended to measure?), (2) reliability (can the assessment results be replicated?), (3) accountability (do lesson objectives found in course syllabi match intentional learning outcomes as described in program descriptions?)

The chapter continues with a look at the fundamentals of assessing the traditional learner with respect to writing, oral presentations, and performance-based learning outcomes. Rubrics are offered for evaluating written assignments, communications and presentations, and performance-based situational, real-world, or simulated problems.

Checklists are applied later in the chapter offering fundamentals for assessing traditional teaching and learning resources with respect to text-based, visual-based, and web-based materials. The reader will note that the recommended checklists concentrate on the final two steps of the ADDIE Model: implementation and evaluation.

Chapter 14: Methodologies for Assessing the Adult Learner familiarizes the reader with the fundamentals of authentic assessment for the adult learner. Authentic assessment seeks to gather information about a student's level of mastery by engaging the learner in tasks that offer an opportunity to demonstrate understanding in a real-world situation, extend that knowledge throughout all aspects of the task, and provide the teacher with a visible performance related to a specific set of criteria. Portfolios illustrate the five essential ingredients of learning: reading, writing, thinking, interacting, and demonstrating. The chapter suggests a step-by-step approach for integrating portfolios into adult assessment by considering what artifacts are to be collected, how they are to be stored (hard copy or digital), and how they will be evaluate. Readers are shown how to organize their portfolios into collecting, working, and showcase folders and, subsequently, into collecting points that will house content area materials, classroom resources, library resources, web sites, social networking connections, learning projects, applications lessons, reflections and self-assessment, and professional documents, service learning projects, and scholarship.

Rating scales provide for fundamental assessment of text-based, visual-based, and web-based materials following the Backward Design Model proposed by Wiggins and McTighe. Specifically, the chapter suggests three rating scales (for text, visual, and web-based resources) that address Step 2 of the BDM model, determining acceptable evidence, with measures that gauge the overall satisfaction of lesson goals. Other measures quantify Step 3, planning the learning experiences and instruction, by assessing the construct of the instruction taken as a whole. Next, the rating scale rates Step 4, creating resources to engage the learner, by probing the complete structure of the materials. Finally, BDM Step 5, revising and refining the lesson judges increases in student performance as a result of using the text, visual, and web-based materials under review.

Traditional evaluations methodologies are not always sufficient to properly assess effective online instruction. ***Chapter 15: Methodologies for Assessing the Distance Learner*** begins with a look at the fundamentals of virtual assessment for the distance learner. It highlights strategies that are designed to accommodate special circumstances such as time, location, and access issues, unique to the distance learner.

The use of various instructional technologies supports assessment of distance learning. The chapter goes on to suggest a virtual outcomes evaluation tool for each technology explored that includes online examinations, eportfolios, online survey instruments, computer mediated communication (CMC) technology, conferencing technology, and games and simulation environments.

The virtual learning outcome assessment tool embraces the Kemp model discussed in an earlier chapter as the instructional system design model for distance education. The newly proposed assessment tool examines text-based, visual-based, and web-based materials appropriate for distance learning. Using the nine elements of the Kemp model, the chapter sequences the design process beginning with the preparation phase and moving to the development, delivery, and, finally, to the evaluation phase. Some sixteen criteria are evaluated, given ratings that range from outstanding, significant strengths, adequate, significant weaknesses, to ineffective. A final analysis recap form graphically plots each assessment factor to visually represent the overall strength or weakness of each technology-based resource.

Distance learning technologies are redefining such previously well-understood terms such as “community of learners” and “non-traditional learners.” A new inventory of characteristics are associated with distance learners; specifically, characteristics that demand that instructors consider issues of time management, autonomous as well as group work, a growing bank of interpersonal skills, and more. Chapter 15 provides the reader with a close look at the use of tools and techniques to help understand which methods work best in the distance learning virtual classroom.

Chapter 13
Methodologies for Assessing the Traditional Learner

Learning Objectives. Assessment may be defined as "any method used to better understand the current knowledge that a student possesses." (Dietel and Knuth, 1991). Assessment can be as simple as a teacher's subjective judgment of student performance or as complex as a standardized achievement test. The concept of "current knowledge" implies that what a student knows is always changing and therefore teachers are to make assessments about their students' achievements repeatedly throughout the school year.

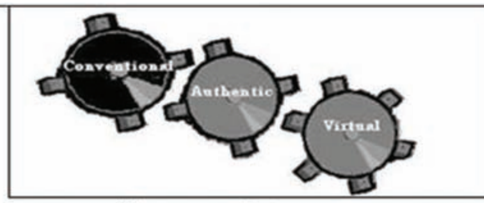
The elements of technology-based materials and lessons introduced in this book have identical reasons for undergoing the scrutiny of formal evaluation as any other form of valid classroom assessment. The purposes of assessment are many, depending in large measure on the initiators of the evaluation. Administrators use assessment to set standards and policies, direct resources, establish goals, and monitor the quality of education. Learners gauge their progress, assess strengths and weaknesses, measure school accountability, and make informed educational and personal career decisions. And, teachers advocate assessment for individual diagnosis and prescription, curriculum revision and modernization, determination of student mastery, and to establish fairness in grading. In support of those objectives, Chapter Fourteen completes this examination of teaching and learning for the traditional learner by proposing that the reader of this chapter:

DOI: 10.4018/978-1-60566-824-6.ch013

- Become familiar with the characteristics of conventional assessment for the traditional learner.
- Apply the fundamentals of assessing the traditional learner with respect to writing, oral presentations, and performance-based learning outcomes.
- Apply the fundamentals of assessing traditional teaching and learning resources with respect to text-based, visual-based, and web-based materials.

Lesson Plan Template. Refer to **Appendix A, Traditional Learner Lesson Plan Template** as this chapter discusses **Focus on Outcomes** as depicted in Figure 1.

Figure 1. Traditional lesson plan template (focus on outcomes)



Focus on Outcomes

Identify **characteristics of good assessment** for the traditional learner included in the lesson:

- ☐ Valid. Does it measure what it is intended to measure?
- ☐ Reliability. Can the assessment results be replicated?
- ☐ Clear purpose
- ☐ Enables the learner to plan for further learning
- ☐ Begins early in the instructional design process
- ☐ Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

- ☐ Rubric for written assignment objectives
- ☐ Rubric for communications/ presentations objectives
- ☐ Rubric for performance-based objectives

Identify the **assessment tools for technology-based resources** included in this lesson:

- ☐ Checklist for assessing text-based materials
- ☐ Checklist for assessing visual-based materials
- ☐ Checklist for assessing web-based materials

INTRODUCTION

Traditionally, educators cite four reasons for assessing student performance (McKeachie, 1994). They include properly diagnosing learner strengths and weaknesses, monitoring progress of the class as well as the individual learner, assigning grades, and determining the overall effectiveness of the instruction. Valid assessment also increases the opportunities to evaluate classroom teaching skills. For example, teachers who use technology are viewed in a more positive light by the educational community, especially if technology has been soundly integrated into the curriculum.

In addition to evaluating student performance, lesson materials created for the traditional learner must also be assessed. Here, teachers are encouraged to consider three integral components: (1) the criteria for determining the effectiveness of the materials produced, (2) a valid methodology for collecting and analyzing the results of the self-evaluation, and (3) an appropriate framework for interpreting the results of the assessment. In support of these components, a series of checklists are proposed for the resources described in this text.

First, considerations for assessing traditional instructional material were provided throughout Parts I – V. In each part and in each chapter, design guidelines presented the fundamentals integral to the creation of successful materials and effective lessons. In assessment, the basic question is, “Does this particular lesson contain the necessary elements to ensure increased learner knowledge and understanding?” The checklists which follow summarize these elements.

Second, while offering a convenient forum for presenting the key elements of a successful lesson, the checklists also provide an excellent tool for tracking whether the materials and lesson objectives contain the elements necessary to ensure a successful application of the many teaching applications and learning styles discussed earlier. A particular weakness associated with assessment is its inherent subjectivity. Reviewing one’s own efforts is often skewed by familiarity and personal misconceptions. By offering checklists as a methodology for assessment, an objective review of traditional materials and lessons may served to provide the rigor necessary to initiate an objective review of the content and resources before undertaking an lesson revisions that are an inherent part of the ADDIE Model of instructional design offered in Chapter Ten, Delivering Instruction to the Traditional Learner.

Third, an analytic approach to assessing student learning should reward important issues; for example, an acknowledgement of the proper uses of classroom handouts, presentations, and web sites. Correct implementation should reap significant points from a valid checklist. Clear and concise directives also contribute to a student-controlled lesson and deserve high marks. The integration of more skills and competencies reflected by a host of technical “bells and whistles” within a visual-based classroom presentation, however, can be highly distracting and actually take away from the student learning opportunity. It should receive a limited number of points on a checklist, perhaps even a negative number. Consider using one of the assessment checklists when evaluating the development of any traditional instructional materials resulting from applications presented in this text.

With this prologue to assessment in general and evaluating the traditional environment more specifically, the discussion now turns to the characteristics of good assessment for the traditional learner.

CHARACTERISTICS OF GOOD ASSESSMENT FOR THE TRADITIONAL LEARNER

Good assessment information provides accurate measurement of learner outcomes and enables teachers to make appropriate decisions regarding subsequent course content and lesson delivery. The first important characteristic of good assessment is validity. Does the assessment tool actually measure what it is intended to measure and does it permit a useful analysis of the student's skills and abilities? A second important characteristic of good assessment is reliability. Can the assessment results be replicated at some other time, using different measurement tools, or when scored by different raters?

Assessment should have a clear purpose. It should be clear what is being assessed and how conclusions are considered and acted upon. It should enable the learner to review their progress and plan for further learning. It should also be subject to its own internal self-examination to promote increased teaching effectiveness.

A solid assessment program begins early in the instructional design process. Actually, it begins the process when using the Backward Design Model (see Chapter Eleven, Delivering Instruction to the Adult Learner). Good assessment focuses on evaluating precise program objectives and intentional learning outcomes using both formative and summative opportunities to evaluate expected results. It has the unequivocal commitment of all levels and includes all stakeholders in the process. Data is collected early on in a continuous and ongoing practice and the process remains flexible to evolving needs and circumstances.

Other characteristics of good assessment for traditional classrooms include an examination of how well the teacher's educational objectives and instruction match the assessment. A well-designed assessment tool includes criteria that represent the full range of knowledge and skills that are the main goals of the instruction. The creation, exercise, and reporting of assessment outcomes is accomplished in strict accordance with generally accepted ethical standards and considers the precepts of federally-mandated institutional review board procedures if not in practice, then in intent so that students and other participants are not experimental subjects

In summary, below in Figure 2 is a thorough presentation of the most important characteristics of good assessment. Ensure that your assessment program considers each of these characteristics when designing instruction targeting the traditional learner.

FUNDAMENTALS OF ASSESSING THE TRADITIONAL LEARNER

Traditional assessment is a term used to describe the process of gathering information on student learning through techniques are categorized broadly as written, presentation, and performance. These approaches are particularly useful in assessing a learner's knowledge of information, concepts, and rules, their ability to communicate, and their ability to exhibit a level of skills mastery.

Written assessments take the form of selected response/short answer (traditional paper and pencil assessments) and include multiple choice, true/false, matching, fill in the blank, label a diagram, or write a sentence. In its expanded form, the essay question often calls for a longer written response, usually to a prompt.

Evaluating objective forms of written assessments (e.g., multiple choice, true-false, etc.) are relatively straightforward and need no additional discussion here. For short answer and essay questions, however,

Figure 2. Characteristics of good assessment for the traditional learner

Characteristics of Good Assessment for the Traditional Learner

Good assessment:

- is valid. Does it measure what it is intended to measure?
- is reliability. Can the assessment results be replicated?
- should have a clear purpose
- should enable learners to plan for their own further learning
- should also be subject to its own internal self-examination
- begins early in the instructional design process and continue throughout
- focuses on evaluating precise program objectives and intentional learning outcome
- has the unequivocal commitment of all levels
- has educational objectives that match instruction
- is accomplished in strict accordance with generally accepted ethical standards

it is often recommended that the instructor use the rubric to objectively evaluate what is certainly a subjective assessment tool. For example, Figure 3 shows a rubric used to assess structure and organization, mechanics, and content of written evidence for a traditional lesson.

Presentations require a student to present information concerning a specific or general subject area. They encompass a brief summary of a group project or lesson or they can be extensive in their coverage of the topic (e.g., thesis defense or capstone project). Presentations are typically scheduled for a pre-determined time and day within the course. Instructors, other students, other faculty/staff, or some combination of knowledgeable and interested parties evaluate group presentations while shorter presentations are typically evaluated by the instructor alone or perhaps the instructor and peer students. Primary consideration is given to understanding the material being presented and the ability of the learner to convey that understanding to listeners. More complex presentations are rated by members of the audience to focus on the scope of the subject area, organization of the materials, completeness and accuracy of the materials presented, and the actual presentation of the materials, including any use of technology employed to support the presentation. Figure 4 provides a rubric for assessing any presentation, but particularly appropriate for traditional learners.

Performance assessments center around situational problems (real or simulated) wherein the student is asked to construct a response that demonstrates the skills needed to resolve the challenge, evidences mastery of the processes involved in its solution, or illustrates a thorough understanding of the concepts related to the circumstances surrounding the question. Performance assessments are often presented to traditional students as projects that may be completed over an extended period of time and that require the learner to locate, gather, organize, and interpret information. Typically, the project being addressed is rated by the instructor using clearly delineated criteria rubrics, which are in line with academic expectations or standards. Figure 5 is a generic rubric for evaluating the performance of a traditional learner.

Figure 3. Rubric for written assessments

WRITING RUBRIC - ANALYSIS OF...				Points Possible	Weighted Score
STRUCTURE AND ORGANIZATION				**12**	**x2 = 24**
	1	**2**	**3**	**4**	
Introduction	One element of the req'd essay structure	Two elements of the req'd essay structure	Both elements and originality	Achieves all elements	
Body	Topical sentence in each para	Presents ideas in logical sequence	Includes supporting detail	Clear and fluent details	
Conclusion	One element of the req'd essay structure	Contains all req'd components	Also includes original insight	Presented in a appealing manner	
MECHANICS				**12**	**x1 = 12**
	1	**2**	**3**	**4**	
Grammar	Simple sentences	Compound sentences	Complex sentences	Employs all styles	
Punctuation	Poor use of rules	Correct use of rules	Consistent use of rules	No errors	
Language	subject terms used sparingly	subject terms used correctly	subject terms used frequently	subject terms used effectively	
CONTENT				**12**	**x3 = 36**
	1	**2**	**3**	**4**	
Elements of style	acknowledges them	identifies them correctly	Used sporadically	Used with confidence	
Originality	expresses own opinions	provides rationale for opinions	Consistent throughout essay	Synthesizes own ideas	
Examples	Provides few examples as evidence	Provides several examples as evidence	Provides many examples as evidence	Well supported by examples	
			TOTAL POINTS		

New assessment alternatives for the traditional learner are continually being developed to measure student progress toward achieving established learning outcomes. An entirely new category of assessment practices known as Classroom Assessment Techniques (CATs) are currently in vogue. CATs are formative evaluation methods that assess the degree to which students understand course content and provide information about the effectiveness of certain teaching strategies (Angelo, 1993). Most are designed to be quick and easy to use and each CAT provides different information. For example, minute papers, employed during the last few minutes of a class period, ask students to identify the most important points of the lesson just presented and those that were clear and those that remain uncertain. At the beginning of the next class period, instructors are encouraged to address the issues uncovered by students' previous comments. CATs include chain notes, memory matrix, directed paraphrasing, one-sentence summaries, and application cards as well as the more traditional exam evaluations and student- generated test questions. Additional information about CATs is available (Angelo & Cross, 1993).

In summary, there are many alternatives to assessment methods that can broaden the scope of how instructors evaluate learning in the traditional classroom. Students may perform self-evaluations of their work while others present informal or formal demonstrations that exemplify their knowledge, skills, and performance related to the content area of the instruction. It is highly recommended that the rubric for

Figure 4. Rubric for communications/ presentations assessments

PRESENTATION RUBRIC - ANALYSIS OF…				Points Possible	Weighted Score
ORGANIZATION				4	x2 = 8
1	2	3	4		
poor organization, introduction undeveloped, presentation is unclear.	difficulty following presentation, some main points unclear or not sufficiently covered	Satisfactory organization, clear introduction, main points well stated, clear presentation.	Excellent organization, supports the presentation, main points well argued.		
MECHANICS				4	x1 = 4
Presentation disorganized with numerous mistakes, speaker not comfortable with presentation	No glaring mistakes but no real effort into creating an effective presentation	Generally good presentation, conveys main points	Creative presentation, well designed to expound the main points, maintained audience interest.		
DELIVERY				4	x3 = 12
Poor oral delivery, practice required to make this more effective, distracting gestures	Inaudible, poor use of words and gestures, articulation unclear	Clear voice, effective delivery, minimal distractions	Confident delivery, conveys the message and enhances it, excellent use of volume and pace		
RELATING TO AUDIENCE				4	x1 = 4
Read presentation, no eye contact with audience, unaware of audience reaction	Occasional eye contact, only brief response to audience questions	Good eye contact when speaking and answering questions	Engaged audience throughout the presentation, responded to audience reactions		
			TOTAL POINTS		

written assessments (Figure 3 be used to objectively evaluate forms of written assessments, the rubric for communications/ presentations assessments (Figure 4) be used to assess the situational problems (real or simulated) wherein the student classroom presentations, and the rubric for performance assessments (Figure 5 be considered when evaluating situational problems (real or simulated) confronted by the traditional learner in the classroom.

ASSESSING TEACHING AND LEARNING RESOURCES FOR THE TRADITIONAL LEARNER

Experts in the field of assessment recognize a common form of assessment as most appropriate for evaluating the traditional technology-based resources. That form is the annotated checklist.

The annotated checklist prompts the user to consider how learning objectives are addressed and satisfied by the target instructional resources. Criteria begin as descriptive statements to which the assessor responds either positively or negatively (Yes or No). They are expanded (i.e., annotated) with

Figure 5. Rubric for performance assessments

State Objective or Describe Performance	**Beginning** 1	**Developing** 2	**Accomplished** 3	**Exemplary** 4	**Score**
Objective A	performance characteristics reflecting a beginning level of performance.	performance characteristics reflecting development and movement toward mastery	performance characteristics reflecting mastery of performance.	performance characteristics reflecting the highest level of performance.	
Objective B	performance characteristics reflecting a beginning level of performance.	performance characteristics reflecting development and movement toward mastery	performance characteristics reflecting mastery of performance.	performance characteristics reflecting the highest level of performance.	
Objective C	performance characteristics reflecting a beginning level of performance.	performance characteristics reflecting development and movement toward mastery	performance characteristics reflecting mastery of performance.	performance characteristics reflecting the highest level of performance.	

additional information that surpasses a simple response and makes the annotated checklist more usable for assessing the traditional learner.

When individual steps are not consistent or self-explanatory, using a checklist becomes much more difficult. It is important that they be constructed so as to present clear and consistent factors to be rated.

An annotated checklist is an excellent vehicle for tracking items as they are accomplished. When using a checklist containing numerous instructions or items, it is recommended that they be constructed in some logical order (e.g., sequence, stages, date completed, etc.). It must be clear which factors have been accomplished and which have not. Required and optional factors, if applicable, should be clearly annotated,. When using these tools for assessing technology-based instructional materials, it often pays to read all of the items thoroughly before beginning the assessment. There may be some additional factors necessary to complete a later task on the list. If someone else prepares the checklist or if the assessor is using a template checklist prepared by a sanctioned organization (e.g., NETS or ISTE), the user must ensure that abbreviations, codes or technical jargon is understood before using the instrument.

Recall that in Chapter Ten, the use of the ADDIE Model for teaching the traditional learner was proposed. The ADDIE Model was represented by five phases of instructional design. To summarize:

- The analysis phase requires that the designer identify the learning problem, the learning objectives, the audience's needs, existing knowledge, and other relevant dynamics.
- The design phase identifies the units of instruction, content and strategies, and classroom instruction.
- The development phase builds specific content items, assignments, and assessments.
- The implementation phase delivers the lesson and performs the first assessments of student learning outcomes.

- And, finally, the evaluation phase ensures that instructional objectives have been met and a process of continuous improvement is in place to continually update and revise the lesson.

This chapter will concentrate on the final two steps of the ADDIE Model: implementation and evaluation.

Also, the following section of this chapter offers the annotated checklist for assessing the instructional materials prepared in Chapter Seven, Text-Based Resources for Teaching the Traditional Learner. As a reminder, these materials included:

- Text-based student materials; specifically, the classroom handout and the student study guide. Handouts are one-page documents that focus on specific learning objectives and include the instructional steps, content material, procedures for learning, and formative assessment to ensure student learning. Study guides focus on a specific learning style, concentrating on a limited number of learning objectives that match with successful teaching strategies.
- Visual-based presentations that offer a multimedia environment for concepts and ideas critical to student understanding. They create powerful slide shows incorporating bulleted lists and numbered text; multimedia clip art, pictures, sounds, and movies; links to teacher-validated web sites and documents; colorful charts and graphs; and, a choice of output options tailored to individual learning styles.
- Web-based home pages that host technology-supported instruction by identifying appropriate web sites for exploration by the traditional learner. Internal as well as external links tie together teacher-made web pages, professional pages found on the Internet, and online handouts and classroom presentations.

Using Checklists (Figure 6) to Assess Text-Based Materials for the Traditional Learner. (Companion to Chapter Seven and Primer One – Text-Based Materials). Indicate by placing a “Y” or “N” in the box if the assessment of this item is present or missing in the text-based resources under evaluation.

Using Checklists (Figure 7) to Assess Visual-Based Materials for the Traditional Learner. (Companion to Chapter Eight and Primer Two – Visual-Based Materials). Indicate by placing a “Y” or “N” in the box if the assessment of this item is present or missing in the visual-based resources under evaluation.

Using Checklists (Figure 8) to Assess Web-Based Materials for the Traditional Learner. (Companion to Chapter Nine and Primer Three – Web-Based Materials). Indicate by placing a “Y” or “N” in the box if the assessment of this item is present or missing in the web-based resources under evaluation.

The instructional designer is encouraged to include, from the outset of the design, a plan for assessing the student learning outcomes anticipated from the lesson/course using characteristics of good assessment for the traditional learner. As a minimum, the use of rubrics for written, presentation, and performance evaluations will appraise a learner’s knowledge of information, concepts, and rules, their ability to communicate, and their ability to exhibit a level of skills mastery.

In addition, the annotated checklist is an appropriate assessment instrument when evaluating text, visual, and web-based materials suitable for the traditional learner.

Figure 6. Checklist to assess text-based materials

Y or N Here	CHECKLIST FOR ASSESSING TEXT-BASED MATERIALS Criteria for Assessment
	ADDIE Implementation Phase
	1. Did the instructional designer select the correct application of text-based formats (i.e., handouts versus study guides)?
	2. Is the title of the lesson present and is there a graphic or image appropriate for the content material contained in the resource?
	3. Does the material include student name to identify materials to be used either by the individual student or in learning groups?
	4. Does the use of a lesson date identify multiple sessions over the course of a semester or multiple academic years?
	5. Are page numbers used to avoid student confusion and enhance classroom discussion?
	6. Did the designer use a variety of sensory aids to student learning? Identify the aids included in the text-based materials from the following list.
	a. Clip art
	b. Images harvested from the Internet
	c. Text harvested from the Internet
	7. Were the materials spell-checked to eliminate misspellings?
	8. When printed, did the documents impart a visually appealing presentation?
	9. Were features of appearance (e.g., bold, underline, etc.) used to stress critical items for student understanding?
	10. Was the number of pages used in the text-based materials appropriate to ensure the lesson objectives were met?
	ADDIE Evaluation Phase
	1. Did students perform well on the lesson that utilized the text-based materials provided to them?
	2. Were the criteria for using the text-based materials clearly identified and unambiguously presented to students before using the materials?
	3. Were the text-based materials appropriate for course content and did they focus on the most important content taught in the lesson?
	4. Did students find the materials relevant to course objectives, current, and easily used by both the teacher and the student?
	5. Were the text-based materials suitable for and did they actually address a wide range of learning/teaching styles or did they disregard the styles a particular group of students?
	6. Did the text-based materials promote student engagement (i.e., did students participate in the activities offered as part of the lesson)?
	7. Did the text-based materials promote communication and group interaction?
	8. Did the text-based materials allow/encourage students to work independently?
	9. Do the text-based materials need to be revised before using them again in the next iteration of this lesson?

SUMMARY

Learning without assessment is like talking to someone who may not be listening. An instructor simply cannot gauge whether the message sent was actually received. So, too, it is with teaching. Without assessment, it is not really possible to know if students are learning, much less meeting the goals and course expectations established when the course was designed. Instructors who assume that students are learning just because they delivered a lecture are often disheartened when exams, assignments, and papers suggest evidence the contrary.

Figure 7. Checklist to assess visual-based materials

Y or N Here	CHECKLIST FOR ASSESSING VISUAL-BASED MATERIALS Criteria for Assessment
	ADDIE Implementation Phase
	1. Do Slides 1 and 2 present the title and topic of the lesson and is there a graphic or image appropriate for the content material contained in this slide?
	2. Does Slide 3 provide the learning objectives in a way that students (and parents, if appropriate) understand what learning outcomes are expected?
	3. Do Slides 4 through 9 confer the content material of the lesson?
	4. Slides 10 and 11 should summarize new vocabulary words and an opportunity for student assessment. Do they?
	5. Was the instructor completely ready, was the presentation finalized, and was it obvious that instructor did a dry-run of the presentation before class began?
	6. Does the designer use a variety of multimedia resources to aid student learning? Identify the aids included in the Presentation from the following list.
	a. Clip art
	b. Images harvested from the Internet
	c. Animated images harvested from the Internet
	d. Text harvested from the Internet
	e. Sounds from the gallery or harvested from the Internet
	f. Movies (i.e., video clips) from the gallery or harvested from the Internet
	g. Hyperlinks from the Internet
	7. Were contents of the slides spell-checked to eliminate misspellings?
	8. Does the designer select a template different from that supplied by Auto Content Wizard and did the selected template add to the quality of the presentation?
	9. Was the slide presentation offered to student in hard copy format? And, if so, when printed, was the presentation visually appealing?
	10. Were features of appearance (e.g., bold, underline, etc.) used to stress critical items for student understanding?
	11. Were colors (e.g., text, background, hyperlinks, etc.) used effectively and consistently throughout the presentation?
	12. Was the number of slides used in the presentation appropriate to ensure the lesson objectives were met?
	ADDIE Evaluation Phase
	1. Did students perform well on the lesson that utilized the visual-based materials provided to them?
	2. Did the presentation demonstrate an effective use of graphics and text to deliver the information to the target audience?
	3. Were the visual -based materials appropriate for course content and did they focus on the most important content taught in the lesson?
	4. Did students find the materials relevant to course objectives, current, and easily used by both the teacher and the student?
	5. Did the presenter demonstrate the ability to utilize the various features of the program to capture and retain the interest of the student?
	6. Did the visual -based materials promote student engagement (i.e., did students participate in the activities offered as part of the lesson)?
	7. Did the visual -based materials promote communication and group interaction?
	8. Did the visual -based materials allow/encourage students to work independently?
	9. Do the visual -based materials need to be revised before using them again in the next iteration of this lesson?

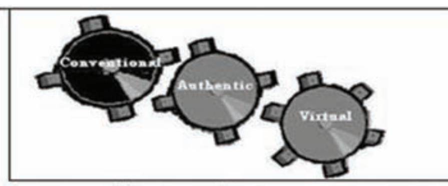
Figure 8. Checklists to assess web-based materials

Y or N Here	CHECKLIST FOR ASSESSING WEB-BASED MATERIALS Criteria for Assessment
	ADDIE Implementation Phase
	1. Does the web page include the title and topic of the lesson and is there a graphic or image appropriate for the content material contained on this page?
	2. Are lesson instructions provided so that the learner understands what outcomes are expected?
	3. Is the web page appropriate for the specific lesson objectives?
	4. Have all the external web sites been previewed prior to the lesson?
	5. Does the web page provide pre-selected web sites, additional workbook material, and further research opportunities for students to continue their exploration of the topic?
	6. Does the designer use a variety of multimedia resources to aid student learning? Identify the aids included in the web page from the following list.
	a. Clip art
	b. Images harvested from the Internet
	c. Animated images harvested from the Internet
	d. Text harvested from the Internet
	e. Sounds harvested from the Internet
	f. Movies (i.e., video clips) harvested from the Internet
	g. Hyperlinks to external sites on the Internet
	h. Hyperlinks to internal sites prepared by the teacher
	7. Were contents of the web page spell-checked to eliminate misspellings?
	8. Does the designer select a background color or image that adds to the quality of the web page?
	9. When printed, is the web page visually appealing?
	10. Were features of appearance (e.g., bold, underline, etc.) used to stress critical items for student understanding?
	11. Were bullets effectively used as an organizational scheme?
	12. Were colors (text, background, hyperlinks, etc.) used effectively and consistently throughout the presentation?
	13. Was the length of the web page appropriate to ensure lesson objectives were met?
	ADDIE Evaluation Phase
	1. Has the author clearly articulated their qualifications, credentials, or personal information that qualifies them as an authority to present the information on the site?
	2. Regarding the purpose of the information presented in the site: is the site clear in its intent to inform, persuade, state an opinion, entertain, or parody?
	3. Are the topics comprehensively explored? Is the site comparable to others on the same topic? Does the site provide information with outside links?
	4. Are the links current and reliable? Are there any dead links or references to sites that have moved or been re-directed? Is there a limited time period that the site is usable? Has the site been permanently under construction?
	5. Can a particular bias be detected with the information presented? Does the site attempt to sway the audience towards or away from certain point of view? Is the site trying to explain, inform, persuade, or sell something and is this the intent of the lesson?
	6. How reliable is the information? If the author is affiliated with a known institution? Does the information on the site seem accurate?
	7. Are proper references cited for the origin of the information found on the web site?
	8. Does the text follow basic rules of grammar, spelling and composition?

Student assessment is not the same as grading. Grading provides a score. An assessment explores how to improve that score or how that score interprets into documented student learning. Student assessments determine which instructional approaches work and which must be sidelined in favor of other instructional strategies. With all the models, strategies, and styles offered in this text, readers should embrace the opportunity to appraise their strengths and shortcomings with a well-developed assessment regimen.

To maximize the benefit of student assessments, an assessment strategy must become an integral and conscious component from the design phase of the lesson. Using the rubric and annotated checklist suggested in this chapter to assess traditional learning will help ensure successful learning outcomes for the traditional learner.

Figure 9. Traditional learner lesson plan template (cumulative)



Focus on Outcomes

Identify **characteristics of good assessment** for the traditional learner included in the lesson:

- [x] Valid. Does it measure what it is intended to measure?
- [x] Reliability. Can the assessment results be replicated?
- [x] Clear purpose
- [x] Enables the learner to plan for further learning
- [ ] Begins early in the instructional design process

Personal note to begin assessment earlier

- [x] Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

- [x] Rubric for written assignment objectives
- [x] Rubric for communications/ presentations objectives
- [ ] Rubric for performance-based objectives

Identify the **assessment tools for technology-based resources** included in this lesson:

- [ ] Checklist for assessing text-based materials
- [ ] Checklist for assessing visual-based materials
- [x] Checklist for assessing web-based materials

CONCLUSION

Appendix A, Traditional Learner Lesson Plan Template A completed **Focus on Outcomes** portion of the template (Figure 9) demonstrates how to complete a traditional classroom lesson on the Planets of the Solar System.

REFERENCES

Angelo, T. A., & Cross, P. K. (1993). *Classroom Assessment Techniques* (2nd ed.). San Francisco: Jossey-Bass.

Dietel, R. J., Herman, J. L., & Knuth, R. A. (1991). *What does research say about assessment?* NCREL, Oak Brook. Retrieved from http://www.ncrel.org/sdrs/areas/stw_esys/4assess.htm

McKeachie, W. J. (1994). The ABC's of assigning grades. In W. J. McKeachie, *Teaching tips: Strategies, research, and theory for college and university teachers* (9th ed.). Lexington, MA: D. C. Heath.

Chapter 14
Methodologies for Assessing the Adult Learner

Learning Objectives. Assessments, when properly considered and constructed, have a potential to recognize and value the adult learner, their varied learning styles, and the diverse backgrounds which they represent in the classroom. Properly prepared, assessments present the adult with complex, purposely ambiguous, open-ended problems and tasks that demand from them the ability to integrate knowledge and demonstrate mastery and performance of critical skills.

It is important for course designers to create an environment in which formal assessment is fully utilized to track and document learners' educational successes and learning shortfalls gains. Teachers conduct informal assessment on a daily basis. They should be encouraged to use the informal tools and procedures consistently, testing and retesting as needed and documenting changes in skill levels to gauge learner progress and supplement lesson instruction as it moves forward. Research in adult education has indicated that many teachers are not well-equipped to carry out crucial assessment (Forlizzi, Kuhne, & Kassab, 2002; Stiggins, 2002). This chapter will present many tested methods for evaluating adult learning. Readers of this chapter should:

- Become familiar with the fundamentals of authentic assessment for the adult learner in the classroom.

DOI: 10.4018/978-1-60566-824-6.ch014

- Become familiar with the fundamentals of portfolios for assessing the adult learner.
- Become familiar with the fundamentals of the portfolio-based authentic assessment with respect to text-based, visual-based, and web-based materials.

Lesson Plan Template. Refer to **Appendix B, Adult Learner Lesson Plan Template** as the chapter discusses **Focus on Outcomes** as depicted in Figure 1.

INTRODUCTION

Plans to assess adult learners are designed to evaluate student outcomes as well as course objectives. To evaluate adult learning, course developers are encouraged to consider both formative and summative measures to consider feedback from as many different perspectives as possible. To evaluate course objectives, it is highly recommended that developers use a variety of tools to simultaneously assess the effectiveness of the course and identify features that require modification.

Formative assessment measures include in-class and homework writing tasks; readings tasks; tasks involving listen, note-taking, and summarizing of classroom and taped lectures; participation in class discussions; and, group and individual presentations and projects. Summative assessment measures include examinations based on reading and writing assignments, listening and note-taking, and discussion and presentations.

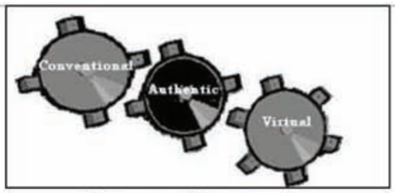
In addition to assessing student progress toward course goals, developers try to integrate student assessment to secure a positive impact on student attitudes toward learning. Adults perform well when engaged in tasks that allowed them to assess their own learning and progress. For example, the use of portfolios requires students to compose, compile, and share their learning – a highly successful medium for evaluating adult learning. A properly constructed portfolio contains artifacts of assigned writing tasks essay, entries from learning and thinking (i.e., reflection) journals, evidence of peer assessment, and final disposition of research projects.

In Parts I – V of this text, design guidelines were recommended that included creating successful materials and effective lessons for the adult learner. In assessing adult learning, the basic question changes somewhat from that of the traditional learner. It becomes more encompassing. “How well does this particular lesson increase learner knowledge and understanding of the content area?” Whereas, traditional learners were evaluated with rubrics (i.e., Yes/No, True/False, Present/Missing), rating scales are used quite frequently in adult assessment to expand the choice of responses from among several arranged in hierarchical order.

There are several different kinds of rating scales. A typical rating scale asks learners to choose one response from several categories composed by the evaluator and arranged in hierarchical order. Response categories may be labeled using one of the following schemata:

(1) Category labels use words as descriptors of possible reactions. Researchers who are interested in creating interval scales (scales in which the respondents perceive equal-sized gradations between the points on the scale) must be careful to choose category descriptors that are truly equal-interval. For example, “always,” “constantly,” “continually,” “frequently,” “seldom,” “not at all,” “none of the time,” and, “never” provides an equal-interval category label.

Figure 1. Adult lesson plan template (focus on resources)



Focus on Outcomes

Identify **characteristics of good assessment** for the adult learner included in the lesson:

- ☐ Valid. Does it measure what it is intended to measure?
- ☐ Reliability. Can the assessment results be replicated?
- ☐ Acknowledges the experience, knowledge, values, beliefs, and opinions of the adult learner
- ☐ Includes a wide range of assessment tools that concedes the diverse learning styles of the adult student
- ☐ Includes participatory assessment techniques such as case studies, portfolios, and problem-solving groups to increase the opportunities to evidence understanding
- ☐ Includes educational objectives that match instruction but allows for variances in learning styles among students
- ☐ Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

Portfolio for collecting artifacts that include:

- ☐ Content area materials
- ☐ Classroom resources
- ☐ Library resources
- ☐ World wide web sites

Portfolio for working artifacts that include:

- ☐ Making connections
- ☐ Learning projects
- ☐ Applications and lessons
- ☐ Reflections and self-assessment

Portfolio for showcase artifacts that include:

- ☐ Teaching materials
- ☐ Professional documents
- ☐ Service
- ☐ Scholarship

Identify the **assessment tools for technology-based resources** included in this lesson:

- ☐ Rating scales for assessing text-based materials
- ☐ Rating scales for assessing visual-based materials
- ☐ Rating scales for assessing web-based materials

(2) Forced-choice rating scales eliminate undecided options that allow for "no opinion." Deliberately omitting "undecided," "no opinion," "uncertain," or "don't know" may be reasonable when students are expected to have an opinion or must profess to an established viewpoint.

(3) Generally, rating scales should reflect an equal number of favorable and unfavorable response choices. However, there are times then using alternatives such as "excellent," "very good," "good," "fair," "poor" is appropriate. Such a scale is unbalanced, with three favorable and only one unfavorable response choice. Evaluators must be ready to justify an unbalanced rating scale, especially if there is no reason to believe that subjects are just as likely to be negative as positive.

(4) Ideally, a rating scale should consist of sufficient points to delineate among the various responses and compile a necessary distinction. Some researchers claim that scales consisting of three points are sufficient (Jacoby and Mattel, 1971). However, there is more contemporary evidence to support the assertion that more scale points produce greater reliability (Churchill and Peter 1984).

Authentic assessment ties nicely into one of the key themes of the Backward Design Model by Wiggins & McTighe offered in Chapter Twelve, Delivering Instruction to the Adult Learner, to serve as the guide for designing instruction for the adult learner. Authentic assessments go to the heart of essential learning, to the understandings and abilities that matter to the learner. By nature, they are more educational and engaging than performance-based assessments and, since they reflect real-life and offer interdisciplinary challenges to student, they are most effective when evaluating lessons delivered to the adult learner.

According to Wiggins & McTighe, "material worth knowing" has enduring value beyond the classroom, resides at the heart of the discipline, required "uncoverage" of abstract or often misunderstood ideas, and offer the potential for engaging students (Wiggins & McTighe, 2006).

With this introduction, the discussion now turns to an examination of some of the important characteristics of good assessment for the adult learner.

CHARACTERISTICS OF GOOD ASSESSMENT FOR THE ADULT LEARNER

As a reminder, the adult learner typically exhibits one or more of the following characteristics. Adults learners have years of experience and a wealth of knowledge to share in the classroom and this experience and knowledge should be tapped and assessed by the teacher. Adults have established values, beliefs, and opinions and teachers must ensure that any assessment tool debates and challenges a full range of ideas represented in the adult classroom.

Adults expect to be treated as adults. Assessment and evaluation should include questions and comments that speak to the student with respect, acknowledge contributions made to the class, and that recognize a diverse learning styles that includes a wider range of assessment tools beyond classroom participation points and objective quizzes.

Adults need to feel self-directed. Using participatory assessment techniques such as case studies, portfolios, and problem-solving groups increases the opportunities for adults to evidence their understanding.

The adult learner prefers a problem centered approach to learning. Assessment should focus on the context of theory and concepts and their applications to relevant problems. The same holds true with assessment of learning. Evaluations should be oriented toward applications as well as theory. They have increased variation in learning styles and, therefore, assessment tools. As age increases, individual differences among learners will also increase. Teachers should be ready to address the issue of using alternative

Figure 2. Characteristics of good assessment for the adult learner

Characteristics of Good Assessment for the Adult Learner

Good assessment:

- Is valid. Does it measure what it is intended to measure?
- Is reliable. Can the assessment results be replicated?
- Should acknowledge the experience, knowledge, values, beliefs, and opinions of the adult learner.
- Should include a wide range of assessment tools that concedes the diverse learning styles of the adult student.
- Includes participatory assessment techniques such as case studies, portfolios, and problem-solving groups to increase the opportunities to evidence understanding.
- Has the unequivocal commitment of administration at all levels
- Includes educational objectives that match instruction but allows for variances in learning styles among students.
- Is accomplished in strict accordance with generally accepted ethical standards

assessment tools when evaluating adult learning outcomes. Using a variety of teaching materials and assessment methods takes into account differences in style, time, types, and pace of learning.

In summary, below in Figure 2 illustrates the most important characteristics of good assessment for the adult learner. Any assessment program must consider each of these characteristics when designing instruction targeting the adult learner.

FUNDAMENTALS OF ASSESSING THE ADULT LEARNER

Foundations of the Portfolio. The foundations of the portfolio include the five essential ingredients of learning: Reading, Writing, Thinking, Interacting, and Demonstrating. Together, these elements represent the basics of teaching and learning. While each of the elements has some applicability to learners at all levels (i.e., traditional adult, and online), they have particular merit when considering the adult student.

Reading remains the first of the foundations. It is concerned with gathering new knowledge and developing new perspectives on prior knowledge, both critical to adult learning. Whether the information is presented to the student using text books, journals, teacher-prepared handouts, or online avenues, reading provides the underpinning for successful learning outcomes. Technology encourages virtual journeys to the largest accumulation of knowledge since the encyclopedia: the Internet. Online searches, electronic journals, and digital libraries contribute to support of the reading foundation. Electronic mail, list servers, and online subscriptions increase the domain of readily available reading resources. Still, whether considering technology or conventional reading materials, reading remains the most encompassing foundation for instructional resources and must be evident during any form of assessment.

Writing. New thinking is presented, defended, and extended via writing. However, it is often overlooked in favor of demonstrating. Writing remains the primary evidence that prior knowledge has been accumulated, integrated, and transferred to practical classroom applications. Writing is worthy of inclusion in any well designed instructional lesson. Formal papers, publication submissions, and classroom materials are represented in this category.

Thinking. Student understanding becomes visible in thinking-centered elements of an instructional program. Teachers of adult students must provide ample opportunities for their learners to evidence this foundation when designing instructional resources. Exercises which require personal reflection and journal writing confirm adult thinking and are authentic indicators of student learning. Certain tools are available to assist the adult learner. Database software manages the drudgery of tracking phone numbers, personal and professional contacts, bibliographic citations, and web site addresses, leaving time to think about the contents, implications, and applications of the information. Spreadsheets manipulate numeric information and present "what if" scenarios for deeper student exploration. Project management software aids in scheduling and time management and oftentimes becomes a classroom management tool for teachers and a valuable technology skill for students. Finally, most multimedia computers come with a host of utility programs which further encourage investigation of downloaded images, sounds, and video clips that augment multimedia resources.

Interacting. Artifacts from this foundation include discovery learning exercises and underline the importance of group inquiry and problem solving – all adult learning applications discussed in earlier chapters. Appropriate collaborative tools include electronic mail with mentors and peers that allow students to share their learning and brainstorm new ideas. Newsgroups and chat rooms offer more interaction with a broader scope of teachers, adults, and content experts. A well designed adult lesson includes ample opportunity for interaction.

Demonstrating. Demonstrating exposes the adult learner to the specific learning objectives of the target lesson. Practical applications of content material offer adults a variety of learning styles from which to choose and, as we have seen, demonstrating becomes a hallmark of adult learning.

Arguably, one of the best ways to assess adult learners is with the use of portfolios. Reading, writing, thinking, interacting, and demonstrating are the logical components of an effective assessment plan based on the portfolio approach to assessment. Teachers who decide to use a portfolio approach to assessing adults must develop unique expectations, guidelines for content, and criteria for assessment suitable for the course and the lesson objectives involved.

Suggested Steps to Follow when Beginning to Use Portfolios. First, decide what artifacts are to be collected, by whom, when, and how (hard copy or electronic)? Where are the portfolios to be kept? How will artifacts be evaluated fairly? It is recommended that portfolios be used in a robust assessment plan that includes other methods of assessment such as rubrics (see previous chapter), surveys (see subsequent chapter), standardized tests, and formally graded assignments.

Second, do not assume that everyone (especially adults) know how to create the kind of portfolio for a specific class. There are indeed many different portfolio format and purposes. Spend time introducing the portfolio: the constructs, contents, and rubrics to be used to assess learning. Be clear about what artifacts are acceptable in a portfolio without limiting the freedom of the learner to create and to choose the contents that will ultimately evidence their degree of learning.

Third, conduct periodic portfolio reviews with learners. For adult learners, a celebration of learning is an appropriate forum for sharing the "best of the best" in terms of artifacts collected. A tri-fold (available in most any teacher resource center or retail store) is an excellent vehicle for exhibiting the highlight contents of an otherwise cumbersome portfolio. Learners discuss the samples of work chosen, the background (e.g., source) of the items and reasons for their choice, and offer their own assessment of the quality of learning demonstrated by the portfolio.

Fourth, assess portfolios holistically. Remain aware that items in one portfolio will most certainly differ from another portfolio. Also, anticipate that any grading process will be time-consuming and allow enough time (especially at the end of a course before grades are due) to invest an amount of time worthy of the student's efforts. Portfolios are intended to demonstrate growth in learning, so ensure this concept becomes the foundation upon which the assessment plan is built.

Finally, either orally or in writing, provide learners with thoughtful responses to their assembled portfolios and the evidence they have chosen. Feedback throughout the process of collecting items for portfolios is also recommended to help the adult learner focus on the strengths of their portfolio in support of their own learning.

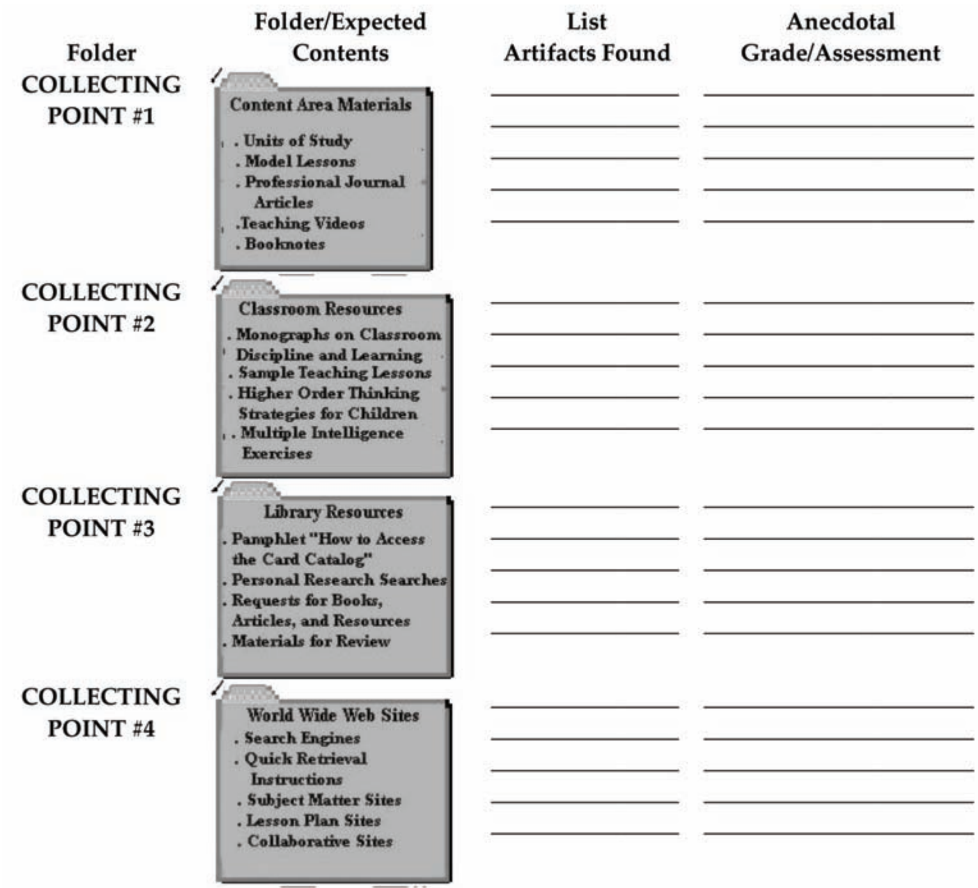
Organizing the Artifacts of the Portfolio. Collecting, working, and showcase folders embody the key repositories of artifacts for any portfolio. By considering these folders (whether hard copy or electronic), a pattern emerges for easy storage and retrieval of artifacts. Specifically, collecting folders focus on acquiring knowledge and skills. Most of the evidence of learning will be housed in the collecting folders of the portfolio. The working folder holds artifacts created as knowledge is applied and new skills are acquired. And, the showcase folder contains artifacts that are moved here when they are ready to be published and shared with the academic community, including the instructor and other students.

A well-constructed portfolio provides up to 12 collection points to hold artifacts. Earlier, it was recommended that teachers who wish to integrate portfolios into an adult course provide specific formats for an acceptable product. Four collection points are offered for the task of collecting artifacts. Artifacts that will be placed initially into one of these four folders include: content area materials, classroom resources, library resources, and World Wide Web (WWW) sites. One of the benefits of the portfolio is the way learning is fostered through the assessment process. Self-assessment must be constant and continuous, just as learning is constant and continuous. With a comprehensive portfolio, the learners set goals and decide whether they were met. It is the learner that proposes the first inkling of what was learned. Assessment provides the link between the process itself and how it connects to instruction. Use Figure 3 as a guide to the adult learner in the preparation of the portfolio and as a measurement tool for assessing the contributions of the portfolio to the teaching-learning process.

Working folders consist of making connections, reflection and self-assessment, learning projects, and applications and lessons. As knowledge is applied and new skills are acquired, artifacts are placed in working folders. Again, four folders have been created for work in progress. Figure 4 serves as a guide to the adult learner in the preparation of the working folder. This particular folder must be assessed as a "snapshot" in time since artifacts here are intended to dropped in whenever the learner is actively working an a project, application, lesson, etc. and summarily removed and returned into collecting or permanently deposited in showcase.

Artifacts assessed for their enduring value are moved to the showcase folders of service, teaching, scholarship, and professional documents and retained there permanently. For example, documents attesting to your professional development, such as teacher certification credentials, are captured in one of the showcase collection points of the portfolio. Figure 5 is the guide to the adult learner in the preparation of the showcase folder. Especially for the adult learner, this folder might contain more artifacts than any of the previous two. Professional documents are likely to be housed here as well as published scholarship and other assessment forms (e.g., course evaluations).

Figure 3. Assessing the portfolio: Collection points of the collection folder

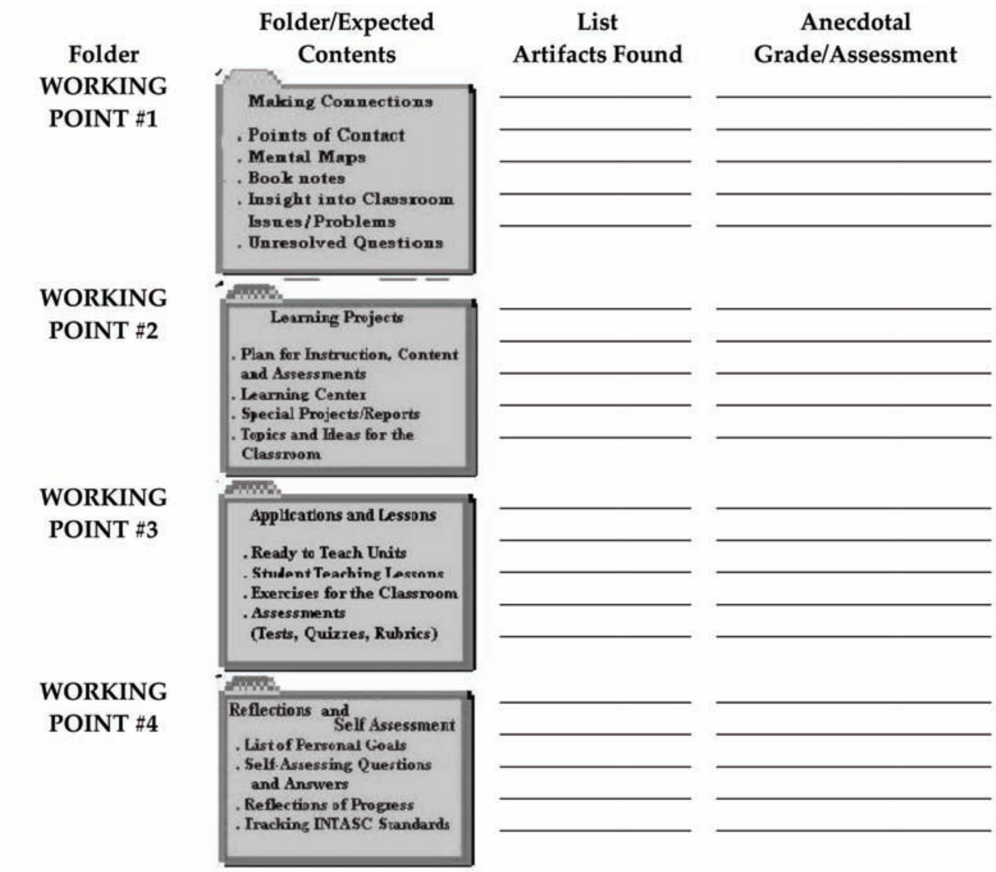


In summary, it is highly recommended that the portfolio be used to assess adult learners. Portfolios evidence learner growth over time. They involve the adult learner directly in the teaching-learning experience. Portfolios are holistic measures of learning, concentrating on process as well as outcomes. The portfolio (especially the showcase component) is useful for adults seeking employment. And, portfolios are an effective tool for lifelong professional development.

Further, teachers of adult learners are encouraged to use the portfolio format illustrated in this chapter. Collecting folders focus on knowledge and skills. Working folders retain artifacts as they are used to create new knowledge. Showcase folders house the exemplary artifacts that a learner wishes to share with colleagues and peers. When applying for a new position, it is the showcase folder that accompanies the prospective candidate to the interview.

Finally, teachers of adults are encouraged to use Figures 2, 3, and 4 to assess adult portfolios.

Figure 4. Assessing the portfolio: Collection points of the working folder



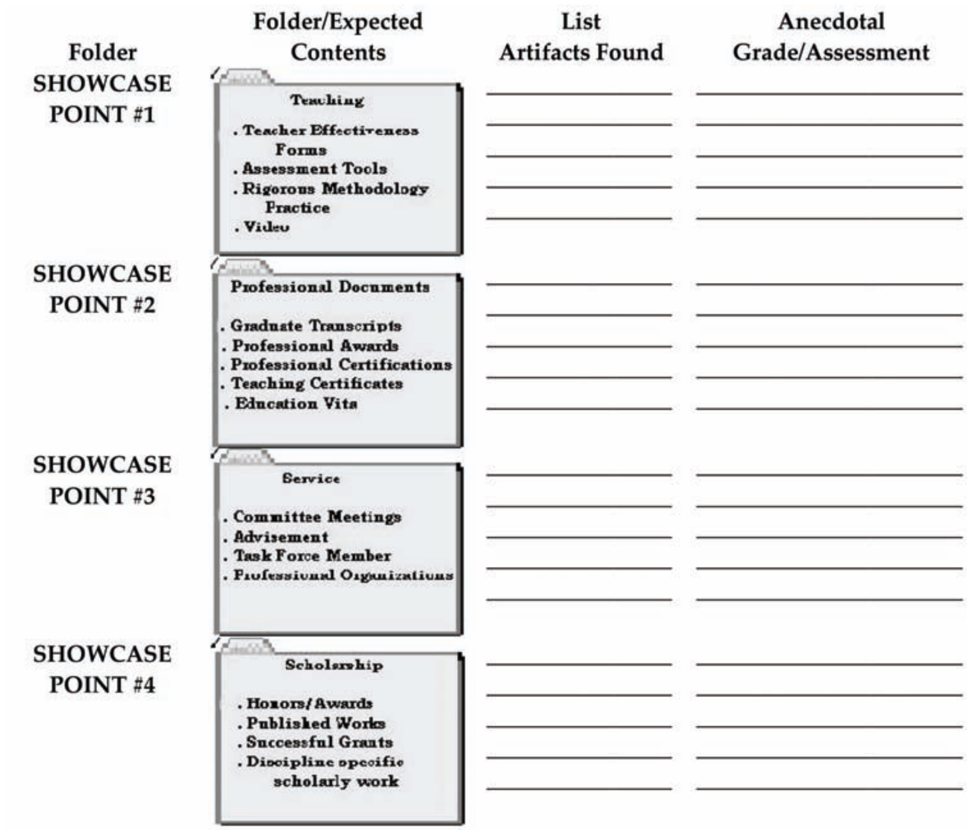
ASSESSING TEACHING AND LEARNING RESOURCES FOR THE ADULT LEARNER

The previous chapter examined the use of the annotated checklist to consider how learning objectives are addressed by traditional instructional resources. It was noted that a basic Yes/No checklist was inadequate to assess the traditional learner – or any learner for that matter. So, the annotated checklist was offered to expand criteria into more descriptive statements, constructed so as to present more clear and consistent factors for evaluation.

Even so, the medium of the checklist pales in its effort to evaluate the adult learner. While checklists may be excellent vehicles for tracking items once they are accomplished, they fall far short when evaluating the capabilities of adult-focused instructional resources. Enter the rating scale.

Rating scales use the Likert format commonly employed in questionnaires and survey research instruments. When responding to a Likert questionnaire item, respondents specify their degree of concurrence to a statement typically using a sliding scale of low to high, strongly disagree to strongly agree, or as in the case of the rating scales used in this chapter, from 1 (inadequate) to 10 (outstanding). After the assessment questionnaire is completed, each item may be analyzed separately or summed in the case of grouped items.

Figure 5. Assessing the portfolio: Collection points of the showcase folder

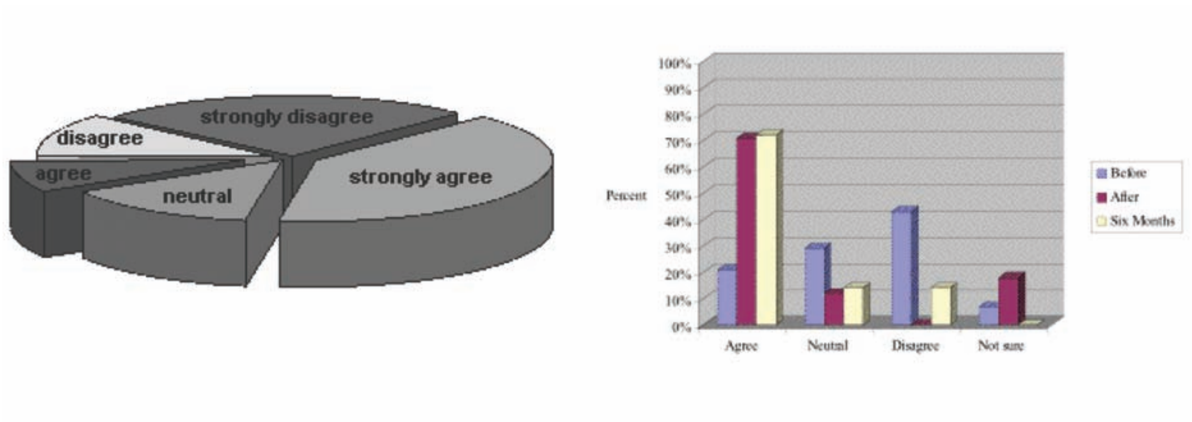


Ordinal data is commonly evaluated using the Likert scale representing the logical sequencing of responses (e.g., 1=Strongly disagree, 2=Disagree; 3=Neutral, 4=Agree, 5=Strongly agree). While computing a median is easily justified for ordinal data, some statisticians have reservations about using any other descriptive statistics such as mean, mode, range, etc. (Merbitz, Morris, and Grip, 1989). If the data is evenly distributed, further analysis may be more meaningful. Likert responses are often displayed as bar charts, pie charts, and other familiar graphic aids (see Figure 6).

In Chapter Eleven, Delivering Instruction to the Adult Learner, the Backward Design Model (BDM) for teaching was introduced. The BDM offered a five-step paradigm for designing courses. Step 1 asked instructors to begin the development process by considering lesson objective that withstand the test of time (enduring understanding). In step 2, the model examined three types of assessment: performance task, criteria referenced assessment, and self-assessments. For adults, authentic assessment garnered the most potential for assessing different abilities in situations that closely resemble the real world. Instructors develop the activities that lead to student understanding in step 3 and created the resources to engage the learner in step 4. Finally in step 5, constant feedback, continuous evaluation and, to take a term from business, continuous improvement was considered.

Steps 2 through 5 are most appropriate as this chapter continues by examining acceptable evidence of learning and the process of refining and revising course materials. Chapters Seven, Eight, and Nine discussed text, visual, and web-based materials that included:

Figure 6. Likert scale results in graphic aids



- The classroom handout and the student study guide. These text-based materials involve one-page documents that focus on specific learning objectives and include the instructional steps, content material, procedures for learning, and formative assessment to ensure student learning. Study guides focus on a specific learning style, concentrating on a limited number of learning objectives that match with successful teaching strategies.
- Presentations that offer a multimedia environment for concepts and ideas critical to student understanding. Visual-based materials create powerful slide shows incorporating bulleted lists and numbered text; multimedia clip art, pictures, sounds, and movies; links to teacher-validated web sites and documents; colorful charts and graphs; and, a choice of output options tailored to individual learning styles.
- Web home pages that host technology-supported instruction by identifying appropriate web-based sites for exploration. Internal as well as external links tie together teacher-made web pages, professional pages found on the Internet, and online handouts and classroom presentations.

Using Rating Scales (Figure 7) to Assess Text-Based Materials for the Adult Learner. (Companion to Chapter Seven and Primer 1 – Text-Based Materials). Circle the rating and assign the numeric score that best describes each of the following criteria for assessment in the text-based resources under evaluation.

Using Rating Scales (Figure 8) to Assess Visual-Based Materials for the Adult Learner. (Companion to Chapter Eight and Primer 2 – Visual-Based Materials). Circle the rating and assign the numeric score that best describes each of the following criteria for assessment in the text-based resources under evaluation.

Using Rating Scales (Figure 9) to Assess Web-Based Materials for the Adult Learner. (Companion to Chapter Nine and Primer 3 – Web-Based Materials). Circle the rating and assign the numeric score that best describes each of the following criteria for assessment in the text-based resources under evaluation.

A plan for assessing the adult learner should encompass the characteristics of good assessment presented in Figure 2. The use of portfolios for authentic assessment provides the vehicle for evaluating adult student

Figure 7. Rating scale for assessing text-based materials

RATING SCALE FOR ASSESSING TEXT-BASED MATERIALS
Criteria for Assessment

Rating Scale:
10 = Outstanding
8 = Significant strengths in above areas
6 = Many strengths listed above
4 = Adequate use of course content material and online research
2 = Not adequate in the above categories

BDM Step 2 Determine Acceptable Evidence

Satisfaction of Lesson Goals

1. Rate how well the text-based materials are linked to specific learning objective(s).

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

2. Determine whether the text-based materials were appropriate to ensure the lesson objectives targeting the adult learner were met.

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step 3 Plan Learning Experiences and Instruction

Construct of the Instruction

3. Title of the lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

4. Demographic information (e.g., name, date, teacher's name, etc.)

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

5. Quantity/Quality of the textual content for the lesson for the adult learner

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

6. Richness of activities and exercises for the adult learner

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step 4 Create Resources to Engage the Learner

Structure of the Text-Based Materials

7. Page numbers, if appropriate

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

8. Bullets, numbering, and indents.

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

9. Grammar and spelling checker

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

10. Appropriate multimedia for lesson content (e.g., clip art, images, text)

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

11. Use of textual content harvested from the Internet

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step5 Revise and Refine the Lesson

12. Student performance increased using the text-based materials provided

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

13. Text-based materials were well suited to address the learning objectives identified for the lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

14. Text-based materials were appropriate for the adult learner

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

15. Text-based materials must be revised before the next presentation of this lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

Figure 8. Rating scale for assessing visual-based materials

RATING SCALE FOR ASSESSING VISUAL-BASED MATERIALS
Criteria for Assessment

Rating Scale:
10 = Outstanding
8 = Significant strengths in above areas
6 = Many strengths listed above
4 = Adequate use of course content material and online research
2 = Not adequate in the above categories

BDM Step 2 Determine Acceptable Evidence

Satisfaction of Lesson Goals

1. Rate how well the visual-based materials are linked to specific learning objective(s).

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

2. Gauge whether number of slides used for the presentation was appropriate to ensure the lesson objectives targeting the adult learner were met.

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

3. Assess whether the slides were well designed and adult-appropriate for the target student population.

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step 3 Plan Learning Experiences and Instruction

Construct of the Instruction

4. Lesson introduction: Slides 1 and 2

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

5. Delivery of learning objectives: Slide 3

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

6. Lesson content: Slides 4 through 9

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

7. Student assessment: Slides 10 and 11

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

8. Richness of activities and exercises for adult learning

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step 4 Create Resources to Engage the Learner

Structure of the Visual-Based Materials

9. Sound design concepts for preparing visual materials (e.g., Use of colors, backgrounds, images, etc.)

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

10. Appropriate multimedia for adult lesson content (e.g., clip art, images, text)

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

11. Use of multimedia content harvested from the Internet

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

12. Use of hyperlink content harvested from the Internet

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

13. Application of new design template/backgrounds

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step5 Revise and Refine the Lesson

14. Student performance increased using the visual-based materials provided

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

15. Visual-based materials were well suited to address the learning objectives identified for the lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

16.Visual -based materials were appropriate for the adult learner

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

17. Visual-based materials must be revised before the next presentation of this lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

Figure 9. Rating scale for assessing web-based materials

RATING SCALE FOR ASSESSING WEB-BASED MATERIALS

Criteria for Assessment

Rating Scale:

10 = Outstanding

8 = Significant strengths in above areas

6 = Many strengths listed above

4 = Adequate use of course content material and online research

2 = Not adequate in the above categories

BDM Step 2 Determine Acceptable Evidence

Satisfaction of Lesson Goals

1. Rate how well the web-based materials are linked to specific learning objective(s).

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

2. Gauge whether length of the web page was appropriate to ensure the lesson objectives were met.

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

3. Assess whether the web page was well designed and adult-appropriate for the target student population.

NA 1 2 3 4 5 6 7 8 9 10 Score: ________

BDM Step 3 Plan Learning Experiences and Instruction

Construct of the Instruction

4. Introduction and student instructions

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

5. Statement of learning objectives

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

6. Web sites for adult learner exploration

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

7. Adult learner assessment

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

BDM Step5 Revise and Refine the Lesson

14. Student performance increased using the web-based materials provided

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

15. Web-based materials were well suited to address the learning objectives identified for the lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

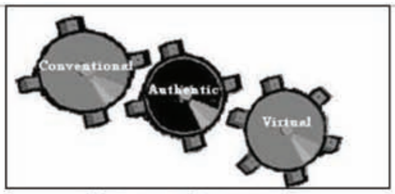
16.Web -based materials were appropriate for the adult learner

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

17. Web-based materials must be revised before the next presentation of this lesson

NA	1	2	3	4	5	6	7	8	9	10	Score: ________

Figure 10. Distance learner lesson plan template (cumulative)



Focus on Outcomes

Identify **characteristics of good assessment** for the adult learner included in the lesson:

- [x] Valid. Does it measure what it is intended to measure?
- [x] Reliability. Can the assessment results be replicated?
- [x] Acknowledges the experience, knowledge, values, beliefs, and opinions of the adult learner
- [x] Includes a wide range of assessment tools that concedes the diverse learning styles of the adult student
- [x] Includes participatory assessment techniques such as case studies, portfolios, and problem-solving groups to increase the opportunities to evidence understanding
- [x] Includes educational objectives that match instruction but allows for variances in learning styles among students
- [x] Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

Portfolio for collecting artifacts that include:

- [x] Content area materials
- [ ] Classroom resources
- [ ] Library resources
- [x] World wide web sites

Portfolio for working artifacts that include:

- [ ] Making connections
- [ ] Learning projects
- [ ] Applications and lessons
- [x] Reflections and self-assessment

Portfolio for showcase artifacts that include:

- [x] Teaching materials
- [ ] Professional documents
- [ ] Service
- [ ] Scholarship

Identify the **assessment tools for technology-based resources** included in this lesson:

- [x] Rating scales for assessing text-based materials
- [x] Rating scales for assessing visual-based materials
- [x] Rating scales for assessing web-based materials

learning outcomes when artifacts are assembled in collecting folders, working folders, and showcase folders. Teachers of adults are encouraged to use Figures 2, 3, and 4 to assess adult portfolios.

Finally, the rating scale is an appropriate assessment instrument for designing adult instruction using steps two and five of the Backward Design Model, examining acceptable evidence of learning, and refining and revising text, visual, and web-based materials.

SUMMARY

Adult learners must learn how to identify and evaluate their own abilities realistically. Assessment strategies for adults are most effective when traditional authority roles are de-emphasized, and the focus for evaluating performance is shifted to the learner (Kopp 1987). Adults should be involved not only in determining what they learn but also in identifying and establishing their own evaluation techniques. Authentic assessment involves adults in evaluating their own learning activities and helps them become more independent and self-directed in their learning endeavors.

Designing learning opportunities for adults begins with the premise that adult learners want to learn. They are goal-oriented, and eager to apply their learning with skills and knowledge applicable to their current situation. There is a high degree of interaction among adult learners and between learners and their instructors.

An assessment strategy for the adult learner, as with the traditional learner, must be established from the design phase of the lesson. In the case of the Backward Design Model, the strategy for assessment begins with step one that identifies expected learning outcomes and what the adult learner is expected to understand, know, and do at the conclusion of the lesson. Using the "poster child" for authentic assessment: the portfolio, as well as the rating scale for evaluating learning resources the adult learner, the teacher of adults has a unique occasion to use the assessment process not only to measure movement toward established learning objectives, but also to provide adult learners with a tool for self-evaluation that will hold them in good stead throughout their pursuit of lifelong learning.

CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on Outcome** portion of the template (Figure 10) demonstrates how to complete a distance learner-oriented lesson on the Planets of the Solar System.

REFERENCES

Churchill, G. A. Jr, & Peter, J. P. (1984). Research Design Effects on the Reliability of Rating Scales: A Meta Analysis. *JMR, Journal of Marketing Research*, *21*(4), 360–375. doi:10.2307/3151463

Forlizzi, L. A., Kuhne, G. W., & Kassab, C. (2002). Researching assessment practices in ABLE programs: Research report. In C. Shefrin & L. Forlizzi, *Researching assessment practices in ABLE programs: Final report*.

Jacoby, J., & Matell, M. S. (1971). Three-Point Likert Scales are Good Enough. *JMR, Journal of Marketing Research*, *8*(4), 495–500. doi:10.2307/3150242

Kopp, K. (n.d.). Evaluate the Performance of Adults. *Module N-6 of Category N*. (ERIC Document Reproduction Service No. ED 289 969).

Stiggins, R. J. (2002). Assessment crisis: The absence of assessment FOR learning. *Phi Delta Kappan*, *83*(10), 758–765.

Wiggins, G., & McTighe, J. (2006). *Understanding by Design*, (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Chapter 15
Methodologies for Assessing the Distance Learner

Learning Objectives. Traditional evaluations methodologies are not always sufficient to properly assess effective online instruction. There is a need for student evaluations specifically designed to provide online instructors with feedback about the effectiveness of their technology-based teaching practices. As more instructors move their courses into the online environment, the one consistent question remains, “How do I know that my distance students are learning?”

Techniques to assess learner mastery of content material are as diverse as the various formats of distance courses. The traditional assessment strategies (e.g., multiple choice, true/false, essays, etc.) continue to remain an option in a virtual learning environment. They are easily administered through the various learning management systems (LMS) and nearly every LMS has a test module that supports online examinations. Once created, these objective tests can incorporate multimedia (i.e., video, audio) for a more visual assessment. Other assessment strategies commonly used in the traditional classroom can also be easily converted to the online environment such as online discussions (i.e., chat rooms and discussion boards) and submission of written papers, essays, or reports (via drop boxes). Additionally, more advanced distance educators are able to include simulations, activities, group projects, virtual case studies, collaborative presentations or reports, and role-playing. The possibilities for assessing distance learning are limited only by the imagination (and sometimes by the wallet).

DOI: 10.4018/978-1-60566-824-6.ch015

Distance learners often overlap with adult learners since they often prefer to be involved in their own assessment using strategies that emulate real-world situations or are clearly relevant to their personal situation. So, in effect as well as in practice, the combination of techniques discussed in previous chapters will be considered here as well to expand our understanding of assessment techniques for the distance learner. This chapter will introduce many of these advanced assessment strategies. And, as a result, readers should become familiar with:

- The fundamentals of virtual assessment for the distance learner.
- Technology tools for assessing the distance learner.
- The fundamentals of the virtual learning outcome form with respect to text-based, visual-based, and web-based materials.

Lesson Plan Template. Refer to **Appendix C, Distance Learner Lesson Plan Template** as the chapter discusses **Focus on Outcomes** as depicted in Figure 1.

INTRODUCTION

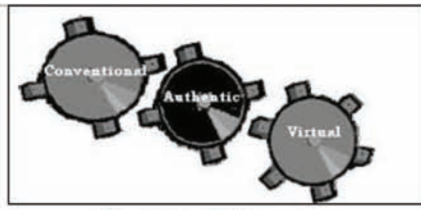
More than 73 percent of adults in the United States and 79 percent of college students reported that Internet use has had a positive impact on their learning experience (Pew Internet and American Life Project 2002 and 2006). As a direct result, more universities are turning to distance-based instruction in response to the changing demands and expanding needs of their students for variety in instructional delivery. In addition to offering online courses, higher education is faced with students who also expect to use the Internet to participate in other kinds of learning opportunities (e.g., service learning, coop and internship experiences, and leadership). Online technologies also contribute to face-to-face desktop video collaborations, provide stock market (class-related and otherwise) updates, offer a forum for purchasing goods and services online (e.g., books, airline tickets, etc.), supply current weather information, sort through available health information, and conduct online research.

As a result of such rising expectations on the part of students and teachers, distance learning has matured rapidly (some say exponentially) from its experimental beginnings to a brand of instructional teaching strategy in its own right. Nearly all colleges and universities offer some form of distance or distributed learning and those who are yet unable have joined consortia of online providers who offer available seats in their courses to partner institutions whose students need the flexible and increased range of options to pursue their academic dreams (OCICU, 2008).

Today's college students have literally grown up expecting everything to be available online and, indeed, the number and quality of online options has grown. Many institutions are developing fully online programs designed to meet student demand and, simultaneously, strategic goals and social responsibilities (e.g., consider the impact of gasoline prices on online enrollment). The debate whether online education is as good as face-to-face instruction has long since been answered by educators and researchers. The focus now is on how to better prepare and support students and faculty in the online environment and how to measure learning outcomes when instructing or learning at a distance.

Distance learning combines many of the characteristics of good assessment found in both traditional and adult learning as mentioned in the previous two chapters. For example, validity and reliability are stable attributes regardless of the instructional modality. Good assessment always has a clear purpose,

Figure 1. Distance lesson plan template (focus on outcomes)



Focus on Outcomes

Identify **characteristics of good assessment** for the distance learner included in the lesson:

- ☐ Valid. Does it measure what it is intended to measure?
- ☐ Reliability. Can the assessment results be replicated?
- ☐ Uses collaborative tools to enhance assessment
- ☐ Incorporates strategies that accommodate special circumstances of the distance learner
- ☐ Organizes learning activities around demonstrable outcomes
- ☐ Targets one of the specific psychologies of education
- ☐ Includes formative assessment using a variety of distance education tools
- ☐ Follows strict accordance with generally accepted ethical standards

Identify the **virtual outcomes assessment tools** employed in this lesson:

- ☐ Evaluation of online examinations
- ☐ Evaluation of e-portfolios
- ☐ Evaluation of online survey instruments
- ☐ Evaluation of computer-mediated communications technologies
- ☐ Evaluation of conferencing technologies
- ☐ Evaluation of simulations and games technologies

Identify the **virtual learning outcome assessment tools for technology-based resources** included in this lesson:

- ☐ Virtual learning outcome assessment tools for assessing text-based materials
- ☐ Virtual learning outcome assessment tools for assessing visual-based materials
- ☐ Virtual learning outcome assessment tools for assessing web-based materials

begins early in the instructional design process, and is conducted according to generally accepted standards – again, regardless of the target learner group. Too, participatory assessment techniques are valuable considerations at both the adult and distance learner level.

Additionally, distance learning can combine many of the assessment instruments discussed previously. Traditional rubrics and checklists are compatible with distance learning as are adult-oriented portfolios and rating scales.

New to the bag of assessment tools to be considered for distance learning are some fresh online tools that can turn the traditional or adult course into a virtual learning environment. Assessment of online learning involves continuing interaction between teacher-student and student-student(s) and is ideally part of the learning process. Some of the most popular virtual assessment tools for collaboration include asynchronous discussion groups, bulletin boards, and email and synchronous chat rooms and webinars– any of which can be effective means for judging a distance learner's knowledge and comprehension of course content.

The hyper book, discussed in Chapter Seven, is a virtual tool for measuring the distance learner's ability to demonstrate knowledge and comprehension of the instructional materials presented in a course or lesson. Instructional content can be gathered from a variety of online sources and compiled into a text-based resource that the distance teacher can use to track student progress.

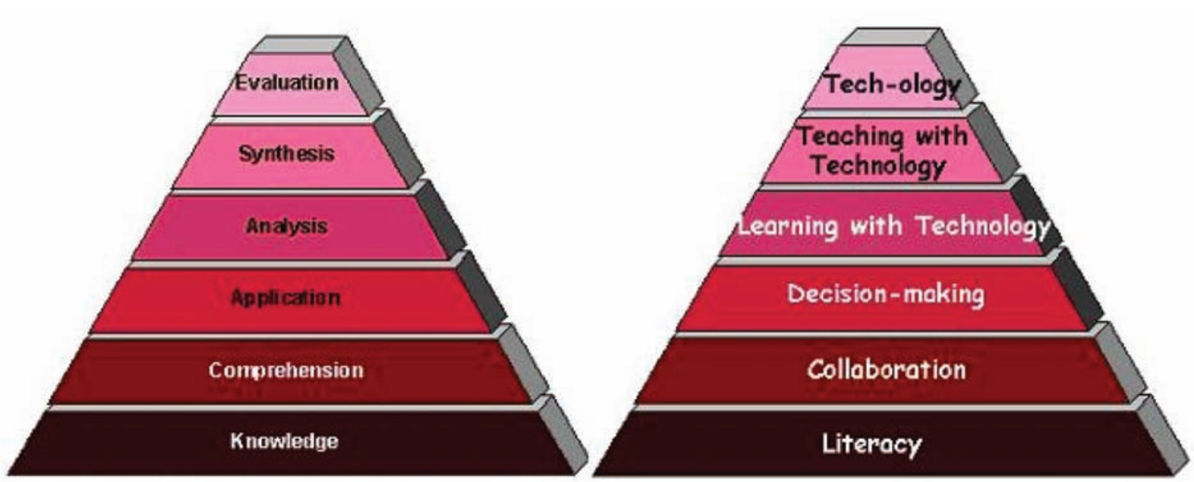
The interactive lesson, offered in Chapter Eight, expands traditional instruction with action button, hide slides, and the kiosk mode for visual-based application and analysis.

Virtual tours, originally discussed in Chapter Nine, provide the vehicle for synthesizing instructional content and exploring how to use this newly acquired knowledge to evaluate the world.

If this all begins to sound familiar, it is because the ***Engine for Designing Online Education*** is built, first and foremost, on the guiding principles of educational psychology considered in previous chapters. In particular, the taxonomies of Benjamin Bloom and Tomei are once again depicted in Figure 2 (Bloom, 1956; Tomei, 2001).

With this introduction, the discussion now turns to some specific characteristics of good assessment for the distance learner.

Figure 2. Levels of Bloom's and Tomei's taxonomy



CHARACTERISTICS OF GOOD ASSESSMENT FOR THE DISTANCE LEARNER

The infusion of new technologies into the classroom has resulted in more fluid assessments in distance education when compared to the traditional or even the adult learning environment. Still, research and practice continues to establish that the focus on learner achievement with respect to established and articulated instructional goals and objectives remain the single most important focus for assessing the online environment. Technologies may be integrated to assist in the assessment process, but cannot be relied upon to obviate a weak, ineffective, or poorly designed assessment program.

In general, assessment principles in an online environment are not markedly different than traditional or adult learning. Yet, distance education often hinges on more efficient assessment in the mind of instructors who may initially be concerned with ensuring that the student on the other "end" of their online learning is indeed the student who signed up for the course.

To better foster this assurance for instructor and learner alike, online assessment should be based on experiences that help build mental schemata designed to serve the distance learner not only in the pursuit of current learning outcomes, but in future learning experiences as well. Distance learners should be made aware that representations of reality are reflected in the assessment stratagem offered in the course. All assessment activities related to knowledge, abilities and skills should be relevant and significant to the learner.

The use of collaborative assessment tools mentioned earlier are necessary characteristics of good assessment for the online learner. Assessment activities should integrate some type of social interaction. Distance education programs organize learning activities around demonstrable outcomes (often expressed in learning objectives), assist the learner to achieve these outcomes, and assess learner progress by reference to these outcomes.

Distance learners should be given ample opportunities to provide feedback regarding the learning outcomes as well as the viability of the assessment tools used in the distance education program.

Assessment strategies should enable learners to assess their progress as the course progresses and to identify areas of weakness and strength. Assessment strategies should accommodate any special needs, learning styles, and situations unique to distance learner. For example, window of opportunity for taking the online assessment may vary by time zone if students participate in various parts of the country or the world.

The target of the assessment should follow one of the specific psychologies of education (i.e., behavioral skill development, cognitive acquisition of knowledge, or humanistic values and attitudes?) Competency-based behaviors represent performance-based capabilities needed to demonstrate knowledge, skill, and ability acquisition. Competency-based behavioral assessments require more time and effort to develop. However, for distance education, they provide more accurate judgments of successful learning outcomes. A recent development in the area of cognitive assessment in distance education is the use of adaptive assessments. As opposed to traditional assessments, which have a set number of questions, adaptive assessment begins at a basic cognitive level and increases in difficulty (Morley, 2000).

Finally, unlike traditional, face-to-face assessment in which formative evaluations (providing feedback during learning) can be effected by the interpersonal contact between the student and the instructor, special care must be taken to evaluate on-going learning in a distance education environment. Formative assessment for distance learning includes such practices as dialog, self and peer assessment, instructor feedback, reflection and involves such technologies as virtual learning collaboration tools, online tutorials, games and simulations, videoconferencing, and electronic portfolios.

Figure 3. Characteristics of good assessment for the distance learner

Characteristics of Good Assessment for the Distance Learner

Good assessment:

- Is valid. Does it measure what it is intended to measure?
- Is reliability. Can the assessment results be replicated?
- Is based on experiences and real world situations.
- Uses collaborative tools (chat rooms, discussion boards, email, etc.) to enhance assessment
- Incorporates strategies that accommodate special circumstances of the distance learner (e.g., time, location, and access issues)
- Organizes learning activities around demonstrable outcomes
- Targets one of the specific psychologies of education (i.e., behaviorism, cognitivism, or humanism)
- Includes formative assessment using a variety of distance education tools
- Has the unequivocal commitment of all levels of administration
- Has educational objectives that match instruction but allows for variances in learning styles among students.
- Is accomplished in strict accordance with generally accepted ethical standards

In summary, below in Figure 3 illustrates the most important characteristics of good assessment for the distance learner. Any assessment program must consider each of these characteristics when designing instruction targeting the distance learner.

FUNDAMENTALS OF ASSESSING THE DISTANCE LEARNER

A host of tools are available for assessing the distance learner. By examining certain fundamentals for assessing the distance learner, the appropriateness of these tools becomes more readily apparent. As Brown, Bull, and Pendlebury (1997) depict (see Figure 4), there exists a notable shift in the paradigm for assessing distance education.

The use of various instructional technologies supports the swing from hard-copy to online exams, didactic to distance-based delivery, instructor-led to learner-initiated evaluations, implicit course goals to unequivocal learning objectives, competition to collaboration, and textbook-based content to a usable inventory of skills and competencies. Each technology will be examined in more detail.

Online Examinations. Considerable reservations have been cited by faculty concerning accountability for distance students with regards to learning outcomes, credit transfer, illegitimate file sharing, plagiarism, and other technology-impacted transgressions of academic integrity. Towards addressing these issues, two important pieces of legislation have extended the provisions of the original 1965 Higher Education Act that require "an institution that offers distance education to have processes through which the institution establishes that the student who registers in a distance education course or program is the same student who participates in and completes the program and receives the academic credit."

Figure 4. Shifting the paradigm in assessment

From…..	Towards…..	Technologies Employed
Written examinations	Online exams	Online exams
Instructor-led	Learner-initiated	Electronic portfolios
Implicit goals	Explicit objectives	Online survey Instruments
Competition	Collaboration	Computer Mediated Communication technologies
Theoretical Objectives	Real-world Outcomes	Conferencing
Content	Competences	Games and Simulations

From a matter-of-fact standpoint, it is simply easier to cheat online when the instructor and the student are physically separated in both time and location. Temptation arises because students are often more relaxed in front of their computers than they are with their instructors. Distance learning programs often lack tradition. They are often taken by people with pressures from other jobs. And, many new programs have not established policies and procedures to address these issues (Bell and Whaley, 1991).

While concern for cheating remains, using online exams for assessing the distance learner offers a number of potential benefits. To guard against cheating on online examinations, consider the following:

Procedural Protections

- Disseminate a clear policy regarding cheating on a test. What happens if a student violates this policy? How will penalties be enforced?
- Establish firm time limits for the exam. When will the exam be available and when will it close? How much time can be spent on each question/ item? Within how many minutes must the exam be completed?
- Require the students to attest/ affirm that the exam was take without the aid of additional materials, reference to text books or notes, or contact with any other individual (peer students, co-workers, etc.). Have the student sign such a statement or affix their electronic signature to the online exam as the final question.
- Remain available to students throughout the available testing period should they encounter technical problems with the online format. Be available to reset the exam.
- Use a question pool that allows the online quiz tool to recreate individualized examinations of randomly selected questions for each student.

Design Protections

- Prepare the online examination as though it were a hard-copy, text-based version of an open-book test. Doing so will strengthen the questions by avoiding direct quotes from the book and asking for comprehension, application, analysis, and synthesis responses from the learner.

- Write effective objective questions that avoid unnecessary and irrelevant material. Use clear, straightforward language in the stem of the item. Avoid clues to the correct answer. Ensure that there is only one correct response. Use only plausible and attractive alternatives as distractors. If possible, avoid the choices “All of the above” and “None of the above”.
- Consider incorporating a number of smaller tests instead of one or two large ones. Using multiple exams will allow the student to perform poorly on one instrument and not abandon hope for a good grade by the end of the course.
- Revise the exams every turn. Exams should be prepared sometime after the content is presented to the student and before the examination date. In that way, the instructor is assured of testing for material that was presented in the course and not left over from previous course offerings.

There are two assessment options in most online examinations. The survey option creates assessments that record answers anonymously and is most effective for opinion polls or course evaluations. Survey results are typically not graded and usually anonymous. The more common form of online assessment is the examination option. Point values are assigned to each question and students answer items taking a variety of forms including multiple choice, true false, fill in the blank, multiple answer, ordering, matching, and short answer/essay. Upon completion of the online test period, grades are scored, results returned to the student, and grades automatically recorded in an electronic grade book. Figure 5 offers an online examination virtual outcomes evaluation tool for consideration.

Electronic Portfolios (ePortfolios). Reflective practice is integral to good learning. Such is especially true of distance education where the responsibility for learning is placed equally with the instructor and the learner. The purpose of the electronic portfolio is to capture, reflect, and summarize experiences and key learning outcomes. Electronic portfolios are hosted on web sites, weblogs, desktop, and laptop computers.

The electronic portfolio can be both a showcase of student work and a repository for evidence of learning as a thinking journal. Student portfolios are not only appropriate for assessment at the end of the course, they are also an excellent tool for measuring formative knowledge throughout the instruction. Many parts of a student’s assignment are valid artifacts for the portfolio, linked to other websites, files, and documents. The portfolio consists of both of collection finished tasks and of works in progress.

To be successful, portfolio goals must be clearly stated and inextricably aligned with stated learning objectives and criteria for what to include in the portfolio and how these items are to demonstrate learning. Posts to an online portfolio include:

- Artifacts logged from a variety of different sources of academic content encountered during the period. Any links, documents, photos, etc. that served to enhance learning from the student’s perspective are appropriate.
- Immediate reflections often follow on the heels of a presentation or digital lecture. Reflections are intended to be brief in an attempt to capture the sentiment and contemplations of the moment.
- Reflections on classmates’ entries serve as a virtual forum for interpersonal collaboration among learners in a class. Engagements continue the reflective process by engaging others’ thoughts and ideas.
- Summative outcomes after completing a lesson or lesson objective. Online learners should be encouraged to post entries to their online portfolios that summarize key learning outcomes taken

Figure 5. Online examination virtual outcomes evaluation tool

Assessment Implications	Accomplished	Capable	Marginal	Deficient
Design Factors				
1. Does the online examination environment permit the designer to assign different quizzes to different classes/ sections?	☐ Unlimited multiple quizzes permitted	☐ Multiple quizzes permitted	☐ Multiple quizzes permitted but restricted	☐ Not a feature
2. Following the examination period, does the online system present the results of the assessment to the instructor and students immediately?	☐ Results rec'd immediately email available	☐ Results delayed but acceptable	☐ Results delayed	☐ Results prepared off-line delay unacceptable
3. Can the assessment results be exported? Can the quiz results be emailed to the instructor?	☐ Results can be exported and emailed	☐ Results can be exported/ emailed, but difficult	☐ Exporting very difficult	☐ Not a feature
4. Does the online examination environment permit the inclusion of images, sounds, and video clips are part of the quiz stem or alternatives?	☐ Multimedia inclusion is unlimited	☐ Limited multimedia integration	☐ Integration difficult	☐ Not a feature
5. Does the online examination environment permit multiple answer items that permit more than one acceptable answer?	☐ Unlimited multiple items permitted	☐ Multiple items permitted	☐ Multiple items permitted but restricted	☐ Not a feature
6. Does the online examination environment permit matching questions where a content area and a list of names or statements must be correctly matched against another list of names or statement?	☐ Environment permits unlimited matching questions	☐ Environment permits matching questions	☐ Environment permits matching questions w/ restrictions	☐ Not a feature
7. Does the online examination environment permit multiple-choice questions where the instructor asks a question and students indicate the correct answer by selecting a radio button. There should be no limit to the number of alternative answers?	☐ Environment permits unlimited multiple-choice questions	☐ Environment permits multiple-choice questions	☐ Environment permits multiple-choice questions w/ restrictions	☐ Not a feature
8. Does the online examination environment permit opinion scale/Likert scale items that measure attitudes using a scale ranging from	☐ Environment permits unlimited opinion scale/Likert questions	☐ Environment permits opinion scale/Likert questions	☐ Environment permits opinion scale/Likert questions w/ restrictions	☐ Not a feature
9. Does the online examination environment permit ordering questions to designate a hierarchy for lists or to indicate the correct order of items such as chronological order, priorities, or correct procedures?	☐ Environment permits unlimited ordering questions	☐ Environment permits ordering questions	☐ Environment permits ordering questions w/ restrictions	☐ Not a feature
10. Does the online examination environment permit essay questions with expanded responses that can be graded by the instructor off-line?	☐ Environment permits unlimited essay questions	☐ Environment permits essay questions	☐ Environment permits essay questions w/ restrictions	☐ Not a feature
11. Does the online examination environment permit short answer or fill in the blank questions, where a student can type a word or series of words into a text field?	☐ Environment permits unlimited short answer questions	☐ Environment permits short answer questions	☐ Environment permits short answer questions w/ restrictions	☐ Not a feature
Development Factors				
12. Does the online examination environment permit randomization of multiple-choice questions and answers to effectively create multiple exams and decrease test compromise?	☐ Environment permits unlimited randomization	☐ Environment permits randomization	☐ Environment permits randomization	☐ Not a feature
13. Does the online examination environment keep quizzes private?	☐ Environment security is advanced and thorough	☐ Environment security is adequate	☐ Environment security has weaknesses	☐ Environment security is seriously deficient
14. Does the online examination environment permit instructors to copy and use other members shared quizzes?	☐ Environment permits secure shared quizzes	☐ Environment permits shared quizzes	☐ Environment permits shared quizzes w/ restrictions	☐ Environment sharing is seriously deficient
15. Does the online examination environment permit external links directly to websites from the quiz to support enhanced question development?	☐ Environment permits unlimited essay questions	☐ Environment permits essay questions	☐ Environment permits essay questions w/ restrictions	☐ Not a feature

continued on the following page

Figure 5. continued

16. Does the online examination environment permit feedback for correct and incorrect answers?	☐ Environment permits unlimited feedback	☐ Environment permits feedback	☐ Environment permits feedback w/ restrictions	☐ Not a feature
17. Does the online examination environment permit the instructor to add instructions that tell the students exactly what to do on the test?	☐ Environment permits unlimited instructions	☐ Environment permits instructions	☐ Environment permits instructions w/ restrictions	☐ Not a feature
Implementation Factors				
18. If the online connection is lost in the middle of an exam, does the online examination environment save the examination, close the browser window, attempt to re-establish the connection, or lose the work already attempted?	☐ Environment is very user-friendly and saves attempts without loss of data	☐ Environment is user-friendly, data loss intermittent	☐ Environment is user-friendly, data loss occurs habitually	☐ Environment is absolutely unacceptable with respect to lost connections
19. Does the online examination environment limit the examination time. If so, does a warning pop-up message display periodically?	☐ Environment limits time and provides ample warning	☐ Environment limits time but does not warn the student	☐ Environment does not limit time	☐ Environment neither limits time nor warns the student
20. If the time limit is exceeded, is the submission accepted or rejected (at the instructor's discretion) and is the time overage recorded?	☐ Submissions accepted or rejected and overtime recorded	☐ Submissions accepted, overtime recorded	☐ Submissions rejected, warning sent to instructor	☐ Submissions rejected without options
21. Saving and Submitting are two separate processes. Does the online examination environment automatically submit the finished attempt even if the student neglects to click Submit when finished or run out of time?	☐ Environment permits saving/ submission, auto-submit when time exceeded	☐ Environment permits saving/ submission, auto-submits when time exceeded	☐ Environment permits saving/ submission, no auto-submit when time exceeded	☐ Environment loses submission when time exceeded
Evaluation Factors				
22. Does the grade book post all student grades associated immediately or upon termination of the examination period (at the discretion of the instructor)?	☐ Gradebook posts scores instantly or at end of exam period	☐ Gradebook posts at end of exam period	☐ Gradebook scores are posted manually	☐ Gradebook is not a feature
23. Does the online examination environment permit user-selected grade book views to include report by student, report by item, spreadsheet view, and export spreadsheet?	☐ Gradebook views are highly sophisticated and provide numerous options	☐ Gradebook views provide numerous options for the most important analyses	☐ Gradebook views are satisfactory for analyzing results of most exam formats	☐ Gradebook views provide only vendor-supplied options
Distance Learner Factors				
24. Does the online examination increase student performance in the course?	☐ Performance increased noticeably	☐ Performance increased	☐ No increase noted	☐ Performance decreased
25. Did the online examination address the learning objectives identified for the lesson?	☐ All	☐ Most	☐ Few	☐ None
26. Was the online examination appropriate for the distance learner?	☐ Recognized by students as appropriate	☐ Acknowledged by students as important	☐ Students missed the importance	☐ Students found the exam of no value
27. Must the online examination materials be revised before the next delivery of the course?	☐ No changes needed	☐ Minor changes only	☐ Significant changes	☐ Current format must be scrapped

from the lesson. This entry should be more complete incorporating previous posts and introducing new ideas.

Examine the evaluation tool for assessing the ePortfolio found in Figure 6.

Online Survey Instruments. Students, particularly distance learners, are often more willing to answer the questions on a survey or questionnaire than to give an opinion that they feel might require a face-to-face encounter. Similarly, a survey or questionnaire has many advantages in an online environment. For example, they are very cost effective when compared to face-to-face assessment, especially when the evaluations involve large sample sizes or extended geographic areas. Questionnaires become even more cost effective as the number of assessment items increases.

Figure 6. ePortfolio virtual outcomes evaluation tool

Assessment Implications	Accomplished	Capable	Marginal	Deficient
1. Selection of Artifacts Criteria: Artifacts and work samples are clearly and directly related to the purpose of the e-portfolio.	☐ All	☐ Most	☐ Few	☐ None
2. Reflections Criteria: Artifacts in the e-portfolio demonstrate achievement of each standard or learning objective.	☐ All	☐ Most	☐ Few	☐ None
3. Use of Multimedia Criteria: Images, sounds and videos are appropriate examples of one or more standards.	☐ All	☐ Most	☐ Few	☐ None
4. Use of Multimedia Criteria: Size of images, sounds, movies, or other files is appropriate to the value of the content.	☐ File size appropriate	☐ Files too large but suitable	☐ File size acceptable	☐ Files too large
5. Creativity Criteria: Creativity and original ideas enhance the content of the e-portfolio	☐ Innovative	☐ Suitable	☐ Weak	☐ No creativity
6. Layout and Text Elements Criteria: Appropriate use of fonts, point size, bullets, italics, bold, and indentations for headings and sub-headings.	☐ Easy to read	☐ Generally easy to read	☐ Often difficult to read	☐ Difficult to read
7. Annotations Criteria: Artifacts cite the importance of that particular work	☐ Each artifact is cited	☐ Most of the artifacts are cited	☐ Some of the artifacts are cited	☐ None of the artifacts are cited
8. Writing Mechanics Criteria: Grammar, capitalization, punctuation, and spelling	☐ The text has no errors	☐ The text has a few errors.	☐ The text has 4 or more errors	☐ The text has many errors
Distance Learner Factors				
9. Does the ePortfolio increase student performance in the course?	☐ Performance increased noticeably	☐ Performance increased	☐ No increase noted	☐ Performance decreased
10. Did the ePortfolio address the learning objectives identified for the lesson?	☐ All	☐ Most	☐ Few	☐ None
11. Was the ePortfolio appropriate for the distance learner?	☐ Recognized by students as appropriate	☐ Acknowledged by students as important	☐ Students missed the importance	☐ Students found the ePortfolio of no value
12. Must the ePortfolio be revised before the next delivery of the course?	☐ No changes needed	☐ Minor changes only	☐ Significant changes	☐ Current format must be scrapped

Surveys and questionnaires are relatively easy to analyze. Actually, many online survey instruments come with built-in analytical packages. Data entry and tabulation for nearly all surveys on the market are easily done, often with only the click of a button. Surveys and questionnaires are understood by most people; certainly, by most online learners. Nearly everyone has had some experience completing these instruments and they cause little anxiety with respect to the anonymity or applications of such tools.

Well-designed surveys and questionnaires reduce bias. A uniform question presentation removes the misinterpretation problems associated with a proctor or administrator. Opinions of the researcher are lessened and respondents are less influenced by the delivery of the question. There are fewer verbal or visual clues to influence the results.

Surveys and questionnaires are less intrusive than other assessment tools. When distance learners are requested to complete the instrument, for example at the conclusion of a course, they are typically free to finish the task within their own time-tables.

Finally, surveys and questionnaires are excellent tools for assessing distance courses at the learning objective level. The structure of many online survey instruments provide a range of statistical results including, but not limited to, the following:

- Write questions that are simple and to the point. Make your questions easy to understand by using simple language. Remember that the intent is to write a question to which the learner can respond with meaningful information.
- Use words with precise meanings. Avoid phrases that are left open to interpretation by the student.
- Limit the number of ranking options. The usual Likert scale calls a range of five possible responses. Ranking items in order of preference or importance should not exceed six items. Optional feedback is always a good idea, allowing the respondent to provide anecdotal qualitative information in addition to the quantitative items.
- Avoid multiple questions. Asking questions with multiple alternatives dilutes the validity of the survey and the significance of the responses. Never ask the respondent to give one answer for two different questions.
- Offer an alternative for questions that may not apply. Some respondents refuse to answer certain items. Providing an option to select "Does Not Apply" or "Don't Know" is an important alternative.
- Avoid too few or too many options. Again, the typical Likert scale of five possible responses is a suitable guide for any survey instrument.

Particularly for distance learning, surveys should be pressed into service to evaluate the use of technology; effectiveness of online lectures, discussion, and class interactions; the online environment and its conduciveness to student learning; quantity and quality of student-student and student-instructor interactions; course content, assignments, and other assessments tools used; support services (including technical support); and, instructor effectiveness both in terms of the academic content presented and as an online facilitator.

A methodology for assessing the online survey instrument is provided in the virtual outcomes evaluation tool shown in Figure 7.

Computer mediated communication (CMC) technology is "any form of communication between two or more individual people who interact and/or influence each other via separate computers through the Internet or a network connection - using social software. CMC does not include the methods by which two computers communicate, but rather how people communicate via computers." (Wikipedia, 2006). There are at least three major categories of CMC to consider with respect to assessing the distance learner.

Distance education in general and assessment of distance learning in particular utilize a range of computer mediated communication tools for evaluating learning outcomes when teaching online. For example, <u>one-way broadcasts</u> using analog TV signal or compressed digital video would give students the opportunity to prepare a presentation for the instructor that visually demonstrates mastery of the academic content under consideration. The shortfall here is, of course, that one-way communications does not allow the instructor to provide immediate feedback.

Figure 7. Online survey instrument virtual outcomes evaluation tool

Assessment Implications	Accomplished	Capable	Marginal	Deficient
Design Factors				
1. Is the length of the questionnaire appropriate for the purpose of the survey and the target audience?	☐ Length right for purpose and audience	☐ Purpose known, audience unfamiliar	☐ Purpose and audience unfamiliar	☐ Length detracts from results
2. Is the layout of questions and answers logical and self-evident to the respondent?	☐ Questions and answers produced outstanding results	☐ Questions and answers were logical and clear	☐ Questions and answers caused some confusion	☐ Layout of the questions detracts from results
3. Do the survey items reflect simple language appropriate for the target population?	☐ Language produced outstanding results	☐ Language appropriate for the target population	☐ Language caused some confusion	☐ Language detracts from results
4. Does the instrument contain survey/question instructions and an introductory paragraph that thoroughly explains the purpose of the survey?	☐ Instructions produced outstanding results	☐ Instructions appropriate for the survey	☐ Instructions caused some confusion	☐ Instructions detracted from results
Development Factors				
5. Do *Open-ended questions* allow respondents to write in or speak their answer freely, without having to choose a predetermined response category?	☐ Open-ended questions produced outstanding results	☐ Open-ended questions appropriate for the survey	☐ Open-ended questions caused some confusion	☐ Open-ended questions detracted from results
6. Do *Field-coded questions* extract essential information from the "open answer" and record it into predetermined categories?	☐ Field-coded questions produced outstanding results	☐ Field-coded questions appropriate for the survey	☐ Field-coded questions caused some confusion	☐ Field-coded questions detracted from results
7. Do *Closed-ended questions* provide predetermined response categories representing the most frequently used responses, leaving the decision up to the respondent as to where an answer fits?	☐ Closed-ended questions produced outstanding results	☐ Closed-ended questions appropriate for the survey	☐ Closed-ended questions caused some confusion	☐ Closed-ended questions detracted from results
8. Does the online survey instrument reflect a professional design and layout of self-completion survey forms	☐ Design and layout thoroughly professional	☐ Design and layout appropriate for the survey	☐ Design and layout caused some confusion	☐ Design and layout detracts from results
9. Is the online survey instrument logical and intuitively obvious sequencing of blocks of questions, and questions within such blocks? Survey questions should be arranged from the more general to the more specific?	☐ Instrument layout logical and intuitive, general to specific	☐ Instrument layout appropriate for the survey	☐ Instrument layout caused some confusion	☐ Instrument layout detracts from results
10. Was the instrument constructed so as to obtain demographic information first with sensitive questions appearing near the end of the survey?	☐ Instrument was properly constructed for maximum results	☐ Instrument construction appropriate for high results	☐ Instrument construction contributed to less than desirable results	☐ Instrument construction detracts from results
11. Was the instrument constructed so as to minimize writing requirements of respondent? Did the developer of the instrument keep the survey length to the minimum necessary?	☐ Length of the instrument was properly constructed for maximum results	☐ Length of the instrument construction appropriate for desirable results	☐ Length of the instrument construction contributed to less than desirable results	☐ Length of the instrument construction detracts from results
12. Did the developer set realistic limits for the active period during which the survey may be completed	☐ Time limits were properly constructed	☐ Time limit construction	☐ Time limit construction	☐ Time limit construction
13. Did the developer use open questions sparingly, since the results tend to be difficult to use for quantitative analyses, and they usually considerably increase the cost of the survey?	☐ Open-ended questions were properly constructed for maximum results	☐ Open-ended questions were appropriate for desirable results	☐ Open-ended questions contributed to less than desirable results	☐ Open-ended questions detracts from results
14. Does the online survey instrument provide clear survey and question instructions	☐ Instructions were properly constructed for maximum results	☐ Instructions were appropriate for desirable results	☐ Instructions contributed to less than desirable results	☐ Instructions detract from results
15. Was the survey instrument designed from the respondent's perspective?	☐ Survey instrument was well designed for audience	☐ Survey instrument design was appropriate for audience	☐ Survey instrument design was less than desirable for audience	☐ Survey instrument design detracts from results

continued on the following page

Figure 7. continued

16. Did the developer keep in mind respondent's likely ability to provide answers based on factors such as age, time in the course/ program, maturity, prior background, etc.?	☐ Respondent factors were considered for maximum results	☐ Respondent factors were appropriate for desirable results	☐ Respondent factors contributed to less than desirable results	☐ Respondent factors detract from results
Implementation Factors				
17. During implementation, was it obvious that the online survey instrument was tested prior to distribution of the instrument to the target respondents?	☐ Testing of the online survey contributed to maximum results	☐ Testing of the online survey was appropriate for desirable results	☐ Testing of the online survey contributed to less than desirable results	☐ Testing of the online survey was not sufficient for the desired results
18. By double-checking responses, is it clear that the instrument is producing expected results in terms of logical reactions and completed responses?	☐ Instrument contributed to maximum results	☐ Instrument was appropriate for desirable results	☐ Instrument contributed to less than desirable results	☐ Instrument was not sufficient for the desired results
19. Did the implementer of the survey compose and include a legitimizing and motivational endorsement letter explaining the survey to target respondents?	☐ Endorsement letter contributed to maximum results	☐ Endorsement letter contributed to desirable results	☐ Endorsement letter led to less than desirable results	☐ Endorsement letter detracts from desired results
Evaluation Factors				
20. Following receipt of the final submitted instruments, did the evaluator identify any loaded and leading questions that might have skewed the outcome of the survey?	☐ Leading questions were not found to skew the outcome of the survey	☐ Leading questions had minimal impact on the outcome of the survey	☐ Leading questions had a negative impact on the outcome of the survey	☐ Leading questions significantly detracted from results
21. Following receipt of the final submitted instruments, did the evaluator identify any sensitive (politically incorrect) questions that might have skewed the outcome of the survey?	☐ Sensitive questions were not found to skew the outcome of the survey	☐ Sensitive questions had minimal impact on the outcome of the survey	☐ Sensitive questions had a negative impact on the outcome of the survey	☐ Sensitive questions significantly detracted from results
22. Following receipt of the final submitted instruments, did the evaluator identify any irrelevant questions that might have skewed	☐ Irrelevant questions were not found to skew the outcome of the survey	☐ Irrelevant questions had minimal impact on the outcome of the survey	☐ Irrelevant questions had a negative impact on the outcome of the	☐ Irrelevant questions significantly detracted from
23. Following receipt of the final submitted instruments, did the evaluator identify any language problems (e.g., vague or unclear words) that might have skewed the outcome of the survey?	☐ Language was not found to skew the outcome of the survey	☐ Language had minimal impact on the outcome of the survey	☐ Language had a negative impact on the outcome of the survey	☐ Language significantly detracted from results
Distance Learner Factors				
24. Does the online survey increase student performance in the course?	☐ Performance increased noticeably	☐ Performance increased	☐ No increase noted	☐ Performance decreased
25. Did the online survey address the learning objectives identified for the lesson?	☐ All	☐ Most	☐ Few	☐ None
26. Was the online survey appropriate for the distance learner?	☐ Recognized by students as appropriate	☐ Acknowledged by students as important	☐ Students missed the importance	☐ Students found the survey of no value
27. Must the online survey be revised before the next delivery of the course?	☐ No changes needed	☐ Minor changes only	☐ Significant changes	☐ Current format must be scrapped

<u>Two-way collaboration</u> via video or Internet webcasting is a richer environment offering discourse between the instructor and the student. Video can stimulate better brainstorming, knowledge sharing and information gathering while retaining the professional delivery that some courses require to promote communications skills in their students. Video systems transcend the simple "talking heads" on a screen and add another dimension to assessing the distance learner via computer mediated communication.

The final category of computer mediated communication is data collection tools. Newsgroups and instant messaging, discussion boards, shared desktop access, shared whiteboard, and chat rooms/virtual environments each provide a valuable means for evaluating student learning outcomes. For example, a well-known form of synchronous communication, the chat room, provides an environment in which students and instructors gather at a specific time to communicate directly with one another. Instructors lecture and students respond to questions immediately. Follow-up questions can be addressed immediately and at an appropriate level of detail. Moreover, the instructor can inquire as to whether the students are clear on aspects of the course material and receive immediate feedback that may alter future presentations. Discussion boards can provide the asynchronous link to immediate feedback to ensure that all class participants feel connected to the instructor and the course.

A methodology for assessing the use of computer-mediated communications tools in a virtual environment is provided in Figure 8 (Virtual Outcomes Evaluation Tool).

Conferencing. Technology has become so ubiquitous that communication, teaching and learning, even assessment can be conducted at a distance. The potential for using audio, video, and web-based communications to assess at a distance may involve any or some combinations of the following:

- Global collaboration. For a course to be truly "online," the assessment component of the program must also be at a distance. Some overly suspicious instructors demand that, while the content of the less/course is offered online, students must be physically present to complete the final examination for the course. As a result, many online offerings are restricted to local students and institutions lose the flexibility that online programs were meant to offer in the first place.
- Supervision. Instructors should consider the possibility of using video conferencing to do their observations of students – especially those in the field. The ability to sit at a desk and observe a student intern without having to drive miles taxing time as well as expense is appealing to many. As still another alternative of conferencing is the ability to tape these sessions and submit them digitally for assessment.
- Time sampling. Conferencing equipment has the capability to take still pictures at pre-set intervals. As assessment artifacts, these snapshots can be organized into albums or digitally encapsulated into an electronic portfolio for easy viewing.
- Student-as-teacher. Conferencing equipment remains an excellent vehicle for capturing student-led instructional opportunities that are appropriate for assessment. For example, a class project report can be turned into an occasion for learning when students record their portions of the final out-briefing via conferencing hardware and combine the audio and/or video into a comprehensive presentation using software such as iMovie or MovieMaker.

Conferencing includes both synchronous and asynchronous technologies, such as email which began as a text-messaging tool and now represents the dominant form of global asynchronous communications. Voice mail, originally a simple answering machine, is now the preferred tool for distributing any audio message. Audio conferencing, an interactive, real-time audio collaboration tool among three or more participants when communications does not require visual or data sharing. Web conferencing is also an interactive, real-time application sharing information between two or more people via the Internet. Video conferencing combines real-time video, audio, and data communications; webcasting (a.k.a. streaming media) moves information across the Internet as one-to-many, non-interactive audio/video in near real-time. Finally, instant messaging incorporates near-real-time text-based messaging.

Figure 8. CMC instrument virtual outcomes evaluation tool

Assessment Implications	Accomplished	Capable	Marginal	Deficient
Design Factors				
1. Was the CMC employed backed by a sufficiently large network to provide a rich resource for information exchange yet small enough to avoid depersonalization?	Size of the network was exact for purpose and audience	Sufficient size to provide resources needed	Size was insufficient to provide resources needed	Size contributed to depersonali- zation
2. Were the uses of CMC designed effectively to reduce problems caused by large geographic distances between colleagues?	Uses of CMC eliminated the feeling of distance between participants	Uses of CMC greatly reduced the feeling of distance between participants	Uses of CMC did not negate the feeling of distance between participants	Uses of CMC detracted from the success of the course
3. Was the application of CMC well designed for the various subject matter content offered in this course?	Application of CMC was most appropriate for this course content	Application of CMC was appropriate for this course content	Application of CMC was, for the most part, inappropriate for this course content	Application of CMC detracted from the success of the course
4. Was CMC used to offer subject matter that involved discussion, brainstorming, problem solving, collaboration, and reflection?	The course was designed to take full advantage of the collaborative strengths of CMC	The course design benefited from the collaborative strengths of CMC	The course design was weak when it came to the collaborative strengths of CMC	The course design ignored the collaborative strengths of CMC
5. Was the course designed to take advantage of CMC's abilities to make choices, express ideas, group interaction, and content organization?	The course design took full advantage of these features	The course design addressed most of these features	The course design addressed some of these features	The course design ignored these important features
6. Did the course preparation structure CMC-supported conferences, activities, and group work so that that the instructor could serve the role of facilitator and not content provider?	The course design ensured that the instructor was facilitator not lecturer	The course design contributed to the role of instructor as facilitator	The course design hampered the role of instructor as facilitator	The course design caused the instructor to remain basically a lecturer
Development Factors				
7. Was the course developed to address student apprehension over certain concerns such as eye strain, neighborhood and family ties, work and communication patterns, and dehumanizing interpersonal interaction?	The course was developed to successfully address and mitigate these concerns	The course was developed to successfully address and mitigate most concerns	The course was not developed to successfully address these concerns	The course design ignored these important concerns
8. The use of technology can produce a loss of the "sense of structure" when it comes to CMC-rich discussions. Was this inherent weakness address in the development of this course?	The use of CMC technologies enhanced a sense of structure rather than detracted	The use of CMC technologies contributed to a sense of structure	The use of CMC technologies negatively impacted a sense of structure	The use of CMC technologies ignored the concern for structure in the course
Implementation Factors				
9. Did the CMC technology allow for greater access to participating learners, providing access for those who cannot attend class because of hectic life schedules, physical limitations, or institutional barriers?	The use of CMC technologies greatly increased access for participating learners	The use of CMC technologies increased access for a target population of learners	The use of CMC technologies became a barrier to access for some learners	The use of CMC technologies interfered with access for many learners
10. Was CMC implemented to promote self-directed learning? Were learners able to determine how, when, and where they studied and negotiated the learning activities and content focus of the course?	CMC greatly increased self-directed learning opportunities	CMC contributed to increased opportunities for self-directed learning	CMC hampered flexibility when it came to how, when, and where learners studied	CMC placed barriers when it came to how, when, and where learners studied
11. During CMC lessons, did it often take longer and was it more difficult to bring the group back on task when discussions strayed from the intended topic?	Situation rarely occurred	Sometimes	Often, and usually recognized by students before the instructor	Very often without anyone recognizing the situation
12. During CMC lessons, was there a problem knowing who is and is not participating, contributing, or simply "lurking" in the course?	Situation rarely occurred, participation was well managed	Sometimes, participation had to be monitored	Often, participation had to be continuously encouraged	Very often "lurking" became rampant

continued on the following page

Figure 8. continued

13. Did the CMC course provide the convenience to learn outside of regular class time expected by most participants?	❑ Feedback indicated overwhelming positive experience	❑ Feedback indicated positive experience	❑ Feedback indicated experience could have been better	❑ Feedback indicated negative experience
14. Regarding communication with participants…	❑ The instructor managed the give and take of CMC interactions skillfully	❑ The instructor was generally good at managing CMC collaborative experiences	❑ The instructor could have been better at managing CMC collaborative experiences	❑ The instructor was usually the one who initiated new topics and/or agendas
Evaluation Factors				
15. Do you believe that participation in a CMC-enhanced course ultimately contributed to students' life situation, goals, and personal factors that affect their pursuit of a formal education?	❑ Feedback indicated overwhelming positive experience	❑ Feedback indicated positive experience	❑ Feedback indicated experience could have been better	❑ Feedback indicated negative experience
15. Do you believe that participation in a CMC-enhanced course contributed toward the goal of developing independent, questioning learners?	❑ Feedback indicated overwhelming positive experience	❑ Feedback indicated positive experience	❑ Feedback indicated experience could have been better	❑ Feedback indicated negative experience
16. Has the use of CMC-augmented courses gained acceptance within your institution at all levels?	❑ Indications at my institution reflect overwhelming acceptance	❑ Indications at my institution reflect acceptance at some levels	❑ Indications at my institution reflect Acceptance at lower levels only	❑ Indications at my institution reject technology-enhanced delivery formats
17. Can the use of CMC-augmented courses be described as a means of extending access to courses, improving the quality of current provision, and meeting the need for flexible learning that cannot be accommodated otherwise?	❑ Feedback indicated overwhelming acceptance of this description	❑ Feedback indicated the description is mildly accepted	❑ Feedback indicated use of technology only to remain competitive	❑ Feedback indicated use of technology only as a route to major cost cutting
18. Did the instructor for this CMC-augmented course demonstrate a high degree of familiarity with the system's features and architecture	❑ Instructor demonstrated a high level of competency using CMC	❑ Instructor demonstrated an acceptable level of competency using CMC	❑ Instructor demonstrated a low level of competency using CMC	❑ Instructor's skill level with CMC detracted from the success of the course
19. Did the instructor for this CMC-augmented course receive the required training and support to successfully teach the critical aspects of the course using this medium?	❑ Instructor demonstrated a high level of training	❑ Instructor demonstrated an acceptable level of training	❑ Instructor demonstrated a low level of training	❑ Instructor's training level detracted from the success of the course
20. Did the use of CMC increase the ease of evaluating student performance?	❑ Evaluating performance was facilitated by the CMC tools	❑ Evaluating performance was challenging	❑ Evaluating performance was difficult at best	❑ Evaluating performance was unsuccessful
Distance Learner Factors				
21. Did the use of CMC address the learning objectives identified for the lesson?	❑ All	❑ Most	❑ Few	❑ None
22. Was the use of CMC appropriate for the distance learner?	❑ Recognized by students as appropriate	❑ Acknowledged by students as important	❑ Students missed the importance	❑ Students found the survey of no value
23. Must the use of CMC be revised before the next delivery of the course?	❑ No changes needed	❑ Minor changes only	❑ Significant changes	❑ Current format must be scrapped
24. Did the use of CMC provide opportunities to compare similarities and differences among distance learners participating in the course?	❑ CMC provide ample opportunities to distinguish among participants	❑ CMC provide opportunities to distinguish among participants	❑ CMC provide meager opportunities to distinguish among participants	❑ Distinguishing among participants was not possible using CMC

When using conferencing for assessment purposes, it is wise to follow some simple guidelines that ensure a successful (i.e., valid and reliable) evaluation. They include the following. A good conference establishes up-front specific goals to ensure all participants are working towards the same objectives when they are participating in the online session. A successful conference will adhere to an inviolable agenda for the conference. Participants must be privy beforehand to the topics that will be covered, the time schedule to be followed, and the procedures that will be followed to stay on that timetable. A manageable conference clearly identifies the facilitator at each site. Obviously, the instructor is the most logical facilitator at the delivery end of the conference; however, local proctors at remote locations is an excellent tool for staying on task, directing comments from these sites, and monitoring behavior and technical issues.

If specific knowledge or skills are necessary for the successful completion of the conference, develop a method (rubrics are always a good avenue for evaluating interpersonal communications) of assessing conference activity. It is often difficult to gauge student contributions to the discussions underway so it is always a good idea to solicit feedback at regular intervals, measure the interactivity of the discussions, and structure the conference to encourage contributions by all participants.

Figure 9 illustrates a virtual outcomes evaluation tool for assessing the use of conference-based communications tools in a distance education environment.

Games and simulations create an environment in which students interact to apply theory and practice skills to real-world issues as they relate to academic content under consideration. Properly designed and implemented, they constitute powerful tools for learning and assessment. They integrate multiple teaching objectives, motivate learners, provide opportunities for active participation (even in an online environment), promote deeper learning, develop interactive and communication skills, and link knowledge and theory to application.

As assessment tools, games and simulations will help students demonstrate their understanding and application of concepts. Guidelines for developing useful games have been developed by Heineke & Meile (2000) who suggest that, to be effective, games and simulations provide insight into concepts and presumptions not otherwise available. They require the learner to generate new information (rather than simply using existing/ provided data). Low stress and simplicity of materials are additional characteristics of effective games and simulations that apply in more general terms to the use of these CMCs in the traditional classroom rather than as assessment tools in a distance environment.

Using games and simulations as an assessment tool for distance learning, it is possible to:

- Grade student abilities resulting from the online instruction.
- Promote higher order thinking and learning.
- Correct learner misconceptions.
- Monitor student progress and speed.
- Improve the effectiveness and delivery of online course materials.
- Motivate the distance learner by focusing on the real-world components of the instruction.
- Encourage students with timely formative and summative feedback.
- Provide feedback for improving analytical and critical thinking skills.

Examine the rubric for assessing games and simulations found in Figure 10.

Figure 9. Conferencing technologies virtual outcomes evaluation tool

Assessment Implications	**Accomplished C**	**apable M**	**arginal**	**Deficient**
Design Factors				
1. Was the conference-based course designed to reach participants that were previously inaccessible?	❑ Most participants were from outside the geographic region of the institution	❑ A number of participants were from outside the geographic region of the institution	❑ A few participants were from outside the geographic region of the institution	❑ Participants were all local to the geographic region of the institution
2. Was the conference-based course designed to reach experts and facilitators that were previously unavailable?	❑ Several experts contributed to the course from outside the geographic region of the institution	❑ A number of experts contributed from outside the geographic region of the institution	❑ A few experts contributed from outside the geographic region of the institution	❑ Experts and course facilitators were all local to the geographic region of the institution
3. Did the instructor design clear guidelines for interaction with students?	❑ Guidelines ensured exceptional interaction with all students	❑ Guidelines ensured consistent interaction with students	❑ Weak guidelines hampered interaction with students	❑ Absent guidelines were a barrier to student interaction
4. Did the instructor present challenging tasks, sample cases, and quality work to convey high expectations for all participants?	❑ High expectations were clearly conveyed	❑ High expectations were implied	❑ High expectations were poorly suggested	❑ High expectations were never conveyed
Development Factors				
5. Did the instructor develop course content that turned simple online conversations into more productive collaborations?	❑ The degree of collaboration was a model for other distance courses	❑ The degree of collaboration contributed directly to the delivery of	❑ The degree of collaboration contributed little to the delivery of	❑ Collaboration was notably lacking in the delivery of course content
6. Did the instructor develop policies describing the types of communication that should (and should not) take place during online sessions?	❑ Communications policies were clearly conveyed	❑ Communications policies were implied	❑ Communications policies were suggested	❑ Communications policies were never conveyed
7. Did the course syllabus identify regularly-distributed deadlines to encourage distance students to spend time on tasks and help them to avoid procrastination?	❑ Deadlines clearly conveyed the need for time management	❑ Deadlines implied time management would be important for success	❑ Deadlines were weak suggesting time on task was not a concern	❑ Deadlines policies were never conveyed much less the need for time management
8. Did the instructor combine both asynchronous and synchronous tools in the delivery of course content?	❑ Both formats were effectively used to deliver content	❑ One format was predominantly used to effectively deliver content	❑ One format was used to the detriment of the delivered content	❑ Both formats were ineffective in the delivery of content
Implementation Factors				

continued on the following page

Figure 9. continued

Implementation Factors Were distance-based sessions delivered using the most appropriate tools for course presentations?				
9. Consider lesson objectives	❑ Appropriate tools for lesson objectives used			❑ Inappropriate or ineffective tools used to deliver lesson objectives
10. Consider cost issues	❑ Appropriate tools for cost considerations used			❑ Inappropriate or ineffective tools used for cost considerations
11. Consider accessibility issues	❑ Appropriate tools for accessibility considerations used			❑ Inappropriate tools for accessibility considerations used
12. Did the instructor present well-designed discussion assignments to facilitate meaningful cooperation among participants?	❑ Discussion assignments were effectively used to facilitate cooperation among students	❑ Discussion assignments were used to facilitate cooperation with mixed results	❑ Discussion assignments were used but cooperation among students was weak	❑ Discussion assignments were either ineffective or not used
13· Were discussion groups using conferencing technologies structured to remain small and focused on a particular set of tasks?	❑ Discussion groups were very focused	❑ Focus provided by discussion groups could have been better	❑ Discussion groups were used but focus was weak	❑ Discussion groups were either ineffective or not used
14. Were learners required to participate in conferences and did their grade depend on their participation?	❑ Learner participation was a key criteria to demonstrate mastery of content	❑ Learner participation demonstrated mastery of content but could have been better used	❑ Learner participation was a criteria to demonstrate mastery but results were weak	❑ Learner participation was not required and resulted in ineffective mastery of the content
15. Describe the quality of the feedback received by participants in the online conferences.	❑ Participants felt the course was well-designed, the content well developed, and technology use excellent	❑ Participants felt the course overall was well-designed, developed, but needed some work	❑ Participants generally approved of the design, content, and technology	❑ Participants were disappointed in the design, content, and technology
16. Did the online conferencing sessions begin on time? Did the instructor properly forewarn participants of any late-starting sessions, if possible?	❑ Participants overwhelmingly were pleased with the instructor's communication regarding session scheduling	❑ Participants were pleased with the instructor's communication, but needed some work	❑ Participants generally approved of the instructor's communication but recommended changes	❑ Participants were disappointed in the instructor's communication regarding session scheduling
17. Did the instructor consider the humanistic state of participants before launching into the formal agenda (e.g., students' health, work-related situations, etc.)	❑ The instructor displayed considerable concern for students	❑ Effective display of concern but could have been better	❑ Concern for students was obviously not a priority for the instructor	❑ The instructor did not demonstrate a concern for students

Figure 9. continued

Evaluation Factors				
18. Are participants expected to present course projects via the same conferencing tools used by the instructor as a means of course evaluation?	❑ All projects are delivered using conferencing tools, well done	❑ Projects are delivered using technology, but not necessarily conferencing tools	❑ Conferencing tools are used to deliver only the final class project	❑ No projects are delivered using conferencing tools, opportunity missed
19. Were students motivated to perform at a higher level by the conferencing technologies employed in the course?	❑ Instructor noted significant student motivation attributable to the technology	❑ Instructor noted significant motivation among some students	❑ Instructor noted little increase in student motivation	❑ Instructor noted lower student motivation attributable to the technology
20. Did the instructor provide information feedback (i.e., analysis regarding course content) feedback during the course?	❑ Information feedback was constant and suitable	❑ Information feedback was suitable but intermittent	❑ Information feedback was notably lacking	❑ Information feedback was nonexistent
21. Did the instructor provide acknowledgement feedback (i.e., comments regarding student-initiated communication) feedback during the course?	❑ Acknowledgem ent feedback was constant and suitable	❑ Acknowledgem ent feedback was suitable but intermittent	❑ Acknowledgem ent feedback was notably lacking	❑ Acknowledgem ent feedback was nonexistent
22. Was the evaluations received by participants based on the quality of postings and not only the length or number?	❑ Evaluations were based primarily on the quality of the postings and reflected in careful instructor	❑ Evaluations considered the quality of the postings reflected in instructor feedback provided	❑ Evaluations were weak based only partly on the quality of the postings	❑ Evaluations were based primarily on the quantity and missed the mark of effective feedback
Distance Learner Factors				
23. Did the use of conferencing technologies address the learning objectives identified for the lesson?	❑ All	❑ Most	❑ Few	❑ None
24. Was the use of conferencing technologies appropriate for the distance learner?	❑ Recognized by students as appropriate	❑ Acknowledged by students as important	❑ Students missed the importance	❑ Students found the survey of no value
25. Must the use of conferencing technologies be revised before the next delivery of the course?	❑ No changes needed	❑ Minor changes only	❑ Significant changes	❑ Current format must be scrapped

ASSESSING TEACHING AND LEARNING RESOURCES THE DISTANCE LEARNER

An instructional system design (ISD) model is a rendering of how teachers are to deliver instruction and how students are to learn. It depicts a process for designing, developing, implementing and evaluating content.

The ISD model is constructed to offer the instructional designer a paradigm for preparing lessons that will ultimately be successful in the classroom, traditional or virtual. At its most basic, instructional

Figure 10. Evaluating simulations and games in a distance learning environment

Assessment Implications	Accomplished	Capable	Marginal	Deficient
Design Factors				
1. Was the goal of the game/ simulation clearly stated and could it be reasonably reached?	☐ Goals were clearly stated as evidenced by student outcomes exceeding expectations	☐ Goals were fairly well stated as evidenced by a majority of realized student outcomes	☐ Goals were ill-defined as evidenced by unrealized student outcomes	☐ Goals were confusing and ineffective as evidenced by a total lack of student learning
2. Did the game/ simulation used include some form of competition?	☐ Competition was the inherent driver in the success of the lesson	☐ Competition was a strong component of a successful games/ simulation lesson	☐ Competition was a weak component of a lesson that could have been stronger	☐ Competition was not utilized in the lesson resulting in unmet learning outcomes
3. Were constraints and rules involved in the game/ simulation clearly presented?	☐ Constraints and rules were clearly stated as evidenced by student outcomes exceeding expectations	☐ Constraints and rules were fairly well stated as evidenced by a majority of realized student outcomes	☐ Constraints and rules were ill-defined as evidenced by unrealized student outcomes	☐ Constraints and rules were confusing and ineffective as evidenced by a total lack of student learning
4. Was there evidence of a mismatch between the level of difficulty and the user skills?	☐ Participants evidenced a strong connection of their learned skills	☐ A mismatch was noticed but had minimal impact on learning outcomes	☐ The engagement of the student noticeably suffered as the results of the mismatch	☐ The user lost engagement and dropped out of the lesson due to the mismatch
Development Factors				
5. Did the game/ simulation employ engaged learning to makes the content more memorable than passive listening?	☐ Engaged learning activities were clearly in evidence and produced active learning results	☐ Engaged learning activities were used and produced active learning results	☐ Engaged learning activities were hardly used and produced minimal active learning results	☐ Engaged learning activities were clearly lacking and produced no tangible active learning results
6. Did the game/ simulation employ interactivity by including a range of input devices and interact with the student depending on what the student has just done?	☐ A wide range of devices were clearly in evidence and produced interactive learning results	☐ wide range of devices were used and produced interactive learning results	☐ wide range of devices were hardly used and produced minimal interactive learning results	☐ wide range of devices were clearly lacking and produced no tangible interactive learning results
7. Did the game/ simulation employ learner control transfer to real life working environments enlarge the user's meta-cognitive skills encourage the user to reflect on his/her own learning?	☐ Learner control activities were clearly in evidence and produced real life working environments	☐ Learner control activities were used and produced real life working environments	☐ Learner control activities were hardly used and produced minimal real life working environments	☐ Learner control activities were clearly lacking and produced no real life working environments
8. Did the game/ simulation employ co-operative teamwork or single-player games where one competes with the computer, other people or simply with one's self?	☐ Cooperative teamwork activities were clearly in evidence and produced real life learning environments	☐ Cooperative teamwork activities were used and produced real life learning environments	☐ Cooperative teamwork activities were hardly used and produced minimal real life learning environments	☐ Cooperative teamwork activities were clearly lacking and produced no real life learning environments
Implementation Factors				
9. Did the game/ simulation utilize skill and action games format to provide real-time play, heavy emphasis on graphics and sound, and use of joysticks or paddles?	☐ Skill and action activities were clearly in evidence and produced active learning results	☐ Skill and action activities were used and produced active learning results	☐ Skill and action activities were hardly used and produced minimal active learning results	☐ Skill and action activities were clearly lacking and produced no tangible active learning results

continued on the following page

Figure 10. continued

10. Did the game/ simulation utilize strategy games format to emphasize cogitation rather than manipulation?	☐ Strategy activities were clearly in evidence to emphasize cognition	☐ Strategy activities were used to emphasize cognition	☐ Strategy activities were hardly used to emphasize cognition	☐ Strategy activities were clearly lacking to emphasize cognition
11. Did the game/ simulation utilize reality format to align with the users' own real-life experience and increase the probability for evoking emotions?	☐ Reality activities were clearly in evidence to increase emotions	☐ Reality activities were used to increase emotions	☐ Reality activities were hardly used to increase emotions	☐ Reality activities were clearly lacking to increase emotions
12. Did the game/ simulation utilize drama effects to engage users and make the characters and circumstances more believable?	☐ Drama effect activities were clearly in evidence to engage learners	☐ Drama effect activities were used to engage learners	☐ Drama effect activities were hardly used to engage learners	☐ Drama effect activities were clearly lacking to engage learners
Evaluation Factors				
13. A key characteristic of effective games/ simulations is clear rules presentation. Did the rules contribute to effective learning for the participant?	☐ Students identified clear rules as a major contributor toward effective learning	☐ Students identified fairly well stated rules as having a positive impact on learning	☐ Students identified poorly stated rules as having a negative impact on student learning	☐ Students identified vague and/or complex rules as detractors from effective learning
14. A key characteristic of effective games/ simulations is clear goals and objectives presentation. Did the goals and objectives contribute to effective learning for the participant?	☐ Students identified clearly stated goals as a major contributor toward effective learning	☐ Students identified fairly well stated goals as having a positive impact on learning	☐ Students identified poorly stated goals as having a negative impact on student learning	☐ Students identified vague goals as detractors from effective learning
15. A key characteristic of effective games/ simulations is a clear opportunity for outcomes and feedback. Did this opportunity contribute to effective learning for the participant?	☐ Students identified clear feedback as a major contributor toward effective learning	☐ Students identified fairly well stated feedback as having a positive impact on learning	☐ Students identified poorly stated or inappropriate feedback as having a negative impact on student learning	☐ Students identified vague or inappropriate feedback as detractors from effective learning
16. A key characteristic of effective games/ simulations is conflict and competition. Did conflict and competition contribute to effective learning for the participant?	☐ Students identified conflict and competition as a major contributor toward effective learning	☐ Students identified conflict and competition as having a positive impact on learning	☐ Students identified conflict and competition as having a negative impact on student learning	☐ Students identified conflict and competition as detractors from effective learning
17. A key characteristic of effective games/ simulations is interaction. Did interaction contribute to effective learning for the participant?	☐ Students identified interaction with peers as a major contributor toward effective learning	☐ Students identified interaction with peers as having a positive impact on learning	☐ Students identified interaction with peers as having a negative impact on student learning	☐ Students identified a lack of interaction with peers as detractors from effective learning
18. A key characteristic of effective games/ simulations is the representation or story. Did the representation or story contribute to effective learning for the participant?	☐ Students identified the use of stories as a major contributor toward effective learning	☐ Students identified the use of stories as having a positive impact on learning	☐ Students identified the use of stories as having a negative impact on student learning	☐ Students identified the lack or misuse of stories as detractors from effective learning

continued on the following page

Figure 10. continued

Distance Learner Factors				
19. Did the use of games/ simulations technologies address the learning objectives identified for the lesson?	☐ All	☐ Most	☐ Few	☐ None
21. Was the use of games/ simulations technologies appropriate for the distance learner?	☐ Recognized by students as appropriate	☐ Acknowledged by students as important	☐ Students missed the importance	☐ Students found the survey of no value
22. Must the use of games/ simulations technologies be revised before the next delivery of the course?	☐ No changes needed	☐ Minor changes only	☐ Significant changes	☐ Current format must be scrapped

design focuses on identifying the instructional objectives, selecting from among various instructional strategies, and evaluating success learning outcomes.

Using the Virtual Learning Outcome Assessment Tool. The Kemp Model examined in Chapter Twelve was adopted for designing instruction for the distance learner. The model is circular rather than linear as is the case in most of the other popular ISD models. The circular nature of the model allows us to depict the virtual aspects of teaching at a distance and simultaneously assess three components of effective virtual learning (See Figure 11).

Phases of instructional design. The nine elements are interdependent and they do not need to be addressed in any particular sequence to effectively complete the design process. For advocates of the Kemp model, instructional design is presented as a continuous cycle of four phases:

The Preparation Phase begins the process by identifying the learning problem, the goals and objectives, the learner's needs, prior knowledge, and any other relevant characteristics. In this phase, the designer also considers the online learning environment, the technologies available (selection comes later), any constraints associated with access or availability, the delivery options, and timelines.

The Development Phase consists of the actual production of the academic content and the creation of the online learning materials that will contribute to successful student learning out comes.

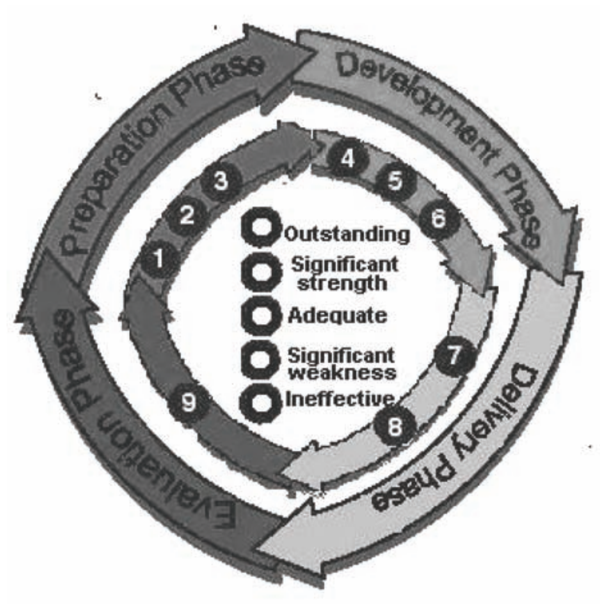
In the Delivery Phase, the lesson is implemented and the content is delivered to the student. For distance education, delivery is augmented by a suite of tools that include asynchronous and synchronous technologies previously discussed in this chapter.

Finally, in the Evaluation Phase, formative and summative assessments (again using available technologies) are engaged to direct the instruction and guide the learner. Formative evaluation is present in each stage of the lesson while summative evaluation consists of tests designed for feedback at the conclusion of the instruction. Revisions are made as necessary.

Steps of instructional design. The PreparationPhase contains three of the model's nine elements: (1) Defining the instructional problem, (2) Examining learner characteristics, and (3) Conducting the task analysis.

The DevelopmentPhase also contains three elements: (4) Developing instructional objectives, (5) Sequencing content, and (6) Designing instructional strategies. Delivery of instruction embraces (7) Integrating resources and (8) Delivering the instruction. Evaluation involves the final stage of the Kemp Model, (9) Evaluating the instruction.

Figure 11. The virtual learning outcome assessment tool



Success of the Criteria towards Meeting Learning Outcomes. In the final analysis, each criteria identified must contribute to learning. The third component of an effective virtual learning experience is to rate each criteria against these expected/ desired outcomes.

An Outstanding rating indicates exceptional use of problems or questions, multimedia materials, and distance-centered delivery formats. Significant strengths are evidenced by the application of course materials to subject content, a well-designed lesson appropriate for distance application, and the excellent use of multimedia materials. An Adequate rating provides a middle ground for lessons that integrate many, but not all, of the strengths that imply good application of course content and online research, acceptable contributions from multimedia materials, and at least some control of lesson content by the distance learner. Significant weaknesses still find some merit in meeting distance learning outcomes; however, the inconsistent use of multimedia materials as well as the misapplication of distance technologies seriously detracts from an otherwise successful lesson. Finally, an Ineffective rating is a grave indictment on the course. Participants have not acquired even the minimal competencies expected when the course was envisioned. For the instructional designer, it's back to the preparation phase for a complete re-write of the course.

Using the Virtual Learning Outcome Assessment Tool and the graphic that is provided can assist the instructional designer in evaluating the multimedia-based materials (text, visual, and web-based) for distance learners. By indicating the Phase in which the assessment criteria resides, the specific stage of the Model that is addressed, and the specific rating that measures movement toward meeting established instructional objectives, the instructor will be able to determine whether a complete and comprehensive evaluation has been conducted.

Using the Virtual Learning (Figure 12) Outcome Assessment Tool to Evaluate Text-Based Materials for the Distance Learner. (Companion to Chapter Seven and Primer One – Text-Based Materials). Check the rating that best describes each of the following Criteria for Assessment in the text-based resources under evaluation and transpose that rating to the Analysis Form at the end of each tool.

Using the Virtual Learning (Figure 13) Outcome Assessment Tool to Evaluate Visual-Based Materials for the Distance Learner. (Companion to Chapter Eight and Primer Two – Visual-Based Materials). Circle the rating and assign the numeric score that best describes each of the following Criteria for Assessment in the visual-based resources under evaluation.

Using the Virtual Learning (Figure 14) Outcome Assessment Tool to Evaluate Web-Based Materials for the Distance Learner. (Companion to Chapter Nine and Primer Three – Web-Based Materials). Circle the rating and assign the numeric score that best describes each of the following Criteria for Assessment in the web-based resources under evaluation.

Assessing the distance learner is arguably the most complex of the three target learners. Evaluating the traditional learner has the advantage of being physically connected to the student. Assessing outcomes can be accomplished with the aid of immediate feedback, interpersonal dialogue, and even body language. The adult learner also has an element of physical contact when it comes to assessment. Plus, adults are typically more forthcoming when asked questions or engaging in the kind of dialogue that can determine whether concepts and content presented in the classroom have been absorbed.

For the distance learner in a virtual environment, a more measured approached must be engaged. The characteristics of good assessment presented in Figure 3 are not atypical of the previous two categories of learners. However, from there on, the differences are considerable. In this chapter, we examined the shift in paradigm from the more traditional assessment formats to those of the online setting and identified the technologies that help this so. Virtual Outcomes Evaluation Tools were offered for each technology: online examinations, electronic portfolios, online survey instruments, computer mediated communications technologies, conferencing, and games and simulations.

The Virtual Learning Outcome Assessment Tool was introduced to assess teaching and learning resources for the distance learner; specifically, text-based resources (handouts, study guides, and the Hyper Book), visual-based resources (classroom presentations and the Interactive Lesson), and web-based resources (web home pages and the Virtual Tour). Kemp's model of instructional systems design was the archetype for evaluating each resource type and an Analysis Recap Form was suggested to visually represent the strengths and weaknesses of these materials for distance learning.

SUMMARY

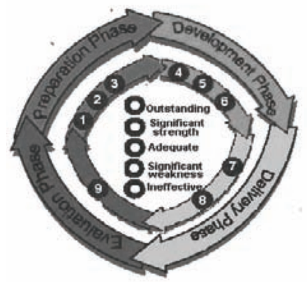
Distance learning has become one of the most rapidly increasing modality for course delivery throughout the world. Colleges and universities have grown to regard distance learning as a better way to service their students: traditional, adult, and online. The result of this shifting in focus has been an expanded student body, a wider range of course offerings, and, as a direct result, increased revenues.

Effective pedagogical practices are evolving as instructors seek to include the innovative technologies that reinforce teaching at a distance. Electronic communication is redefining what a community of learners represents to educators and how students seek information. A new inventory of learner characteristics is being associated with success. Such characteristics include mastery of time management, ability to work alone, interpersonal skills that include the use of technology, and others. Instructors are recognizing that they must adopt a new set of principles that apply to the unique environment of distance learning. With this dramatic increase in distance learning comes the debate regarding acceptable modes of instruction,

Figure 12. Rating scale for assessing text-based materials

VIRTUAL LEARNING OUTCOME ASSESSMENT TOOL FOR EVALUATING TEXT-BASED MATERIALS (including the Hyper Book)
Criteria for Assessment

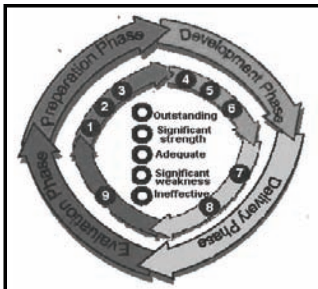
1. Rate how well the text-based materials contribute to the definition of the instructional problem.
   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Preparation
Step: 1
Rating: O SS A SW I
Circle the appropriate rating

2. Rate how well the text-based materials address the range of distance learner characteristics that include: self-motivation, ability to work independently, ability to manage time, ultimately personal responsibility for learning, reading skill level, ability to communicate, computer experience, access to technology, learning new technologies.

   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



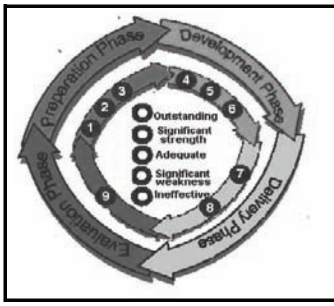
Phase: Preparation
Step: 2
Rating: O SS A SW I
Circle the appropriate rating

3. Rate how well the text-based materials address the scope of tasks identified by the instructional designer for this course, to include: adequate coverage of each identified task, depth of coverage spanning all levels of distance learning, validity and accuracy of the materials with respect to the learning objectives, and identification of skills/sub-skills in the text-based materials stated in behavioral/performance terms.

   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

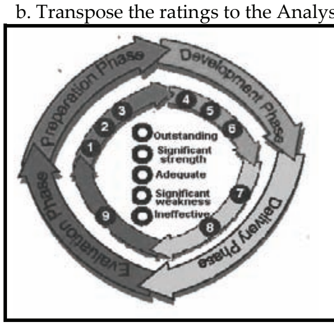
Figure 12. continued



Phase: Preparation
Step: 3
Rating: O SS A SW I
Circle the appropriate rating

4. Rate how well the text-based materials contribute in addressing the instructional objectives for this course; specifically, evaluate whether the objectives included in the text-based materials are **specific, outcome based, measurable,** and **describe the learner's behavior after completing the materials.**

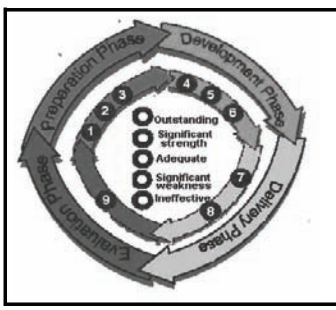
a. Rate the overall success of this criteria towards meeting the learning outcome.
b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Development
Step: 4
Rating: O SS A SW I
Circle the appropriate rating

5. Rate the effectiveness of the sequencing of the content offered in the text-based materials. Specifically, there are seven sequencing methods: Job performance order, chronological order, critical sequence, simple to complex order, comparative sequence, relationships between objectives, and part to whole.

a. Rate the overall success of this criteria towards meeting the learning outcome.
b Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Development
Step: 5
Rating: O SS A SW I
Circle the appropriate rating

6. Rate the effective applications of technology-based instructional strategies adopted by the text materials (i.e., handouts, study guides, Hyper Book, etc.) to the distance learner. From Chapter 13 for this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

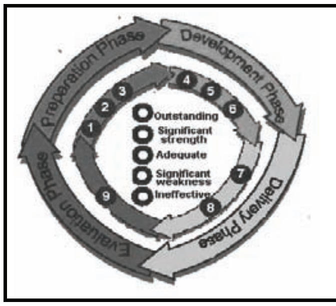
Figure 12. continued

a. Proper level of the Taxonomy for the Technology Domain (i.e., Literacy, Collaboration, Decision-making, Technology for Learning, Technology for Teaching, Tech-ology).

b. Appropriate nature of the content material (i.e., abstract versus concrete)

c. Suitable level of competency (i.e., easy, challenging, difficult)

d. Transpose these ratings to the Analysis Recap Form at the end of this tool.



Development
Step: 6
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
Circle the appropriate ratings

7. Rate the effectiveness of <u>integrating text-based resources</u> (including the Hyper Book). For this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

a. Quantity of the textual content of the lesson for the distance learner

b. Quality of the textual content of the lesson for the distance learner

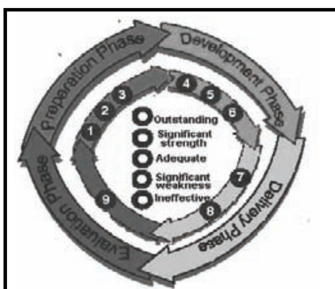
c. Richness of the activities and exercises for the distance learner

d. Syntax of the resource (e.g., page numbers, design layout, bullets, numbering, indentation, indicative information, etc.)

e. Grammar and spelling

f. Appropriate use of multimedia (e.g., hyperlinks and images)

g. Transpose these ratings to the Analysis Recap Form at the end of this tool.



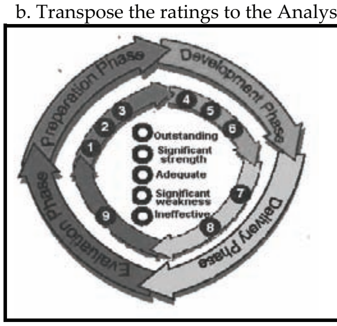
Phase: Development
Step: 7
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
d. Rating: O SS A SW I
e. Rating: O SS A SW I
f. Rating: O SS A SW I
Circle the appropriate ratings

continued on the following page

Figure 12. continued

8. Rate any improvements to <u>instructional delivery</u> supported by the use of text-based materials. Specifically, assess the use of the text materials in both asynchronous and synchronous delivery, as appropriate for the lesson.

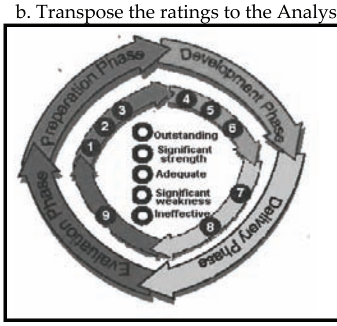
   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Delivery
Step: 8
Rating: O SS A SW I
Circle the appropriate rating

9. Rate any contributions to the <u>evaluation of the lesson</u> made by the use of text-based materials. Specifically, assess whether the text materials contained formative and/or summative evaluations as an inherent element of the handout, study guide, Hyper Book, etc.

   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Evaluation
Step: 9
Rating: O SS A SW I
Circle the appropriate rating

Analysis Recap Form

Transpose each rating to the Analysis Form below

Step 1	O	SS	A	SW	I
Step 2	O	SS	A	SW	I
Step 3	O	SS	A	SW	I
Step 4	O	SS	A	SW	I
Step 5	O	SS	A	SW	I
Step 6a	O	SS	A	SW	I
Step 6b	O	SS	A	SW	I
Step 6c	O	SS	A	SW	I
Step 7a	O	SS	A	SW	I
Step 7b	O	SS	A	SW	I
Step 7c	O	SS	A	SW	I
Step 7d	O	SS	A	SW	I
Step 7e	O	SS	A	SW	I
Step 7f	O	SS	A	SW	I
Step 8	O	SS	A	SW	I
Step 9	O	SS	A	SW	I

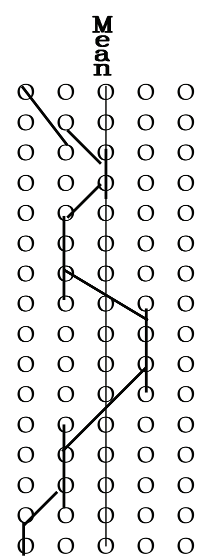
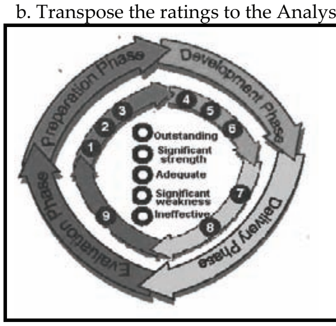


Figure 13. Rating scale for assessing visual-based materials

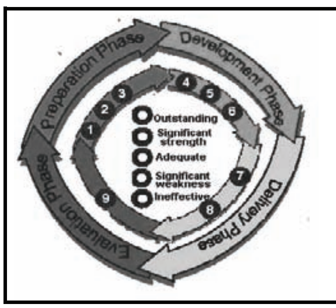
VIRTUAL LEARNING OUTCOME ASSESSMENT TOOL FOR EVALUATING VISUAL-BASED MATERIALS (including the Interactive Lesson)
Criteria for Assessment

1. Rate how well the visual-based materials contribute to the definition of the instructional problem.
    a. Rate the overall success of this criteria towards meeting the learning outcome.
    b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Preparation
Step: 1
Rating: O SS A SW I
Circle the appropriate rating

2. Rate how well the visual-based materials address the range of distance learner characteristics that include: self-motivation, ability to work independently, ability to manage time, ultimately personal responsibility for learning, reading skill level, ability to communicate, computer experience, access to technology, learning new technologies.
    a. Rate the overall success of this criteria towards meeting the learning outcome.
    b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



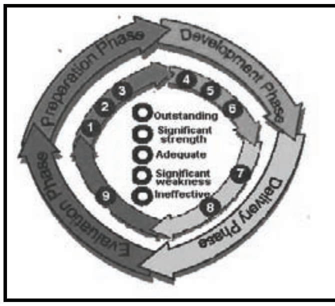
Phase: Preparation
Step: 2
Rating: O SS A SW I
Circle the appropriate rating

3. Rate how well the visual-based materials address the scope of tasks identified by the instructional designer for this course, to include: adequate coverage of each identified task, depth of coverage spanning all levels of distance learning, validity and accuracy of the materials with respect to the learning objectives, and identification of skills/sub-skills in the visual -based materials stated in behavioral/ performance terms.

    a. Rate the overall success of this criteria towards meeting the learning outcome.
    b. Transpose the ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

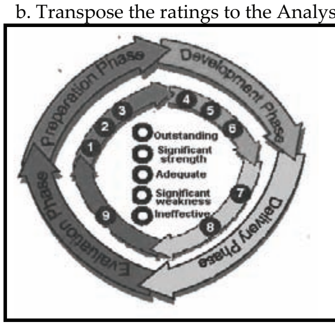
Figure 13. continued



Phase: Preparation
Step: 3
Rating: O SS A SW I
Circle the appropriate rating

4. Rate how well the visual -based materials contribute in addressing the instructional objectives for this course; specifically, evaluate whether the objectives included in the visual-based materials are **specific, outcome based, measurable,** and **describe the learner's behavior after completing the materials.**

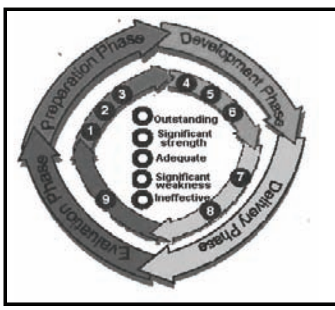
   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Development
Step: 4
Rating: O SS A SW I
Circle the appropriate rating

5. Rate the effectiveness of the sequencing of the content offered in the visual-based materials. Specifically, there are seven sequencing methods: Job performance order, chronological order, critical sequence, simple to complex order, comparative sequence, relationships between objectives, and part to whole.

   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Development
Step: 5
Rating: O SS A SW I
Circle the appropriate rating

continued on the following page

Figure 13. continued

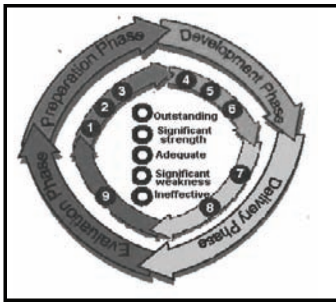
6. Rate the effective applications of technology-based instructional strategies adopted by the visual materials (i.e., classroom presentation and the Interactive Lesson) to the distance learner. From Chapter 13 for this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

a. Proper level of the Taxonomy for the Technology Domain (i.e., Literacy, Collaboration, Decision-making, Technology for Learning, Technology for Teaching, Tech-ology).

b. Appropriate nature of the content material (i.e., abstract versus concrete)

c. Suitable level of competency (i.e., easy, challenging, difficult)

d. Transpose these ratings to the Analysis Recap Form at the end of this tool.



Development
Step: 6
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
Circle the appropriate ratings

7. Rate the effectiveness of integrating visual-based resources (including the Interactive Lesson). For this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

a. Quantity of the visual content of the lesson for the distance learner

b. Quality of the visual content of the lesson for the distance learner

c. Review of prior student knowledge including selected questions to arrive at the level of student understanding of the topic

d. Syntax of the resource (e.g., number of slides, , lesson introduction: slides 1 and 2, delivery of learning objectives: slide 3, lesson content: slides 4 through 9, student assessment: slides 10 and 11, new design template/backgrounds, etc.)

e. Richness of the activities and exercises for the distance learner

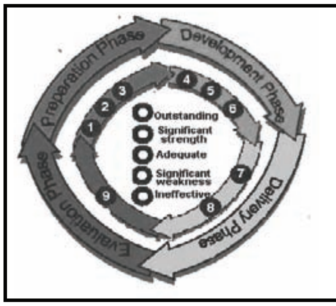
f. Grammar and spelling

g. Appropriate use of multimedia (e.g., hyperlinks, images, sound, and video)

h. Transpose these ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

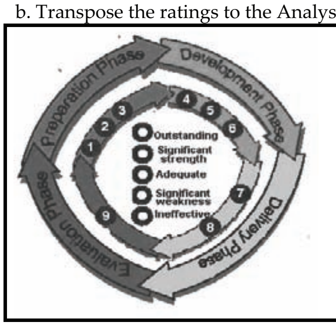
Figure 13. continued



Phase: Development
Step: 7
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
d. Rating: O SS A SW I
e. Rating: O SS A SW I
f. Rating: O SS A SW I
g. Rating: O SS A SW I
Circle the appropriate ratings

8. Rate any improvements to instructional delivery supported by the use of visual-based materials. Specifically, assess the use of the visual materials in both asynchronous and synchronous delivery, as appropriate for the lesson.

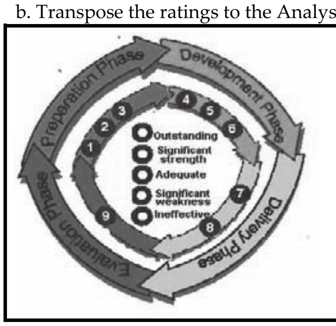
    a. Rate the overall success of this criteria towards meeting the learning outcome.
    b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Delivery
Step: 8
Rating: O SS A SW I
Circle the appropriate rating

9. Rate any contributions to the evaluation of the lesson made by the use of visual -based materials. Specifically, assess whether the visual materials contained formative and/or summative evaluations as an inherent element of the classroom presentation and Interactive Lesson.

    a. Rate the overall success of this criteria towards meeting the learning outcome.
    b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Evaluation
Step: 9
Rating: O SS A SW I
Circle the appropriate rating

continued on the following page

Figure 13. continued

Analysis Recap Form

Transpose each rating to the Analysis Form below

Step 1	O	SS	A	SW	I
Step 2	O	SS	A	SW	I
Step 3	O	SS	A	SW	I
Step 4	O	SS	A	SW	I
Step 5	O	SS	A	SW	I
Step 6a	O	SS	A	SW	I
Step 6b	O	SS	A	SW	I
Step 6c	O	SS	A	SW	I
Step 7a	O	SS	A	SW	I
Step 7b	O	SS	A	SW	I
Step 7c	O	SS	A	SW	I
Step 7d	O	SS	A	SW	I
Step 7e	O	SS	A	SW	I
Step 7f	O	SS	A	SW	I
Step 7g	O	SS	A	SW	I
Step 8	O	SS	A	SW	I
Step 9	O	SS	A	SW	I

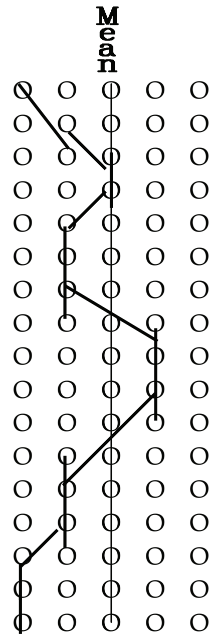
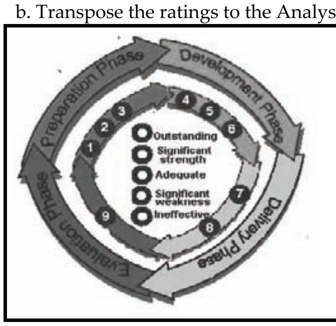


Figure 14. Rating Scale for assessing web-based materials

VIRTUAL LEARNING OUTCOME ASSESSMENT TOOL FOR
EVALUATING WEB-BASED MATERIALS (including the Virtual Tour)
Criteria for Assessment

1. Rate how well the web-based materials contribute to the definition of the <u>instructional problem</u>.
   a. Rate the overall success of this criteria towards meeting the learning outcome.
   b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



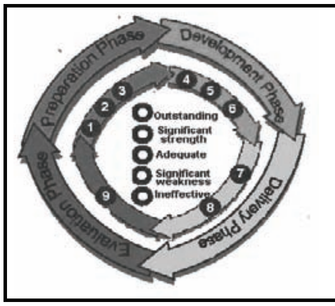
Phase: Preparation
Step: 1
Rating: O SS A SW I
Circle the appropriate rating

continued on the following page

Figure 14. continued

2. Rate how well the web-based materials address the range of distance learner characteristics that include: self-motivation, ability to work independently, ability to manage time, ultimately personal responsibility for learning, reading skill level, ability to communicate, computer experience, access to technology, learning new technologies.

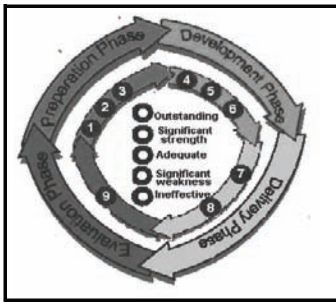
  a. Rate the overall success of this criteria towards meeting the learning outcome.
  b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Preparation
Step: 2
Rating: O SS A SW I
Circle the appropriate rating

3. Rate how well the web-based materials address the scope of tasks identified by the instructional designer for this course, to include: adequate coverage of each identified task, depth of coverage spanning all levels of distance learning, validity and accuracy of the materials with respect to the learning objectives, and identification of skills/sub-skills in the web -based materials stated in behavioral/ performance terms.

  a. Rate the overall success of this criteria towards meeting the learning outcome.
  b. Transpose the ratings to the Analysis Recap Form at the end of this tool.



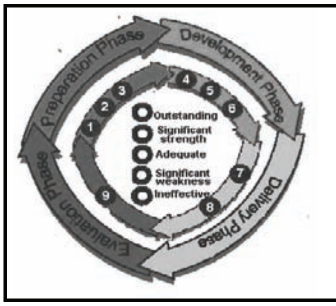
Phase: Preparation
Step: 3
Rating: O SS A SW I
Circle the appropriate rating

4. Rate how well the web-based materials contribute in addressing the instructional objectives for this course; specifically, evaluate whether the objectives included in the web-based materials are **specific, outcome based, measurable,** and **describe the learner's behavior after completing the materials.**

  a. Rate the overall success of this criteria towards meeting the learning outcome.
  b. Transpose the ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

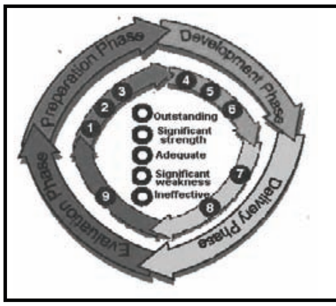
Figure 14. continued



Phase: Development
Step: 4
Rating: O SS A SW I
Circle the appropriate rating

5. Rate the effectiveness of the sequencing of the content offered in the web-based materials. Specifically, there are seven sequencing methods: job performance order, chronological order, critical sequence, simple to complex order, comparative sequence, relationships between objectives, and part to whole.

a. Rate the overall success of this criteria towards meeting the learning outcome.
b Transpose the ratings to the Analysis Recap Form at the end of this tool.



Phase: Development
Step: 5
Rating: O SS A SW I
Circle the appropriate rating

6. Rate the effective applications of technology-based instructional strategies adopted by the web materials (i.e., web home page and the Virtual Tour) to the distance learner. From Chapter 13 for this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

a. Proper level of the Taxonomy for the Technology Domain (i.e., Literacy, Collaboration, Decision-making, Technology for Learning, Technology for Teaching, Tech-ology).

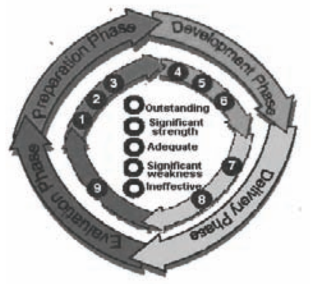
b. Appropriate nature of the content material (i.e., abstract versus concrete)

c. Suitable level of competency (i.e., easy, challenging, difficult)

d. Transpose these ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

Figure 14. continued



Development
Step: 6
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
Circle the appropriate ratings

7. Rate the effectiveness of <u>integrating web-based resources</u> (including the Virtual Tour). For this particular criteria, provide *separate ratings* for each of the elements identified in the assessment tool:

a. Quantity of the web content of the lesson for the distance learner

b. Quality of the web content of the lesson for the distance learner

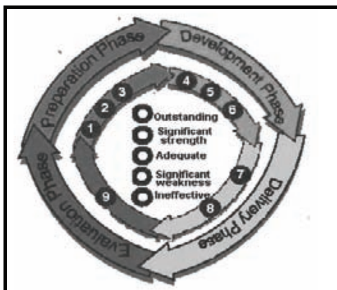
c. Richness of the activities and exercises for the distance learner

d. Syntax of the resource (e.g., introduction, student instructions, and Lesson overview, sites for exploration, banner title and opening image, selection of a suitable front door (Virtual Tour only), follow-on activities, etc.)

e. Grammar and spelling

f. Appropriate use of multimedia (e.g., internal and external hyperlinks, images, sound, and video)

g. Transpose these ratings to the Analysis Recap Form at the end of this tool.



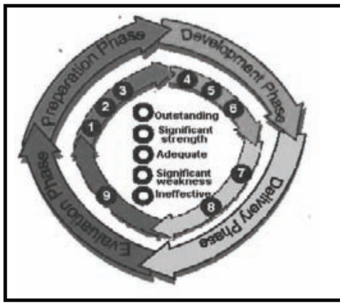
Phase: Development
Step: 7
a. Rating: O SS A SW I
b. Rating: O SS A SW I
c. Rating: O SS A SW I
d. Rating: O SS A SW I
e. Rating: O SS A SW I
f. Rating: O SS A SW I
Circle the appropriate ratings

8. Rate any improvements to <u>instructional delivery</u> supported by the use of web-based materials. Specifically, assess the use of the web materials in both asynchronous and synchronous delivery, as appropriate for the lesson.

a. Rate the overall success of this criteria towards meeting the learning outcome.
b. Transpose the ratings to the Analysis Recap Form at the end of this tool.

continued on the following page

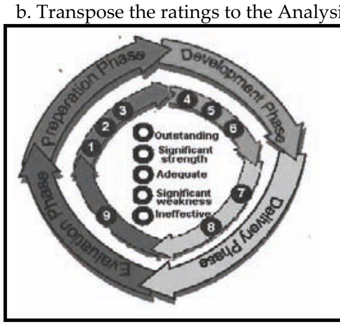
Figure 14. continued



Phase: Delivery
Step: 8
Rating: O SS A SW I
Circle the appropriate rating

9. Rate any contributions to the evaluation of the lesson made by the use of web - based materials. Specifically, assess whether the web materials contained formative and/or summative evaluations as an inherent element of the classroom presentation and Virtual Tour.

a. Rate the overall success of this criteria towards meeting the learning outcome.
b. Transpose the ratings to the Analysis Recap Form at the end of this tool.

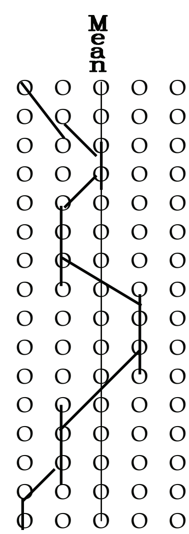


Phase: Evaluation
Step: 9
Rating: O SS A SW I
Circle the appropriate rating

Analysis Recap Form

Transpose each rating to the Analysis Form below

Step 1	O	SS	A	SW	I
Step 2	O	SS	A	SW	I
Step 3	O	SS	A	SW	I
Step 4	O	SS	A	SW	I
Step 5	O	SS	A	SW	I
Step 6a	O	SS	A	SW	I
Step 6b	O	SS	A	SW	I
Step 6c	O	SS	A	SW	I
Step 7a	O	SS	A	SW	I
Step 7b	O	SS	A	SW	I
Step 7c	O	SS	A	SW	I
Step 7d	O	SS	A	SW	I
Step 7e	O	SS	A	SW	I
Step 7f	O	SS	A	SW	I
Step 8	O	SS	A	SW	I
Step 9	O	SS	A	SW	I

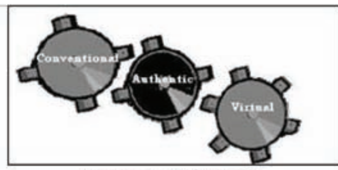


the need for policies and procedures to serve non-traditional students, and the issue of assessment.

This chapter introduced distance educators to meaningful strategies that included the fundamentals of good assessment as well as practical tools for assessing distance learning in general and teaching and learning resources in particular. Although distance learning is not new, it is only now beginning to garner the reputation in the academic community that comes with the recognition of teaching online as a successful delivery modality for more and more learners.

The dramatic growth of the adult learner population is making distance learning an increasingly popular choice of learning techniques. Further changes to the demographics of the traditional learner

Figure 15. Distance learner lesson plan template (cumulative)



Focus on Outcomes

Identify **characteristics of good assessment** for the distance learner included in the lesson:

- [x] Valid. Does it measure what it is intended to measure?
- [x] Reliability. Can the assessment results be replicated?
- [x] Uses collaborative tools to enhance assessment
- [x] Incorporates strategies that accommodate special circumstances of the distance learner
- [x] Organizes learning activities around demonstrable outcomes
- [x] Targets one of the specific psychologies of education
- [x] Includes formative assessment using a variety of distance education tools
- [x] Follows strict accordance with generally accepted ethical standards

Identify the **virtual outcomes assessment tools** employed in this lesson:

- [x] Evaluation of online examinations
- [ ] Evaluation of e-portfolios
- [ ] Evaluation of online survey instruments
- [ ] Evaluation of computer-mediated communications technologies
- [x] Evaluation of conferencing technologies
- [ ] Evaluation of simulations and games technologies

Identify the **virtual learning outcome assessment tools for technology-based resources** included in this lesson:

- [x] Virtual learning outcome assessment tools for assessing text-based materials
- [x] Virtual learning outcome assessment tools for assessing visual-based materials
- [x] Virtual learning outcome assessment tools for assessing web-based materials

and the adult learner will push institutions to develop even more online course offerings supported with the infrastructure to ensure achievement of student outcomes at the same, if not higher, levels than the traditional student. Use of the tools and techniques offered in this text will help institutions understand which methods work best in the distance learning classroom.

CONCLUSION

Appendix C, Distance Learner Lesson Plan Template A completed **Focus on Outcomes** portion of the template (Figure 15) demonstrates how to complete a distance learner-oriented lesson on the Planets of the Solar System.

REFERENCES

Bell, J. B., & Whaley, B. (1991). *Cheating and deception*. New York: Transaction Publishing.

Brown, G., Bull, J., & Pendlebury, M. (1997). *Assessing Student Learning in Higher Education*. New York: Routledge.

Heineke, J., & Meile, L. (1995). *Games and exercises for operations management: hands-on learning activities for basic concepts and tools.* Englewood Cliffs, NJ: Prentice-Hall.

Morley, J. (2000, January). Methods for Assessing Learning in Distance Education Courses. *Education at a Distance Magazine*, *13*(1). Retrieved August 2008 from http://www.usdla.org/html/journal/JAN00_Issue/Methods.htm.

Appendix A:
Traditional Learner Lesson Plan Template

LESSON PLAN TEMPLATE

TRADITIONAL CLASSROOM LESSON FORMAT

Teacher Name:

Date of the Lesson:

Subject: Planets of the Solar System

Focus on the Learner

Grade Level:

Psychology of the Lesson: Behavioral

Major **instructional application**:

- ☐ Programmed instruction
- ☐ Computer-assisted instruction
- ☐ Mastery learning
- ☐ Other ____________________

Traditional student characteristics targeted by this lesson plan:

☐ Subject-oriented; seek to successfully complete each course, regardless of how course relates to their own goals

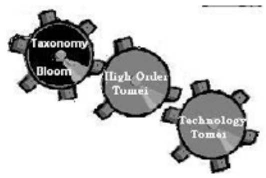
☐ Future-oriented; youth education is often a mandatory or an expected activity in a youth's life and designed for the youth's future

☐ Often depend on adults for direction

☐ Likely to accept new information without trying it out or seriously questioning it

☐ Seek education that prepares them for an often unclear future; accept postponed application of what is being learned

☐ Depend on others to design their learning; reluctant to accept responsibility for their own learning



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

☐ Philosophy
(What are we teaching?)

☐ History
(When are we teaching?)

☐ Psychology
(How do we teach?)

☐ Leadership
(Whom is responsible?)

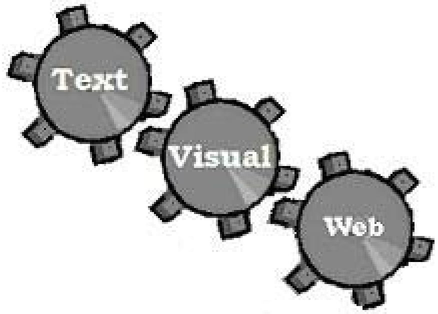
☐ Sociology
(Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the taxonomy and level of objectives addressed by the lesson.

☐ Cognitive [Knowledge __ Comprehension __ Application __ Analysis __ Synthesis __ Evaluation __]

☐ Affective [Receiving __ Responding __ Valuing __ Organization __ Characterization by a value __]

☐ Psychomotor [Perception __ Set __ Guided response __ Mechanism __ Complex overt response __ Adaptation __ Origination __]



Focus on Resources

Technology-based instructional resources for the traditional learner.

Text-based resources
- ☐ Handouts, study guides, etc.
- ☐ Hyper book

Visual-based resources
- ☐ Classroom presentation
- ☐ Interactive lesson

Web-based resources
- ☐ Lesson home page
- ☐ Virtual tour

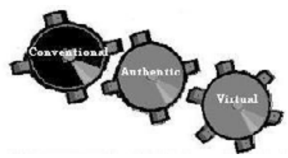
Focus on Delivery

Document the development of this lesson using the traditional learner instructional design **ADDIE Model** to ensure that the lesson plan includes these elements:

- ☐ Analysis phase [Purpose __ Audience __ Goals/Objectives __]
- ☐ Design phase [Learning units __]
- ☐ Development phase [Content __ Assignments __ Assessment __]
- ☐ Implementation phase [Prototype lesson __ Revisions __]
- ☐ Evaluation [Learning outcomes __ Competencies mastered __]

Identify the **instructional teaching strategy** to be used in this lesson:

- [ ] Direct Instruction (approximate time):
- [ ] Activity-based Instruction (approximate time):
- [ ] Independent strategies instruction (approximate time):
- [ ] Thinking skills Instruction (approximate time):
- [ ] Cooperative strategies (approximate time):



Focus on Outcomes

Identify **characteristics of good assessment** for the traditional learner included in the lesson:

- [ ] Valid. Does it measure what it is intended to measure?
- [ ] Reliability. Can the assessment results be replicated?
- [ ] Clear purpose
- [ ] Enables the learner to plan for further learning
- [ ] Begins early in the instructional design process
- [ ] Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

- [ ] Rubric for written assignment objectives
- [ ] Rubric for communications/ presentations objectives
- [ ] Rubric for performance-based objectives

Identify the **assessment tools for technology-based resources** included in this lesson:

- ☐ Checklist for assessing text-based materials
- ☐ Checklist for assessing visual-based materials
- ☐ Checklist for assessing web-based materials

Appendix B:
Adult Learner Lesson Plan Template

Subject: Planets of the Solar System

Focus on the Learner

Grade Level:

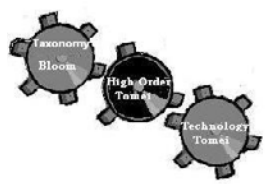
Psychology of the Lesson: Cognitive

Major **instructional application**:

☐ Discovery learning ☐ Reception learning ☐ Other ________________

Adult student characteristics targeted by this lesson plan:

- ☐ Problem-centered; seek educational solutions to where they are compared to where they want to be in life
- ☐ Results-oriented; have specific results in mind for education - will drop out if education does not lead to those results because their participation is usually voluntary
- ☐ Self-directed; typically not dependent on others for direction
- ☐ Often skeptical about new information; prefer to try it out before accepting it
- ☐ Seek education that relates or applies directly to their perceived needs, that is timely and appropriate for their current lives
- ☐ Accept responsibility for their own learning if learning is perceived as timely and appropriate



Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☐ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☐ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the level of the taxonomy addressed by the lesson.

- ☐ Knowledge
- ☐ Practice
- ☐ Application
- ☐ Evaluation
- ☐ Research

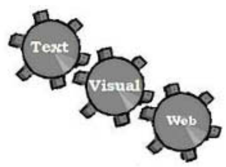
What **"essential" and "unit" questions** will become the focus this unit?

1. ____________________________

2. ____________________________

3. ____________________________

4. ____________________________



Focus on Resources

Technology-based instructional resources for the adult learner.

Text-based resources

☐ Handouts, study guides, text student materials

☐ Hyper book

Visual-based resources

☐ Classroom presentation

☐ Interactive lesson

Web-based resources

☐ Lesson home page

☐ Virtual tour

Identify other adult learner-oriented materials needed for the lesson.

1. ____________________________

2. ____________________________

3. ____________________________

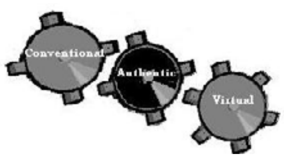
Focus on Delivery

Document the development of this lesson using the adult learner instructional design **Backward Design Model** to ensure that the lesson plan includes these elements:

- ☐ Identify Learner Outcomes
- ☐ Determine Acceptable Evidence
- ☐ Plan Learning Experiences and Instruction
- ☐ Create resources to engage the learner
- ☐ Revise and refine the lesson

Identify the **instructional teaching strategy** to be used in this lesson:

- ☐ Direct Instruction (approximate time):
- ☐ Activity-based Instruction (approximate time):
- ☐ Independent strategies instruction (approximate time):
- ☐ Thinking skills Instruction (approximate time):
- ☐ Cooperative strategies (approximate time):



Focus on Outcomes

Identify **characteristics of good assessment** for the adult learner included in the lesson:

☐ Valid. Does it measure what it is intended to measure?

☐ Reliability. Can the assessment results be replicated?

☐ Acknowledges the experience, knowledge, values, beliefs, and opinions of the adult learner

☐ Includes a wide range of assessment tools that concedes the diverse learning styles of the adult student

☐ Includes participatory assessment techniques such as case studies, portfolios, and problem-solving groups to increase the opportunities to evidence understanding

☐ Includes educational objectives that match instruction but allows for variances in learning styles among students

☐ Follows strict accordance with generally accepted ethical standards

Identify the **outcomes assessment tools** employed in this lesson:

Portfolio for collecting artifacts that include:

- ☐ Content area materials
- ☐ Classroom resources
- ☐ Library resources
- ☐ World wide web sites

Portfolio for working artifacts that include:

- ☐ Making connections
- ☐ Learning projects
- ☐ Applications and lessons
- ☐ Reflections and self-assessment

Portfolio for showcase artifacts that include:

- ☐ Teaching materials
- ☐ Professional documents
- ☐ Service
- ☐ Scholarship

Identify the **assessment tools for technology-based resources** included in this lesson:

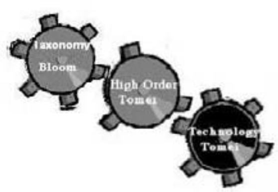
- ☐ Rating scales for assessing text-based materials
- ☐ Rating scales for assessing visual-based materials
- ☐ Rating scales for assessing web-based materials

Appendix C:
Distance Learner Lesson Plan Template

LESSON PLAN TEMPLATE **DISTANCE LESSON FORMAT** **Instructor's Name**:
Date of the Lesson:
Subject: Planets of the Solar System
 **Focus on the Learner**
Grade Level:
Psychology of the Lesson: Humanism
Major **instructional application**: ☐ Open education ☐ Cooperative learning

Distance learner characteristics targeted by this lesson plan:

- ☐ Self-motivation
- ☐ Time management skills
- ☐ Self-discipline
- ☐ Reading comprehension
- ☐ Persistence
- ☐ Availability of time
- ☐ Ability to use a desktop or laptop computer, printer, software, and Internet
- ☐ Typing speed and accuracy



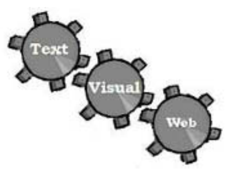
Focus on Learning

Identify the primary **Pillar of Education** that provides the comprehensive conditions of teaching and learning addressed by this lesson:

- ☐ Philosophy (What are we teaching?)
- ☐ History (When are we teaching?)
- ☐ Psychology (How do we teach?)
- ☐ Leadership (Whom is responsible?)
- ☐ Sociology (Who are we teaching?)

Objectives and Goals introduced in the following domains of traditional learning. Identify the level of the taxonomy addressed by the lesson.

- ☐ Literacy
- ☐ Collaboration
- ☐ Decision-making
- ☐ Technology for learning
- ☐ Technology for teaching
- ☐ Tech-ology



Focus on Resources

Technology-based instructional resources for the distance learner.

Text-based resources

- ☐ Handouts, study guides, text student materials
- ☐ Hyper book

Visual-based resources

- ☐ Classroom presentation
- ☐ Interactive lesson

Web-based resources

- ☐ Lesson home page
- ☐ Virtual tour

Focus on Delivery

Document the development of this lesson using the distance learner instructional design **Kemp Model** to ensure that the lesson plan includes these elements:

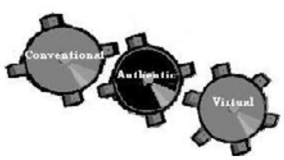
- ☐ Define the instructional problems
- ☐ Describe learner characteristics
- ☐ Conduct a task analysis
- ☐ Develop the instructional objectives
- ☐ Sequence the content to be delivered
- ☐ Design the instructional strategies
- ☐ Integrate the resources
- ☐ Deliver the instruction
- ☐ Evaluate the instruction

Identify the **instructional teaching strategy** to be used in this lesson:

- ☐ Direct Instruction (approximate time):
- ☐ Activity-based Instruction (approximate time):
- ☐ Independent strategies instruction (approximate time):
- ☐ Thinking skills Instruction (approximate time):
- ☐ Cooperative strategies (approximate time):

Method of Delivery: Synchronous Asynchronous LMS Other

More than one method may be used to present the lesson



Focus on Outcomes

Identify **characteristics of good assessment** for the distance learner included in the lesson:

- ☐ Valid. Does it measure what it is intended to measure?
- ☐ Reliability. Can the assessment results be replicated?
- ☐ Uses collaborative tools to enhance assessment
- ☐ Incorporates strategies that accommodate special circumstances of the distance learner
- ☐ Organizes learning activities around demonstrable outcomes
- ☐ Targets one of the specific psychologies of education
- ☐ Includes formative assessment using a variety of distance education tools
- ☐ Follows strict accordance with generally accepted ethical standards

Identify the **virtual outcomes assessment tools** employed in this lesson:

- ☐ Evaluation of online examinations
- ☐ Evaluation of e-portfolios
- ☐ Evaluation of online survey instruments
- ☐ Evaluation of computer-mediated communications technologies
- ☐ Evaluation of conferencing technologies
- ☐ Evaluation of simulations and games technologies

Identify the **virtual learning outcome assessment tools for technology-based resources** included in this lesson:

- ☐ Virtual learning outcome assessment tools for assessing text-based materials
- ☐ Virtual learning outcome assessment tools for assessing visual-based materials
- ☐ Virtual learning outcome assessment tools for assessing web-based materials

Appendix D:
The K–A–RPE Model—Research Investigation

Knowledge, application, and research, practice and evaluation provide the necessary distinctions among the adult-as-learner, adult-as-expert, and the adult-as-scholar to questions pertaining to similarities and differences among seemingly analogous levels of instructional programs. As with other more well-known taxonomies, the K-A-RPE Model is both progressive and assumes mastery and competency at previous levels.

In 2004, the author completed a study of higher education that examined the differences and similarities among pre-service (undergraduate), in-service professionals (graduate), and post-graduate (doctoral) programs with respect to technology-based curriculum. Specifically, the study attempted to investigate technology courses across three levels in the minds of faculty and students alike as they move through their formal education agendas. The study addressed the following questions.

- When it comes to technology skills and competencies, what can I expect to learn differently as a graduate or doctoral candidate than I did as a freshman?
- Is there a different set of skills and competencies appropriate for each of these levels?
- If I take undergraduate technology courses am I sufficiently prepared (i.e., competent) to use technology throughout an entire career?

The accompanying review of the literature explored the various standards for instructional technology education published by such organizations as the SUCCESS Program (SUCCESS and the Pittsburgh Public School System), the International Society for Technology in Education (ISTE), and the International Technology Education Association (ITEA). The review also encompassed the most widely recognized taxonomies of Teaching (Bloom, Krathwohl and Kibler) as well as those classification systems specifically dealing with technology (Bledsoe, Tomei, and Bruce & Levin).

The study's statement of the problem called for an examination of incidents of student learning objectives in information technology courses taught at the undergraduate, graduate, and doctoral levels of higher education. These objectives were compared to the three respective levels of the K-A-RPE model in an attempt to determine whether, as expected, knowledge objectives occur more at the undergraduate level, application objectives at the graduate level, and research-practice-evaluation objectives at the doctoral level.

What is reported in the next few paragraphs is a synopsis of the results of the study presented at the 2005 IRMA International Conference and published in the official journal of the Society for Information Technology and Teacher Education in 2006.

Sixty-nine (69) university and college technology programs were investigated. Most offered information technology programs on at least two of the three academic levels reviewed: undergraduate, graduate, and doctoral. An email requesting participants to submit learning objectives in their respective programs was sent to the schools and selected based on information available from their web sites. Two separate examiners reviewed the programs to enhance inter-rater reliability. In total, 1286 courses and nearly 12,000 objectives were identified, categorized, and analyzed during this research. (Figure D-1).

To recap the findings, the investigation supported the assertion that knowledge is the essential building block of technology at the undergraduate (bachelors) level of higher education. Likewise, research, practice, and evaluation were critical to post-graduate scholars. However, it could not be confirmed that application was the most used category of objective for graduate (masters) candidates. Specifically, of the 1,300 objectives reviewed at the bachelor's level, nearly half (.49) of the learning objectives were categorized as knowledge-based outcomes; 30 percent explored the application of technology; and, 21 percent considered research, practice, or evaluation.

Surprisingly, most graduate programs continued to offer their candidates knowledge-based objectives (.43) while the application level came in at a distant 33 percent. Only a quarter of the objectives (.24) carried research, practice, or evaluation implications.

As expected, most (.44) of the doctoral learning objectives examined were found the research, practice, or evaluation level. As a result of this study of selected schools and the nearly 1,300 learning objectives, the study was determined sufficient to generalize the K-A-RPE model to higher education programs. Further investigation was recommended to explore the implications of the model in other academic disciplines within higher education in addition to the corporate training environment.

Summary of the Investigation. The K-A-RPE model distinguishes among undergraduate, graduate, and doctoral programs throughout higher education. The same model can effectively dissect the

Figure D-1. Results of the K-A-RPE Investigation into Learning Objectives of Technology-Based Courses in Higher Education

Program of Study	Nr of Learning Objectives			% of Learning Objectives		
	K	A	R-P-E	K	A	R-P-E
Bachelor (Undergraduate) Programs • Reviewed 1,308 objectives and 271 courses	636	398	274	49	30	21
Masters (Graduate) Programs • Reviewed 5,155 objectives and 492 courses	1944	1763	1448	43	33	24
Doctoral (Post-graduate) Programs • Reviewed 5,462 objectives and 523 courses	1749	1297	2416	32	24	44
Totals • Reviewed 11,925 objectives and 1,286 courses	4329	3458	4138	36	29	35

Shaded area represents actual findings from this study

Boxed area represents hypothesized majority of objectives at each level

various learning objectives in a corporate program targeting novice, journeymen, and master learners. When asked by prospective candidates, “what will I learn differently as a doctoral candidate than I did as a graduate student or as a freshman?” the K-A-RPE model provides a basis for a carefully measured response.

Simply put, a well-designed educational program, whether in formal higher education or corporate training, considers the three roles of the adult learner during the course of their life. Knowledge demands initiate the focus for the adult-as-learner as skills and competencies as well as technical proficiency form the basis for all personal development. The adult-as-expert, in comparison, traverses the broader range of abilities necessary to effectively apply learning strategy in the classroom. Ultimately, adults are expected to expand the horizons of their chosen discipline by robust, scholarly investigation followed by advancements to best practice and culminating in constructive and impartial evaluation of a discipline shared throughout a lifetime of personal achievement.

Appendix E:
Bibliography of Recommended Reading

Abelson, Harold and Gerald Jay Sussman with Julie Sussman, (1985). The Structure and Interpretation of Computer Programs. Cambridge: the MIT Press.

Ackermann, Edith, (1993). Tools for Constructive Learning: Rethinking Interactivity. E&L Memo #15. Cambridge: MIT Media Laboratory Epistemology and Learning Group.

Allport, G. W. (1955) Becoming: Basic Considerations for a Psychology of Personality. New Haven, CT. Yale Univ. Press.

Bateson, Gregory, (1972). Steps to an Ecology of Mind. New York: Ballantine Books.

Bourdieu, Pierre and Jean-Claude Passeron, (1977). Reproduction in Education, Society and Culture, second edition. London: Sage Publications.

Bourdieu, Pierre, (1977). Outline of a Theory of Practice. Cambridge: Cambridge University Press.

Brainerd, C. J., (Ed.), Special Section: Psychological Science Celebrates the Centennial of Jean Piaget. Psychological Science, 7 (4), (1996): 191[-]225.

Bridges, W. (2004) Transitions: Making Sense of Life's Changes. De Capo Press.

Brown, John Seely, Allan Collins, and Paul Duguid, (1989). Situated Cognition and the Culture of Learning. In Educational Researcher, pp. 33-42, January-February, 1989.

Bugental, J. F. T. (1965) The Search for Existential Identity. New York: Holt, Rinehart & Winston.

Bugental, J. F. T. (1992) The Art of Psychotherapy. New York: W. W. Norton.

Bugental, J. F. T. (Ed.) (1967) Challenges of Humanistic Psychology. New York: McGraw-Hill.

Cardwell M, Clark L and Meldrum C (2004) *Psychology for A2 Level*, London: Collins Educational.

Cardwell M, 3rd ed (2003) *Complete A-Z Psychology Handbook*, London: Hodder and Stoughton.

Cavallo, David, (1996b). New Initiatives in Youth Development: Technology Works Enterprises. In International Conference on the Learning Sciences, July, pp. 9-13.

DeCarvalho, R. (1991) The founders of humanistic psychology. New York: Praeger.

DeLoache, Judy, S., Early Understanding and Use of Symbols: The Model Model.

Dewey, John, (1938). Experience and Education. New York: Collier Books.

Dewey, John, (1956). Philosophy of Education. Ames, Iowa: Littlefield, Adams and Co.

Dewey, John, (1961). Democracy and Education. New York: The Macmillan Company.

Egan, Kieran, (1997). The Educated Mind: How Cognitive Tools Shape Our Understanding. Chicago: The University of Chicago Press.

Ellis, A. (1973) Humanistic Psychology: The rational-emotive approach. New York: Julian Press.

Erikson, Erik H. Identity and the Life Cycle. New York: International Universities Press, 1959.

Flavell, John, H., “Cognitive Development: Children’s Knowledge About The Mind.” Annual Review of Psychology, 50, (1999), 21-45.

Fontana D, 3rd ed, (1995). Psychology for Teachers, London: Macmillan/BPS Books.

Freire, Paulo, (1989). Education for Critical Consciousness. New York: Continuum.

Freire, Paulo, (1995). Pedagogy of Freedom: Ethics, Democracy, and Civic Courage. Lanham, MD.: Rowman and Littlefield Publishers Inc.

Freire, Paulo, (1995). Pedagogy of Hope: Reliving Pedagogy of the Oppressed. New York: Continuum.

Fromm, E. (1989) The art of loving. New York: Harper & Row.

Gardner, Howard, (1999). The Disciplined Mind: What Should All Students Understand. New York: Simon and Schuster.

Gendlin, E. (1981) Focusing. New York: Bantam.

Gibb, J. (1978). Trust. Los Angeles: Guild of Tutors Press.

Gruber, Howard E. and J. Jacques Voneche, ed. (1977). The Essential Piaget. New York: Basic Books.

Halford, Graeme, S., Children’s Understanding: The Development of Mental Models. Lawrence Erlbaum Associates, 1993.

Harel, Idit, (1991). Children Designers: Interdisciplinary Constructions for Learning and Knowing Mathematics in a Computer-Rich School. NJ: Ablex Publishing Corporation.

Hirsch, E.D., (1996). The Schools We Need: Why We Don’t have Them. New York: Doubleday.

Hoffman, E. (1988) The Right to be Human: A Biography of Abraham Maslow. Los Angeles: Jeremy P. Tarcher.

Holt, John, (1989). Learning All the Time. Reading: Addison-Wesley.

The Humanistic Psychologist. Journal of the division of Humanistic Pscyhology, American Psychological Association.

Humanity and Society. Journal of the Association for Humanist Sociology.

Jourard, S. (1964) The transparent self. Princeton, NJ: Van Nostrand.

Journal of Humanistic Psychology. Journal of the Association for Humanistic Psychology, Sage Publications.

Journal of Transpersonal Psychology. Journal of the Association for Transpersonal Psychology.

Kafai, Yasmin, (1995). Minds in Play: Computer Game Design As a Context for Children's Learning. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Kolodner, Janet, David Crismond, Jackie Gray, Jennifer Holbrook, Sadhana Puntambekar, (1998). Learning by Design from Theory to Practice. EduTech Institute, Georgia Institute of Technology.

Lave, Jean and Etienne Wegner, (1991). Situated Learning: Legitimate Peripheral Participation. Cambridge: Cambridge University Press.

Lave, Jean, (1988). Cognition in Practice: Mind, Mathematics and Culture in Everyday Life. Cambridge: Cambridge University Press.

Lowry, R. (Ed.) (1979) The Journals of A. H. Maslow. Monterey, CA Brooks/Cole.

Maslow, A. H. (1954) Motivation and Personality. New York: Harper & Bros.

Maslow, A. H. (1968) Toward a Psychology of Being (2nd ed.). Princeton, NJ: Van Nostrand.

Maslow, A. H. (1976) The Farther Reaches of Human Nature. New York: Penguin.

Moustakas, C. (1961) Loneliness. Englewood Cliffs, NJ: Prentice-Hall.

Moustakas, C. (1994) Existential Psychotherapy and the Interpretation of Dreams. Northvale, NJ: J. Aronson.

Norman, Donald A., (1990). The Design of Everyday Things. New York: Doubleday.

Nunes, Teresinha, and Peter Bryant, (1996). Children Doing Mathematics. Cambridge: Blackwell Publishers.

Papert, Seymour, (1993). The Children's Machine: Re-Thinking School in the Age of the Computer. New York: Basic Books.

Perkins, David, (1986). Knowledge As Design. Mahwah, NJ: Lawrence Erlbaum Associates.

Perls, F. (1973) The Gestalt Approach and Eyewitness to Therapy. Palo Alto, CA: Science & Behavior Books.

Piaget J (1975) A Child's Conception of the World, Toitowa, NJ: Rowman & Littlefield.

Piaget J (2001) *The Psychology of Intelligence*, London: Routledge.

Piaget, Jean and Inhelder. The Psychology of the Child. N.Y.: Grossman. 1969

Piaget, Jean, (1923). The Language and Thought of the Child, in The Essential Piaget, Howard E. Gruber and J. Jacques Voneche, eds. New York: Basic Books.

Piaget, Jean, and Inhelder, Barbel, *The Psychology of the Child.* Routledge and Kegan Paul, 1969.

Piaget, Jean, with Alina Szeminska, (1941). The Child's Conception of Number, in The Essential Piaget, Howard E. Gruber and J. Jacques Voneche, eds. New York: Basic Books.

Piaget, Jean. Insights and Illusions of Philosophy. London: Routledge and Kegal Paul, 1965.

Piaget, Jean. The Construction of Reality in the Child. N.Y.: Basic Books, 1954.

Piaget, Jean. The Growth of Logical Thinking from Childhood to Adolescence. N.Y.: Basic Books, 1958

Piaget, Jean. The Moral Judgement of the Child. N.Y.: Free Press, 1932.

Piaget, Jean. The Psychology of Intelligence. Armand Colin, 1947.

Puntambekar, Sadhana, and Janet Kolodner, (1998). Distributed Scaffolding: Helping Students Learn in a 'Learning by Design' Environment. EduTech Institute, Georgia Institute of Technology.

Ravitch. Diane and Maris A. Vinovskis, eds., (1995). Learning from the Past: What History Teaches Us about School Reform. Baltimore: The Johns Hopkins University Press.

Reich, W. (1949) Character analysis. New York: Orgone Institute Press.

Rogers, C. R. (1951) Client-Centered Therapy. Boston: Houghton Mifflin.

Rogers, C. R. (1972). On Becoming a Person. Boston: Houghton Mifflin.

Rogers, C. R. (1980) A Way of Being. Boston: Houghton Mifflin.

Rogoff, Barbara, (1990). Apprenticeship in Thinking: Cognitive Development in Social Context. New York: Oxford University Press.

Satir, V. (1972) Peoplemaking. Palo Alto, CA: Science & Behavior Books.

Schaffer, HR (2004) Introducing Child Psychology, Oxford: Blackwell Publishing.

Schank, Roger and Chip Cleary, (1995). Engines for Education. Hillsdale, NJ: Lawrence Erlbaum Associates Publishers.

Schutz, W. C. (1967) Joy. New York: Grove Press.

Siegler, Robert, S., Emerging Minds: The Process of Change in Children's Thinking. Oxford University Press, 1996.

Suhd, M. H. (Ed.) (1995) Positive Regard: Carl Rogers & other Notables He Influenced. Palo Alto, CA: Science & Behavior Books.

Thomas, R. Murray, Comparing Theories of Child Development. California: Brooks/Cole Publishing Company (4th Edition), 1996.

Walkerdine, Valerie, (1988). The Mastery of Reason: Cognitive Development and the Production of Rationality. London: Routledge.

Wheelis, A. (1958) The Quest for Identity. New York: W. W. Norton.

Glossary of Terms

Accelerated Learning programs are diverse techniques, methodologies and approaches to teaching and learning geared toward the whole person. They encompass a wide assortment of creative methodologies supported by current theories and the literature of how people learn best. Accelerated learning techniques are poised to enhance retention and performance. Their outcome is to produce more effective learners. Accelerated learning is appropriate for traditional classrooms in a wide range of subjects.

Action Research involves investigations conducted by students for the purpose of solving a problem or obtaining information. Typically those involved in action research generally want to solve some kind of day-to-day problem. Action research is a particularly appropriate strategy for teaching adults and professionals or to simply improve a learner's ability to improve educational practice. Typically, action research follows the general procedures of the scientific process that calls for identifying the research problem, gathering the necessary information, analyzing and interpreting the information, developing an action plan, and testing the plan and revising the actions until the problem is resolved.

Active Learning allows students to talk, listen, read, write, and reflect on course content by way of practical, real-world problem-solving exercises. Small groups, simulations, case studies, role playing, and other similar hands-on activities are employed by the instructor. Students apply their learning and move up to the higher levels of learning taxonomy.

Applied Learning is a process of integrating one or more subject matter content areas (disciplines) with authentic (personal, home, career, community, society) learning experiences that apply to the home, career, or society. Applied learning provides experience in the problem solving process; the manipulative use of tools, equipment, materials and related techniques; personal skills; occupational awareness and safety. Applied learning is an effective strategy for learning many of the skills and concepts embodied in academic subject matter and relate directly to content and accepted performance standards.

Assessment Alternatives present a strategy for addressing critical questions about the value of instruction and quality of student learning outcomes. What am I doing? How well am I doing it? What do I need to do to improve? There are generally two kinds of data used in educational assessment or evaluation: quantitative and qualitative. A quantitative measurement uses input from a standardized instrument that limits data to predetermined set of responses. Qualitative measurement is more concerned with descriptive input and is by nature more subjective. Also, educators generally recognize objective, subjective, self-assessment, and authentic assessments.

Audio Conferencing is a telephone conferencing service that uses regular telephone lines and a digital conference bridge to provide an inexpensive, flexible, and convenient method of communication. Using this service, individuals or groups at multiple locations meet for business or administrative purposes, saving travel expenses and time. Audio conferencing offers an alternative method of communication in distance education courses. Voice communication is delivered through standard telephone lines or web-based software either in real time and synchronously. When more than one person is at a location, speakerphones or special audio conference equipment is required. When more than two sites are involved, a telephone conference bridge is needed. Successful audio conferencing requires good audio quality, a reliable audio bridge, and comfortable or quiet environment to reduce noise. Some equipment used to facilitate audio conferencing includes high-performance speaker phones and headsets, or both. A well run audio conference requires planning, testing, and backup systems to ensure success.

Audio Technologies. Audio offers cost-effective (and technically uncomplicated) ways to enhance distance learning courses. Audio components of distance learning may take the form of a simple telephone call or it can be as complex as an audio teleconference with microphones, telephone bridges, and speakers. Telephones are one of the simplest, most accessible technologies used for distance learning. Voicemail is becoming extremely common. Audiotapes (cassettes) are inexpensive, easily duplicated, and very versatile.

Most every application of audio technologies is relatively inexpensive (especially when compared to multimedia and video applications). With the proliferation of the cell phone in the 1990s, it can be argued that every home (if not every person) has a telephone or immediate access to one. Learners have access to an audiotape player and/or CDROM in their home or car. And, almost every learner is at ease using audio electronics. On the down side, voice technologies, for the most part, are synchronous and require considerable attention by the both the instructor and the student with regards to a convenient time to initiate the conference. Finally, although audio-based learning is one of the most effective modalities for learning (19 percent of people have auditory learning preferences), students still have difficulty focusing on content presented entirely via audio (Sousa, 1997).

Brainstorming sessions share problem solving in an environment of collaboration in which all members of a group spontaneously contribute ideas. A problem is solved by rapidly generating a variety of possible solutions. The purpose of a brainstorming session is to work as a group to define a problem, and find, through a participatory intervention, the best group decision for a plan of action to solve it. Procedures for conducting a brainstorming session include: defining the problem, generating goals, delineating the objective, ascertaining resources and constraints, recommending possible strategies, and summarizing group decisions. The facilitator (i.e., the teacher) calls for suggestions from the participants, refuses criticism of any suggestions by anyone, and records all ideas without comment or critique.

Case Studies have historically been associated with business schools, law schools and social science classes, but have more recently be used in many other disciplines which explore issues and consider principles depicting real world situations. Case study methodologies have expanded to include the physical sciences, mathematics, literature, history, and certainly, adult education. They often take the form of real-word scenario (cases generally based on real world situations), supporting data and documents (effective cases using real world artifacts for students to analyze), and open-ended problems (cases that require students to answer open-ended questions or develop solutions to an open-ended problems). Case studies may be designed for teams or for independent learning.

Character Education. Since their inception, school systems (both public and private) have served the dual purpose of both raising standards of academic achievement and serving the moral and character development needs of society. Environments, activities, the arts, and service projects help students to appreciate the nature of citizenry demanded of graduates. They learn responsibility, compassion, integrity, civility, leadership and cooperation as well as math, science, and language. A well-developed character is mastered through examples and exercised by opportunities presented in the classroom.

Cognitive Coaching is a form of teaching intervention that has, as its primary purpose, the intention of enhancing self-directed learning. It is a combination of skills and strategies, maps and tools, and mental models and personal beliefs. Unique to this coaching model are the five conditions of efficacy, flexibility, consciousness, craftsmanship and interdependence. Used by the cognitive coach, these resources enhance and develop a learner's self-directedness and ability to learn on their own.

Collaborative Learning is the instructional use of small groups so that students work together to maximize learning – both their own and their peers. Collaborative learning is governed by the amount of in-class or out-of-class time built around group work. Activities range from classroom discussions (with short lectures, if necessary) through entire class periods. A foundation in research and investigation as well as teamwork and collaborative relationships is critical to success. In collaborative learning, the development of interpersonal skills is as important as the learning itself. The development of social skills in a group work – learning environment is key to successful learning outcomes.

Computer-Assisted Instruction (CAI) is a narrow term and most often refers to drill-and-practice, tutorial, or simulation activities offered either autonomously via distance education or as a complement to traditional, teacher-directed instruction.

Computer-Based Training is any training that uses a computer as the focal point for instructional delivery. With CBT, training is provided through the use of a computer and software, which guides a learner through an instructional program.

Computer-Based Technologies. With the increased popularity of the Internet, computer-based technologies are receiving more attention as a modality for delivering distance learning. The primary computer technologies used for distance education include learning management systems (e.g., WebCT, TopClass, Web Course in a Box, and Learning Space); synchronous and asynchronous platforms (e.g., bulletin boards, chat rooms, and online discussion groups); and, Web-based education (e.g., web tutorials, simulations, interactive projects, and virtual tours).

Computer-based technologies encourage self-directed learning. Computers encourage learners to proceed at their own pace, solicit feedback instantaneously, and evaluate their learning outcomes as often as they like making them a natural for distance-based instruction. Another key advantage of computer-based technologies is their ability to incorporate text, graphics, audio, and video into a single content modality. With the trend toward digital audio, digital video, and computer animations, it is easy to incorporate various media into computer programs. Also, they encourage a high level of interactivity. They are relatively inexpensive and can be accessed worldwide.

Computer technologies for distance learning require a considerable outlay in hardware and software that, until the advent of the 21st century, was often beyond the financial resources of many learners. Successful application of these technologies demands a substantial investment in design, development, implementation, and evaluation. Considerable preparation time and expense must go into each lesson and considerable preparation on the part of the instructor must precede the delivery of each lesson. Finally, as most users of technology are quick to admit, computers are notoriously unreliable. Previewing the technology, practicing the lesson, and preparing a backup (preferably non-technical) in case of emergencies is standard fare.

Computer-Managed Instruction is an instructional strategy whereby the computer is used to provide learning objectives, learning resources, and assessment of learner performance. CMI aids the instructor in instructional management without actually doing the teaching.

Often, CAI, CBT, and CMI are used interchangeably to describe technology-assisted learning. The most common techniques employed include: (a) the tutorial, used to introduce new information that must be taught in a sequential manner, (b) drill and practice that promotes mastery of a new skill or information and is typically used after initial instruction, (c) simulations to motivate and engage the learner with instruction that replicates real-word situations not otherwise available in a traditional classroom environment, and problem solving to help students develop skills in logic, solving problems, and following directions, and is generally used to augment higher order thinking skills.

Conferencing is a generic term that, thanks in large measure to the burgeoning technologies, is defined as formal or informal discussions for the purposes of exchanging opinions or ideas. From an educational perspective, conferencing also involves instruction between a teacher and a student or small group of students. Current educational use reflects more of the interchange idea, with the student being an active participant in the discourse as well as a recipient of content. Conferencing has become more widely used as a classification of teaching at a distance. For example, computer conferencing, audio conferencing, teleconferencing, web conferencing, and video conferencing are all manifestations of the idea that instruction can be delivered not as a one-way didactic presentation bur more effectively (especially for adults) as an interchange of ideas. The instructor takes on a more facilitative role; whereas, the learner will adopt a more active participant role.

Conflict Resolution. The purposes of conflict resolution are to provide an environment in which learners feel physically and psychologically free from threats and danger and seek out opportunities to work and learn with others for the mutual benefit of all concerned. The diversity of the school's population is respected and celebrated. Conflict resolution is particularly appropriate in adult education. A report entitled, "Conflict Resolution Education: A Guide to Implementing Programs in Schools, Youth-Serving Organizations, and Community and Juvenile Justice Settings," a joint report from the Office of Juvenile Justice and Delinquency Prevention and the Office of Elementary and Secondary Education goes on to define four basic approaches to conflict resolution education:

- **Process Curriculum.** This approach is characterized by teaching conflict resolution as a separate course, a distinct curriculum, or a daily lesson plan.
- **Mediation Program.** Selected individuals (adults and/or students) are trained in the principles of conflict resolution and mediation to provide neutral third-party input to assist others in reaching resolution to a conflict.

- **Peaceable Classroom.** This approach integrates conflict resolution education into the curriculum and classroom management strategy.
- **Peaceable Schools.** Built on the peaceable classroom approach, this strategy uses conflict resolution as a system for managing the school as well as the classroom. Every member of the school community, including parents, learns conflict resolution principles and processes.

Cooperative Learning is one of the best researched of all teaching strategies. The results show that students who have opportunities to work collaboratively, learn faster and more efficiently, have greater retention, and feel more positive about the learning experience. Cooperative learning utilizes small group tenets that call for students of different levels of ability to use a variety of learning activities to improve their understanding of a subject. Each member of a team is given responsibility for learning the content material and for helping peers learn as well, creating an atmosphere of both achievement and interpersonal fulfillment. Cooperative efforts often have beneficial side-effects such as mutual increase from the expended efforts of the team (i.e., the whole is greater than the sum of its parts), from the realization that the team shares a common fate regarding success or failure (i.e., sink or swim), individual performance is mutually-inclusive (i.e., the team cannot succeed without everyone's contribution), and pride in success results from group achievement (i.e., a characteristic to be found later in life).

Critical Thinking is the ability to consciously examine the elements of one's own reasoning abilities, to assess another's abilities, or to evaluate any reasoning against universal intellectual standards for clarity, accuracy, precision, relevance, depth, breadth, and logic. Critical thinking has five important components: skill, responsibility, sound criteria, sensitivity to context, and self-correction.

Differentiated Instruction suggest creating multiple paths so that students of different abilities, interest or learning needs experience equally appropriate ways to succeed in the classroom. Differentiation can occur in the content (knowledge, skills and attitudes taught), process (varying instructional activities or strategies to provide appropriate methods for learning), product (working below, at, or above grade level), or environment (learning styles) in the classroom. Differentiating instruction allows students to take greater responsibility and ownership for their own learning, and provides opportunities for team-teaching and cooperative learning.

Direct Instruction has a long and well-documented history in the traditional classroom. Lectures, demonstrations, drill and practice, Socratic instruction, storytelling, and workbooks continue to be an important teacher-centered strategy for the traditional learner. Highly structured, the direct information delivery method often relies on drills, repetition, and scripted materials and provides the teacher with a strong, structured framework for imparting information and tracking learning outcomes.

Discussion Boards are asynchronous collaboration tools that host an individual's posted comments or questions. Other individuals who are members of the same discussion board are permitted to read the posted comments/questions and respond with their own remarks as they see fit. A discussion board is a general term for any online bulletin board. Some discussion boards are controlled and the posts monitored by a moderator before the posts are uploaded. From a historical perspective, the first major implementation of the discussion board on the Internet was hosted by Usenet who ultimately provided thousands of discussion boards before moving to the World Wide Web for its platform. A discussion board is similar to e-mail without the need for a specific user account or the demands of storing and organizing the content. A discussion board is comprised of various forums, folders established by the contributing users containing messages on a particular subject.

Distance Learning is defined as a technology-supported learning environment in which the learner and the instructor are physically separated by distance, time, or both. Distance learning makes use of online learning management systems, synchronous and asynchronous technology, and a host of instructional technologies to organize, present, and assess the intellectual content, delivery, and evaluation of instruction. A distance learning course has two components: the academic, subject matter content and how that content is delivered. The delivery of distance learning courses demands an understanding of learning theories as well as technology for successful learning outcomes.

eBook is an electronic version of a traditional print book that resides on a personal computer or a portable device such as a laptop computer, PDA or e-book reader using eBook software. Copious e-books can be kept on portable units for traveling, eliminating weight and volume compared to equivalent paper books. Electronic bookmarks make referencing easier, and most readers allow the user to annotate pages. Technical and educational material (i.e., text books) are especially suited for e-book delivery because it can be searched, indexed, and copied. Most CDROM-based eBooks contain the entire text of the work have been included in the back of many technical paper books. Users typically purchase an eBook on diskette or CD or downloadable the file of the eBook from a Web site. Generally, an eBook can be downloaded in five minutes or less. The major shortcomings of the e-book are the many formats competing for prime time, including Adobe PDF (most popular), as well as Microsoft Reader, eReader, Mobipocket Reader, OPS and OpenReader.

ePortfolio is an authentic assessment tool that enables learners to chronicle their learning by giving them a medium for organizing, storing, and displaying their skills, academic and career goals, and professional potential. The ePortfolio is an instrument that facilitates mobility and acknowledges formal and informal learning over a lifetime in a particular career or vocation. For example, the concept of Teacher as Learner, Teacher as Expert, and Teacher as Scholar answers the question of WHO would be using the portfolio. Educators display characteristics of three different natures over the span of a 30-year career in education. An internal assessment of where the portfolio user is in an academic career must be considered before the correct format of the portfolio can be developed. ePortfolios have a multitude of uses. They can be used to assess communication skills such as writing; provide evidence of student learning outcomes; track learner progress towards course, standards, program, institutional, district, state, and national standards; serve as a platform for authentic classroom assessment, Maintain an unofficial record of academic performance, credentials, certification, and career development; and, link a learner to peers and colleagues. Categories or components of an effective ePortfolio include collecting folders in which artifacts are stored initially as the learner gathers content area materials, classroom resources, library resources, and world wide web sites; working folders where new skills are acquired as the learner seeks to make connections, reflect and self-assess, prepare learning projects, and apply lessons learned; and, showcase folders that contain permanent artifacts of service, teaching, scholarship, and professional (Wilcox & Tomei, 1999).

Graphic Tools. A majority of learners are visually oriented. As a result, graphic tools such as illustrations, charts, diagrams, and photos are often more successful than words in explaining instructional content. Visual aids transform abstract ideas into concrete concepts and aid the learner in moving information from short-term to long-term memory. A few specific examples of graphics tools include clustering, spider map, writing chart, concept mapping, fishbone maps, events chains, cycle circle, and continuum scale.

Guided Reading/ Listening/ Speaking. Guided learners develop positive attitudes to the communications skills associated with reading, listening, and speaking. In a guided environment, teachers assist their students in recognizing, experimenting, developing, and finally adopting personal strategies that enable them to make sense of the world around them. They explore new language concepts and witness how these literacy features aid in responding critically to the ideas and concepts presented. On the downside, when students are placed into groups according to their perceived needs, educators often bristle at the appearance of grouping. Yet, in the case of communicative skills, when teachers plan their instructional decisions based on a close relationship with the participants, teaching groups often produce better learning outcome results.

Guided Writing. Similar to the purpose and outcomes of guided reading. Listening/ speaking guided writing continues the teaching strategy of extending and developing written text and independent writing. Guided writing involves the instructor and a small group of students focused on creating individual written assignments. Teachers respond to these attempts by considering the target audience, purpose of the writing, topic(s) selected, text type selected, and other factors specific to writing. The purpose of this strategy is to extend the student's thinking process, help them focus on conventions such as spelling, punctuation, standard usage and handwriting, and ultimately encourage students to revise and edit their writing as part of a self-evaluative process of writing.

HyperBook is a text-based, workbook -centered teaching strategy integrating images, real-world exercises, visual aids, and real-time links appropriate for learning and assessment. (Tomei, 2001). To be successful, the HyperBook is created in an environment rich in word processing, graphics, and the Internet. The HyperBook lesson offers learners an opportunity to work together in groups. Text-based material is very effective in helping students comprehend new concepts using diagrams, outlines, and summaries. It opens the door for individualized discovery and inquiry learning opportunities and encourages learners to learn on their own. Many teachers prefer to combine text-based workbooks with web-based lessons. Some use the workbook to encourage parents to assist their child with online research. Others find the HyperBook useful in verifying that students personally accomplished the assigned exercises. Designing, developing, implementing, and evaluating the HyperBook was presented earlier in Chapter 8, Text-Based Resources for Teaching the Traditional Learner.

IDEAL Problem Solving. During the 1960s and 70s, researchers developed general problem solving models to explain problem solving processes (Bransford & Stein, 1984). The assumption was made that by learning abstract (decontextualized) problem solving skills, one could transfer these skills to any situation (context). One example of this general problem-solving model is Bransford's IDEAL model: 1) identify the problem, 2) define the problem through thinking about it and sorting out the relevant information, 3) explore solutions through looking at alternatives, brainstorming, and checking out different points of view, 4) act on the strategies, and 5) look back and evaluate the effects of your activity.

Inquiry is a form of independent learning strategies that involves the learner in the act of constructing new knowledge. Using this strategy, learners evidence skills and attitudes that promote the process of seeking facts, information, or knowledge by questioning. The process of inquiring begins with gathering information and data through the physical senses of seeing, hearing, touching, tasting, and smelling. But the process moves quickly past sensory perception into the realm of questioning, problem-solving, and critical thinking. Some students prefer this type of learning approach because they better understand concepts and abstract ideas when they are more involved in the learning process. .

Inquiry Learning (or inquiry-based learning) is a strategy for learning where students formulate investigative questions, obtain factual information, and build solutions that ultimately reflects their alternative hypotheses to the question. The Inquiry Learning model takes advantage of students' natural curiosity. For adults, inquiry learning expands their questioning skills and helps them develop strategies and processes for collecting and evaluating information. The process consists of the following steps. First, definition of the essential question where students form the essential question that becomes the basis of the inquiry). Second, hypothesis generation where students work in small groups or pairs to form hypotheses for the possible alternatives to be explored. Third, gathering information (i.e., investigation and research) that calls for learners to work collaboratively in groups to identify suitable resources for subsequent investigation in terms of accessibility, up-to-date information, readability, and quality. Fourth, synthesis of the alternatives to evaluate, develop test scenarios and criteria, and select alternatives for further inquiry. Students examine their subsidiary question again. Fifth, Reporting examines all relevant information investigated to solve the essential question. Finally, answering the essential question affords the learners a chance to defend their approach to the essential question in light of new knowledge. Students are asked to think critically about a solution or new insight, and about action they may be able to take.

Instrumental Enrichment is an instructional technique designed to enhance the cognitive functions necessary for academic learning and achievement. The fundamental assumption of the program, based on the theory and research pioneered by Professor Reuven Feuerstein, is that intelligence is dynamic and modifiable, not static or fixed. Thus, the program seeks to correct deficiencies in fundamental thinking skills, provide students with the concepts, skills, strategies, operations, and techniques necessary to function as independent learners, to diagnose and, and to help students learn how to learn. (Ben-Hur, 2000)

Issue-Based Analysis in the classroom helps students develop the skills of critical analysis and life-long learning while dealing with the ever-changing nature of knowledge and information. The strategy is used to help learners make decisions about the issues they will face in the future. An issue is basically defined as a topic with no clearly-defined single outcome or answer about which reasonable people might be expected to differ. Issues can also be framed in terms of a case study (see definition of Case Study), particularly those known as decision dilemma cases. Issues most useful for teaching adults are characterized as "data-rich," so learners have an opportunity to consider and evaluate potentially contradictory evidence, as well as to understand how that evidence was generated.

Integrated Thematic Instruction is a comprehensive school improvement model designed to increase student performance. Advocates of thematic instruction organizes their curriculum around macro subject matter, integrating basic disciplines like reading, math, and science with the exploration of broader subject areas such as global communities, rain forests, energy, etc. Thematic instruction is based on the supposition that learning new knowledge is facilitated when it occurs within the context of a perceived "whole." Thematic instruction places the teaching of reading, mathematics, science, and writing in the context of a real-world application that is both specific enough to be practical, and broad enough to allow personal exploration.

Interactive Lesson is a visual-based, classroom-centered teaching strategy appropriate for learners of all ages who benefit from concrete, sequential instruction imbedded with real-time assessment necessary to assure student learning. To be successful, the Interactive Lesson integrates self-paced content with specific, logical, systematic instruction that places a good deal of the responsibility for mastering the material directly in the hands of the learner. The Interactive Lesson embraces mastery learning techniques and suggests alternatives for presenting learning objectives, corrective instruction, and enrichment activities. A summary of the key components of a successful Interactive Lesson include:

The lesson overview page containing, as a minimum, the introduction to the topic, instructions, time allotted, lesson goals, and any review of prior knowledge.

Elements of the first few slides of the interactive lesson that include: selected questions to arrive at the level of student understanding of the topic, positive feedback slide to reinforce the correct response, negative feedback slide to provide the correct response and encourage further student exploration, transition slide moves the learner from the pre-lesson to the body of new material

Learning objective component includes: a series of slides containing content material presented in the following sequence, objective title slide, content slide(s), formative assessment slide(s), summative assessment slide(s) recap the lesson goals with a measurement of student learning outcomes over the entire lesson, follow-on activities with additional information (e.g., web sites) for student enrichment activities, and additional resources such as videotapes, audiocassettes, and publications.

Learning Log/ Journaling is an incredibly flexible instructional tool, useful across many curriculums, especially for adults. Journals, thinking journals, thinking logs (all terms used synonymously) give learners an opportunity to express their ideas, observations, emotions, and writing without fear of criticism. Some of the benefits of journals include the ability to reflect on classroom experiences (instruction as well as activities); the capacity to judge solutions to problems and their potential repercussions; the chance to establish relationships with peers, teachers, and others; the opportunity to reflect on personal values, goals, and ideals; the practice of summarizing ideas, experiences and opinions before and after instruction; and, an occasion to witness one's own academic progress by tracking past entries and recognizing personal growth.

Learning Styles. A learning style is a student's personal schema for attending, responding, remembering/ recalling, and using stimuli from the environment to acquire new knowledge. Learning styles are not really concerned with what a learner learns (i.e., content, subject matter, or substance) but rather how they prefer to learn (i.e., the psychology of education discussed earlier as a key Pillar of Education). Learners bring their own individual approaches, talents and interests to the classroom. Research has also identified an individual's culture, family background, beliefs, and socioeconomic level as critical factors affecting learning. These beliefs, principles and levels have an important impact on the opportunities for success for every student in our schools. The learning styles theory implies that how an individual learns is dependent more on whether the educational experience in the classroom has been designed and delivered to target a particular style of learning and less on the native intelligence (i.e., IQ score) of the learner. As discussed in this chapter, traditional learners use many learning styles, the most appropriate being visual, linguistic (verbal), logical (mathematical), interpersonal, intrapersonal, convergent, and accommodative styles of learning.

Lecture. The lecture method remains the most frequently used method of instruction of the traditional learner. While the effectiveness of the lecture method also remains in question because of the ostensible lack of interaction, it continues as a primary methodology for reaching large groups simultaneously with a targeted, organized body of knowledge. Lectures can be very effective when used in conjunction with active learning and teaching strategies. For example, maintaining good eye contact along with a high degree of perceived enthusiasm; using a natural, conversational voice for the presentation; emphasizing important points by the use of gestures, repetition, and variation in voice; and, employing formative assessment techniques throughout the presentation often results in effective learning outcomes. Advances in technology have also contributed to an expanding chronicle of increased relevancy for classroom lecture presentations.

Mentoring is a term that describes a relationship between a less experienced individual (protégé) and a more experienced sponsor known as a mentor. Traditionally, mentoring is viewed as a dyadic, face-to-face, long-term relationship that fosters the protégé's professional, academic, or personal development (Donaldson, Ensher, & Grant-Vallone, 2000). The process of mentoring involves either a one-on-one relationship or a network of mentors who support the initial introduction of the protégé. Two categories are usually used to describe mentor roles: psychosocial and career-related. Psychosocial mentoring involves roles such as counselor or colleague. Career-related mentoring involves roles such as coach or advocate.

Metacognitive Reflection. Metacognition is thinking about how we think, about how we know, and about how we learn. Metacognitive reflection pertains to how learners think about their own thinking and learning and describe the processes that they engaged in during problem-solving, for example. Metacognitive reflection on learning questions habitual or traditional learning behavior and encourages a wider range of approaches to students who wish to enhance their thinking abilities.

Multicultural Education is a strategy for teaching that is grounded in ideals of social justice, education equity, and a dedication to facilitate educational experiences in which all students reach their full potential as learners and as socially aware and active beings, locally, nationally, and globally. Multicultural education acknowledges that schools are essential to laying the foundation for the transformation of society and the elimination of oppression and injustice. The underlying goal of multicultural education is to affect social change. The pathway toward this goal incorporates three strands of transformation: the transformation of self, the transformation of schools and schooling, and the transformation of society. (Gorski, 2008)

Multiple Intelligences. In 1983, Howard Gardner introduced his Theory of Multiple Intelligences in Frames of Mind (Gardner, 1983). Based on his work as a teaching professor, brain researcher, and supporter of the arts, Gardner expanded his foundational arguments that intelligence is not a single attribute that can be measured and quantified. His investigations into verbal, logical-mathematical, and spatial intelligence surfaced factors of learning that were heretofore sloughed off as incidental to "common intelligence." Believing that there are varying kinds (and quantities) of intelligence has turned education on its head. Teaching all students (especially traditional students) using the same instructional strategies ignores the important aspects of human capacity that suggests other ways of teaching material might produce more effective learning. Currently, Gardner's theory of multiple intelligences include: visual, spatial, bodily/kinesthetic, musical, logical-mathematical, linguistic, interpersonal, and intrapersonal intelligences. Recently, he added naturalist intelligence and suggested that in the future other possibilities (e.g., spiritual and existential) might be identified and incorporated into his list.

Oral Presentation. Delivering an address to a public audience. A public recitation or narration (usually from memory) and prepared in advance. The act of delivering a formal spoken communication to an audience in the classroom. Formats for oral presentation include the <u>introduction</u> (background information, the reasons for the presentation, any hypothesis to be tested, etc.); the <u>question</u> (the experimental design, testing and controls, major procedures performed); the <u>results</u> (clear and concise explanation of the data); and the <u>findings</u> and Recommendations (interpretation of results and recommendations for further study).

Peer Practice (often used interchangeably with the term Reciprocal Learning) is a learning strategy based on collaboration between students rather than independent learning. Learners are taught to help one another succeed in completing tasks and learning objectives. Students develop cooperative skills while simultaneously working closely with teachers to cover the curriculum. In this strategy, students work together as peer partners, alternately serving as the learner and the guide in completing the task. Peer Practice is a proven method to reinforce content since it is the peer relationship that, first and foremost, fosters immediate feedback. The strategy has also been found to benefit students throughout their life as they develop lifelong learning skills to collaborate and decipher information.

Peer Teaching is a recognized strategy for teachers in the classroom and teacher education in general. Peer teaching is concerned with the practice of "teachers teaching teachers." Peers assume a role of learning from their colleagues, receiving feedback, and reflecting on experiences presented. As a pedagogy, peer teaching shifts the total responsibility for the structure and delivery of the lesson away from a single teacher (via lectures or didactic lessons) and focuses instead on modeling exemplary practice.

Podcasting. A type of media file that is distributed over the Internet and can be replayed on personal computers or portable media players. A method of syndication that offers direct, automatic downloading and streaming of video and audio. This method is widely being used to service the millennial generation of students.

Portfolios are collections of student work and artifacts that represent particular student performance. Portfolios in the adult classroom are derived from the visual and performing arts tradition which showcased artistic accomplishments and preferential works. A portfolio may be a folder containing a learner's best pieces or it may be a placeholder for works-in-progress. Portfolios may take the form of physical folders or electronic media. Teachers of adults use portfolios in all curricular areas as a means to support new instructional approaches and promote the student's role in constructing and demonstrating new knowledge.

Problem-based learning (PBL) is a focused, experiential learning strategy that focuses instruction on the investigation and resolution of real-world problems. PBL curriculum provides authentic experiences that foster active learning, support knowledge construction, and integrate school learning and real life, making it an ideal strategy for working with the adult learner. Students become engaged problem solvers, identifying the essential questions inherent in problems posed and the conditions required for a good solution. Teachers serve as problem-solving colleagues rather than lecturers. They model interest and enthusiasm for learning and coach those who need an environment that supports open inquiry. (Torp, L. and Sage, S., 2002).

Print Materials. Printed matter continues to serve as the primary source of instructional content. As a primary source, distance students might use a textbook to prepare for a specific topic or content area. Other print-based technologies such as e-mail would be used to submit questions or upload assignments. Text-based materials also take the form of worksheets or study guides used together with other distance technologies. Some of the advantages to incorporating print materials include their portability, level of familiarity to most students, cost effectiveness, and availability.

Disadvantages of print materials include their limitations with regards to personal interaction, lack of visual and audio components accepted by many learners, a requisite level of reading and comprehension language skills, and the built-in delay required to distribute the printed matter.

Reciprocal Teaching is a learning style and teaching strategy for improving academic skills. Grounded on the development of comprehension through direct engagement, teachers engage in dialogue with students using four strategies: generating questions, summarizing, clarifying and predicting. The approach fosters comprehension techniques enabling learners to construct their own meaning from the content of the instruction presented.

Reflection is the capacity to exercise introspection in the pursuit of personal growth. For the adult, reflection involves an examination of how learning can be fostered by a self-critique of failure as well as success, personal goals and life ambitions, learning and enjoyment, education's role in professional development, actions necessary to move forward when confronted with private obstacles, time management, interpersonal relationships with teachers and peers, fears and apprehensions, shortcomings in knowledge and skills, and more.

Round Table. An education Round Table is a network to promote partnerships of educators, faculty, staff, administrators, and others responsible for the delivery of instruction and high quality education as well as corporate training. Programs that develop under a round table approach have a higher success rate in education than those developed in a vacuum of administration. Round tables typically develop their own unique set of tools to determine these needs of each classroom and tailor programs specifically to those needs. In adult education, a round table can facilitate a needs analysis, finding common academic content, link education to corporate business strategies, identify potential grants, develop appropriate curriculum materials, connect with educators in other programs as well as national networks and organizations, and sustain long range planning.

Seminars are didactic teaching strategies in which participants share experiences regarding a focused topic or content area under the guidance of the instructor or an expert in the field. Most seminars are single sessions; short meetings dedicated to presentations on and discussion of a specialized topic, usually at an advanced or professional level. In adult education, a seminar can take the form of an entire course of specialized study under faculty supervision, in which ideas, strategies for teaching and learning, and real-world experiences are shared among participants.

Service Learning as a method where students learn and develop personally and professionally by participating in organized activities that meet identified community needs. Service learning is integrated into the student's academic curriculum and provides time for them to think, talk, or reflect on actions and service activities. It also provides opportunities to use newly acquired skills and knowledge in real-life situations. The Corporation for National Service (1993) established eight essential elements of service learning, that include the following: meet actual community needs; be coordinated in collaboration with school and community; be integrated into the youth's academic curriculum; provide structured time for students to think, talk, and write about what he/she did during the service activity; provide students with opportunities to use newly acquired skills and knowledge in real life situations in their own communities; enhance what is taught in school by extending student learning beyond the classroom; help foster the development of a sense of caring for others; and, encourage the ethics of citizenship and social action.

Simulation. The use of games and simulations in education is well documented in history and in the recent literature. They have been used in preschool, K-12, the university, the military, business, and by adults. Simulations have potential educational application in two key areas. First, simulations serve as a replacement for real world experiences. They are cheaper, safer, and more accessible than the real thing in many educational situations without placing the student at risk. Second, simulations are adaptable and accommodating, helping students learn underlying theories based on hypothesizing, testing, revising suppositions, and re-testing to produce the desire (or expected) outcomes.

Small Group Discussion. Most researchers define a small group as having at least three, but no more than twelve members. To be considered a "group," the membership of at least three can utilize an organizational structure, albeit very rudimentary. Any group larger than 12-15 hinders their ability to communicate effectively across the membership. Small group discussions require a capability (using face-to-face or technology-based) to communicate freely and openly with all of the other members of the group. Small groups develop rules and customs about discussions as well as roles which affect their ability to interact. A group must have a common purpose or goal (supplied by the instructor in the form of learning objectives and lesson goals) and the environment is situated in such a way that all members must work together to successfully achieve the goal.

Social Learning Theory suggests that students learn through observing others' behavior, conduct, and attitudes and the resulting outcomes of those behaviors. In social learning theory, human behavior is explained in terms of personal factors, environmental influences, and behavior and the impact of their continual interaction. A basic premise of social learning theory is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions. "Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action." (Bandura, 1977). Social learning theory explains human behavior in terms of continuous interaction between cognitive, behavioral, and environmental influences that play on each individual differently. Social learning theory has also been referred to as the bridge between the schools of behaviorist and cognitivism with its emphasis on attention, memory, and motivation.

Socratic Instruction. Socratic teaching (or the Socratic method) is one of the oldest and still most powerful tactics for teaching the traditional learner and fostering critical thinking. Using the Socratic method, teachers focus on giving students questions, not answers. They model an questioning, probing mind by continually subjecting their students with queries and inquiries. The Socratic method arouses innate curiosity and at the same time serve as a logical, incremental, sequential process that enables students to uncover complex topics or issues with their own thinking and insights. Socratic questioning fosters critical thinking, evaluation, and knowledge application in students and is highly recommended for assignments and class discussions. Certain principles of employing the Socratic method include: allowing a sufficient 'wait time' to permit the student to think and postulate hypotheses. Students must be provided time to consider the question and their response before requesting them to answer. Teachers are encouraged to keep away from strict yes-no answers that do not promote thinking and limit (or even discourage) classroom discussion. Before successfully implementing this method, students need the proper background and resources to react to the questions posed. Open-ended questions promote critical thinking while closed questions serve to focus the learner's attention. Clarifying questions help guide the learner as they consider possible answers. Finally, it must be noted (somewhat humorously) that the Socratic method does not always work. Socrates used to anger his onlookers who thought he was sarcastic and disrespectful by asking obtuse questions, then tricking them into confusion with a clever rebuttal.

Statistical Software encompasses three general classes of software using different user interfaces. Relational databases and spreadsheet software such as Oracle and Excel blends with mathematical software such as MATLAB to provide descriptive and inferential analysis at the lowest cost. Mathematical software such as SPSS exhibits not only statistical capabilities flowing from code for matrix manipulation, but also optimization and symbolic manipulation useful for statistical purposes. Finally, visualization software overlaps to some extent with software intended for exploratory data analysis. The user interfaces commonly include graphical interfaces, drag and drop capabilities, and system interfaces.

Teaching for Understanding. The aim of education remains the dynamic use of knowledge and skill for everyday living. Teaching for Understanding began as a research program designed to develop and test a new pedagogy for understanding. The project targeted the middle and high school years and focused on teaching and learning in four subject matter areas: English, History, Math, and Science. Interdisciplinary studies offered the scaffolding that stressed comprehensive learning. Teachers planned their curriculum so that their student was encouraged to understand a topic. With that understanding, it was hypothesized, that learners could not only reproduce knowledge, but also use it in truly innovative and inventive ways. Teachers were encouraged to design their curriculum around generative topics that connect the interests of the traditional learner with their (albeit) limited experiences. Lessons must be clearly articulated, students must understand (and agree with) lesson goals, and experiences must be wrapped in a real-world context. Students are expected to do a great deal of thinking when applying what they are taught to challenging, new situations. The true goal of teaching for understanding is not to arrive quickly at any one, particular answer (even if it is the right answer), but to develop richer and more sophisticated hypotheses over time through several experiences of learning and reflection.

Technology in Education. All educators should be better prepared to teach about technology, the report says. Schools need to move beyond the perception of technology as a separate subject to be taught in "shop class." Science teachers in particular need a solid education in technology and engineering, and even history and social studies teachers should be required to know how technology relates to their subjects. Schools should ensure that teachers specializing in technology follow standards issued by the International Technology Education Association. Neither the educational system nor the policy-making apparatus in the United States has recognized the importance of this more comprehensive view of technological literacy. The National Academy of Engineering calls for a broad-based effort to increase the technological literacy of all Americans, a goal that will have many benefits including more informed decision-making by citizens and business and government leaders about the development and use of technology, and a more erudite population that will be better prepared for the demands of today's high-tech work environment. (National Academy of Engineering, 2002).

Thinking Skills. "Thinking skills are viewed as crucial for educated persons to cope with a rapidly changing world. Many educators believe that specific knowledge will not be as important to tomorrow's workers and citizens as the ability to learn and make sense of new information." (Gough, 1991). Thinking skills are considered the "building blocks" of learning and have an established foundation in research and literature. Most educators believe that such skills can and should be taught and reinforced in school. They include such skills as focus skills (attending to selected bits of information and ignoring confounders), information processing skills (observing information and formulating questions), organization skills (rearranging information to be used more effectively), analysis skills (clarifying information by examining parts and relationships – from general to specific), generation skills (producing new information, meaning or ideas – from specific to general), integration skills (connecting and combining information), and assessment skills (evaluating the sensibility and quality of ideas).

Threaded Discussion is a series of messages on a particular topic posted in a forum that allows students to interact with their peers, instructor, and other previously allowed participants. A threaded discussion is asynchronous so students can log on at any time from any web-enabled computer to share issues, discuss coursework, converse about topics raised in class, or initiate new discussions on related topics. A good threaded discussion has the same effect as in-class discussions in which students collaborate to build on one another's perspectives and gain a deeper understanding of the materials. Electronic messages are posted, archived, retrieved, and viewed using a web browser or online learning management system. An instructional-based course management shell allows students to pose and answer questions while participating in a shared discussion, where one conversation builds off another. Most often, the instructor functions as the moderator and threads are implemented into the instructional strategy of the distance educator. Some common etiquette parameters for threaded discussions include treating fellow participants with respect and courtesy, observing the basic rules of internet etiquette, reading each post carefully and reflecting upon the message before responding, respecting diversity of opinions, adding to the discussion while refraining from "I agree" and "me too", refraining from attacks of a personal nature, and adhering to labeling convention with respect to subject titles and main points to speed up the review process.

Tutorials are behavioral learning strategies that assist students in the process of learning new skills by following a step-by-step process that ensures comprehension and mastery of the material. Tutorials typically have the following characteristics. First, they present content, usually with examples, broken into discrete modules or lesson components. Second, they integrate assessment into the module to reinforce learning and test understanding of the content in the related module or section. Third, they transition to additional modules or sections, branching being the most common method of moving about the tutorial lesson.

Video Technologies. The ability to see and hear an instructor presenting content offers a unique set of instructional opportunities not possible with any of the previous modalities of distance learning identified so far. Video techniques for distance learning are often characterized by their transmission media (videotapes, satellites, cable TV, computers, microwave, and the Internet). Each media is characterized by the direction of the audio/video transmission: one or two-way video; one or two-way audio; or, one or two-way audio/video. Some of the most common video technologies include videotapes that offer a widely accepted, easy-to-use format for instructional materials. Video teleconferencing is used in a host of different environments, including business meetings, educational training, formal instruction and interpersonal collaboration. It can be found in extensive use in medicine, communications, surveillance and security, and emergency response as well as education. Cable and public broadcast television has been around as an instructional media for many years. Educational networks such as CNN, Learning Channel, Children's Educational Television, and National Educational Television authorities allow schools to transmit television courses at nominal cost. Desktop computer videoconferencing employs cameras and microphones to transmit video and audio to computers at other sites.

The advantages of video technologies are as abundant as the variety of technologies supporting education. Video technologies provide a distance alternative to face-to-face classes for learners separated by distance and cost. Facial expressions, body language, and personalities are transmitted via video and provide an aspect of teaching not available even in a traditional classroom environment. And, most video communication is synchronous, allowing a higher degree of interaction among teachers, students, and their peers.

Conversely, video technologies are expensive. Cameras, transmission lines, and editing equipment remain expensive and out of reach of many schools and educators. The infrastructure (e.g., conference rooms, video connections, lighting, etc.) costs alone can be very costly. Video conferences are seldom spontaneous; rather, to be effective, they must be planned far in advance to ensure the best possible attendance by the target audience and hardware, software, and networking assets must be committed in an environment of insufficient resources. Lastly, the complexity of video technologies demands a technical support team to ensure the equipment works properly and valuable instructional time is not forfeited by faulty equipment.

Videoconference is a two-way, voice and video connection between participants in geographically separate locations for the purpose of collaboration. Videoconferencing runs the gamut of capabilities from simple static images and text between two locations to full-motion video and high-quality audio between several locations. Real-time visual and audio communication employs a computer, video camera or web camera, and a network with connectivity to the Internet. Examples of video conferencing include an instructor delivering a didactic lecture from a central location (i.e., classroom or office) to many different students in different locations or a meeting between a handful of students collaborating together to share ideas or complete a group project. Effective use of videoconferencing for interactive learning requires practice and planning as well as attention to instructional strategies. Expert guests can employ video conferencing to share ideas with students and teachers without having to travel. Institutions such as zoos, museums, and science centers use video systems to provide students an opportunity to see, hear, and interact in real time without the costs of transportation. In order to create videoconferencing-learning experiences, hardware and software are available from a growing sector of the technology industry at a decreasing cost. The tangible benefits for using videoconferencing include lower transportation costs and increased collaboration gained from offering videoconferencing as both an instructional media and customer service tool. The intangible benefits include the facilitation of group work among geographically distant teammates and a stronger sense of community among peers and colleagues.

Virtual Tour is a "web-based teaching strategy which presents multi-sensory, multimedia instruction appropriate for individual student exploration and group learning experiences." The Virtual Tour is appropriate for students who learn best when instruction is offered in a student-centered and student-controlled learning environment embracing discovery and cooperative learning techniques. A total of 14 different front doors are available to present abstract and concrete concepts; behavioral, cognitive, and humanistic content; and, technically challenging or difficult construction. Developing follow-up activities is a matter of creating additional Web pages or identifying great sites already available on the Internet and linking them to the Virtual Tour. Behaviorally, the Virtual Tour is a natural extension of sequential learning with content presented from first to last, simple to complex, general to specific. The cognitive teacher offers content in progressive steps until a schema, or pattern, emerges to aid the learner in the construction of new knowledge. Humanism offers the personalized approach to learning, selecting information determined to be important to the student. The Virtual Tour supports each of these major psychologies perhaps better than any previous teaching strategy ever devised. With the advent of the World Wide Web, responsibility for creating student-centered, age-appropriate material rests in the hands of the classroom teacher. The design of the Virtual Tour is the newest strategy for linking literally millions of content specific sites that add images, sounds, and video media to an instructional lesson.

REFERENCES

Bandura, A. (1977). Social Learning Theory. New York: General Learning Press.

Ben-Hur, M (2000). Learning and Transfer - A Tautology. In Costa, A., ed. Teaching for Intelligence II. Arlington Heights, IL: Skylight Publishing.

Bransford, J.D. & Stein, B.S. (1984). The IDEAL problem solver, New York: Freeman.

Donaldson, S. I., Ensher, E. A., & Grant-Vallone, E. J. (2000). Longitudinal examination of mentoring relationships on organizational commitment and citizenship behavior. Journal of Career Development, 26, 233-249

Gardner, Howard (1983; 1993) Frames of Mind: The theory of multiple intelligences, New York: Basic Books.

Gorski, P. C. (2008). Multiclutural Education Awareness Quizzes. Retrieved June 12, 2008, from Multicultural Education: Diversity, Equity, Reform: http://www.edchange.org/multicultural/quizzes.html

Gough, D. (1991). Thinking about thinking. Alexandria, VA: National Association of Elementary School Principals.

National Academy of Engineering, Technology in Education, Annual Report, 2002. URL: http://www.nae.edu/NAE/naehome.nsf/weblinks/MKEZ-5PYP4P?OpenDocument. Downloaded: August 2008.

Tomei, L.A. (2001). Teaching digitally: A guide for integrating technology into the classroom. Norwood, MA: Christopher-Gordon Publishing.

Torp, L., & Sage, S. (2002). Problems as possibilities: Problem-based learning for K-16 education. Association for Supervision and Curriculum Development.

Wilcox, B., & Tomei, L.A. (1999). Professional portfolios for teachers: A guide for learners, experts, and scholars. Norwood, MA: Christopher- Gordon Publishers.

Primers for Constructing Text, Visual, and Web-Based Instructional Materials

PRIMER ONE: TEXT-BASED MATERIALS

INTRODUCTION

This **Primer for Text-Based Materials** is the first of three instructional manuals for developing technology-rich resources provided as addendums to The Engine for Designing Technology-Based Instruction. Each primer consists of two interdependent sections that move the teacher of traditional, adult, and distance learners through a series of step-by-step instructions for constructing elementary and advanced materials.

In this primer, **Section I. Constructing Basic Text Documents** begins with a look at the features, commands, and practical examples for building basic handouts and study guides. Teachers who feels comfortable with word processing may find this section too grassroots and may opt to pass by the instructions. However, there is much to be gained by looking at the resulting examples (called Supplements to the Primer) at the end of the primer.

Section II. Constructing the Hyper Book Lesson carries on with more advanced word processing features that make the interactive, digital hyper book possible. Again, a supplement to the primer provides an example of an actual hyper book for classroom application.

Launching Microsoft Word. Access to Word is made easier with a desktop shortcut. If a shortcut or alias is available on the desktop, ***double click the Word icon*** to launch the application. If not, follow the instructions for creating a shortcut located in Supplement 1a.

CONSTRUCTING BASIC TEXT DOCUMENTS

Launching Word. Microsoft Word contains hundreds of commands, options, and menus. To learn all of the features would require many hours of training. Fortunately, the software is so powerful that it provides shortcuts even for the novice user. Access to the single most frequently used application is facilitated with a Windows shortcut. If a desktop shortcut is available, *double click the* Word *icon* to launch the application. If not, *click the Start Button* on the Task Bar, scroll to *Programs* then *Microsoft* Word.

Opening Documents. Word opens with a New Document window named "Document1." Text may be entered directly into this new document and saved to the hard disk or jump drive. However, it is easier to discuss editing, moving, inserting, and printing features by examining a completed document already prepared. So, new documents will be ignored for the moment in favor of an exercise that demonstrates best practices. At the end of this chapter, Supplement 1b provides an excellent example of how Microsoft Word was used to construct text-based content material.

Author's Note: To construct a personal version of Space Handout as features and commands are discussed throughout this chapter, either use Supplement 1b and enter the content as these options are explained or download this Handout directly from the author's web site at: http://academics.rmu.edu/~tomei/Spacehandout.doc to practice the new capabilities needed to fully integrate text-based materials in a lesson.

The *Solar System Study Guide* is a series of one-page introductions to each of the nine planets. For purposes of this chapter, the debate as to whether Pluto is a planet will not to be considered; here, Pluto is a planet. With that understanding, an exploration of some basic features of Microsoft Word is in order to construct straightforward text-based materials.

Saving Documents. A good rule of thumb is to save a document after composing each paragraph. The process takes only a single mouse click but saves considerable time in the event of a power outage, mechanical failure, or computer virus.

- To Save the document, *click the Save icon* on the Office Button (Figure P.1). If the file has never been saved, the Save As dialog box appears.
- Set the location by *clicking the Save In box* until the correct folder appears. *Enter a new File Name* for the document, then *click the Save button* (Figure P.2).

Editing Text. Practice each new basic editing feature of Microsoft Word features as they are presented using the *Solar System Study Guide*. Apply each skill before deciding whether to save changes made during the exercise or to retain the original document unaffected by any revisions. Download a fresh version of the document from the web site at any time.

Selecting (Highlighting) Text. Very few features come standard on all word processors. One such feature, however, is highlighting text. Before editing, the text to be modified must be highlighted or "selected" (in word processing parlance). Selecting text may seem a relatively fundamental skill, but it is amazing to discover that even after using word processing for so many years, many users use fail to employ the most rudimentary skills. In Microsoft Word, to select:

- **A Word,** position the cursor on the desired ***word*** and ***double-click*** the mouse button.
- **A Sentence or Line,** place the cursor anywhere in the middle of a sentence or line, hold the ***Control*** key and ***click once***.

Figure P.1. Office Button *Figure P.2. The Save As dialog box*

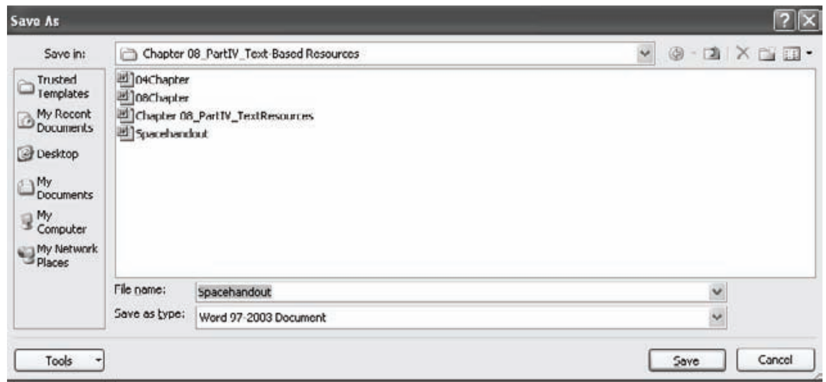
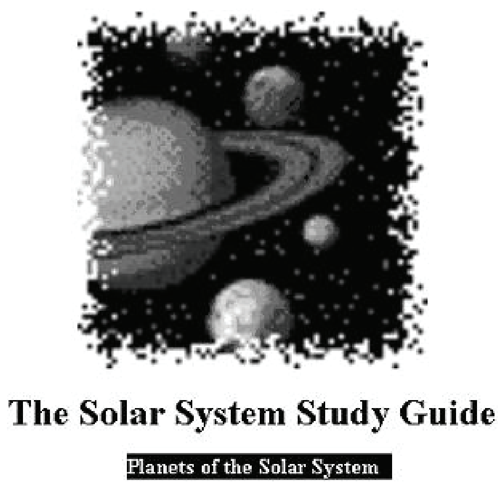
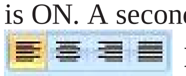


Figure P.3. Highlighting text

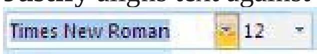


- **A Paragraph,** position the cursor any where within the paragraph and ***triple-click*** the mouse.

Changing the Appearance of Text. Scroll down the title page 1 of the *Solar System Study Guide* and locate the sub-title, "Planets of the Solar System." Use the mouse and the directions above to ***select the entire line***. The highlighted text looks like Figure P.3.

-  **Bold, Underline, and Italics.** Once selected, several editing commands are available to change the appearance of the text. Click on the **Bold** icon, then **Italics**, then **Underline** to affect the look of the selected text. The buttons change appearance when clicked to indicate the feature is ON. A second click toggles the feature OFF.
-  **Left, Center, Right, and Justify.** To the right of the **BIU** icons are four alignment functions. **Left** alignments line the text along the left margin while **Centering** is easily accom-

plished by clicking the second icon. A **Right** alignment is appropriate for address lines and dates. **Justify** aligns text against both the left and right margins and is appropriate within paragraphs.

- 

Changing Fonts and Font Size. On the same menu line as the **BIU** icons are pop-down menus for changing Font and Font Size. Click the down arrow next to the **Font** window to view the various formats available. The same procedure sets a new Font Size -- the larger the number, the larger the size of the type.

Moving Text. With the line still highlighted, try the Cut, Copy, and Paste commands to move or repeat text at another locations in the document. Take a look at the following icons.

- 

Cut, Copy, and Paste. Find the set of icons that look like a pair of scissors, two identical documents, and a clipboard. The scissors **Cut**, or delete the selected text. The twin documents **Copy** text or images. And, the clipboard **Pastes** the text into a new location.
- ***Click the scissors*** and watch how the **Cut** text disappears from the body of the document.
- The **Copy** command is identical to the Cut command except that the text is duplicated to an area of memory called the "clipboard."
- **Paste** adds the text to other locations elsewhere in the document.

The Undo Command. After any change such as deleting text or bolding an entire paragraph, a simple click of the Undo button on the Toolbar reverses the operation and returns the text to its former appearance.

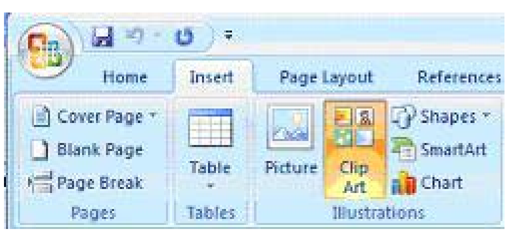
-  ***Click Undo to reverse the last action***. To undo an action, click the left arrow icon. Undo is an important feature that saves time and recovers user mistakes.

Enhanced Word Processing Features. When preparing student handouts and study guides, advanced features involve the integration of graphics and clip art, spelling and grammar checking, and capturing and printing professional learning materials.

Inserting Clip Art. The Microsoft Clip Art Gallery offers a wide array of pictures, photographs, sounds, and video clips for inclusion into a handout or study guide (see Figure P.4). The *Solar System Study Guide* incorporates several clip art graphics, including the one on the cover. To insert clip art into a document, follow these simple steps.

- **Position the Cursor**. Before inserting clip art, the cursor must be at the point in the document where the image is to appear. Click the mouse button once to position the flashing cursor at the desired location.

Figure P.4. Clip art example

- 

View the Clip Art Gallery. The clip art icon is found on the Insert Menu at the top of the screen and loads a gallery of images from which to choose. (see Figure P.5).
- **Select a Category.** Click an icon to display the contents of images available in each category. Scroll through the available images and locate one appropriate for the instructional material under consideration.
- **Select the Image**. Click the **Insert button** to insert the image into the body of the document. Once there, the image may be resized or moved as desired (see Figure P.6).
-  **To Resize Clip Art**. Click anywhere on the image to activate the "anchors;" the square boxes that appear on the perimeter of the image. Place the cursor on one of the four corner anchors to convert the cursor from a pointer to a diagonal arrow. Hold the mouse button and drag diagonally to resize the image proportionally. The anchors appearing in the mid-perimeter locations stretch the image horizontally or vertically.
- **To Move Clip Art**. Move the mouse anywhere inside the target image. The cursor becomes a four-way arrow. Hold the mouse button and drag the image to a new location.
- **Cut, Copy, and Paste** To the word processor, clip art and text are handled exactly the same. Select the clip art by clicking the image. Click the **Cut** (scissors) icon to delete it; **Copy** the image to the clipboard; or, **Paste** it to a new location.
- **Left, Center, Right, and Justify** functions operate to align an image as well as text.

Figure P.5. Clip Art Gallery

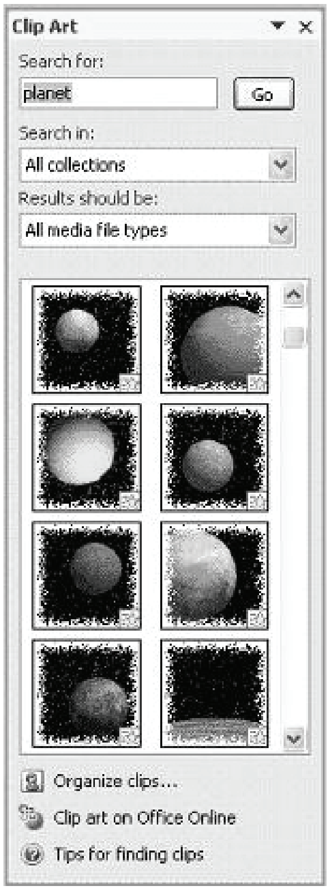
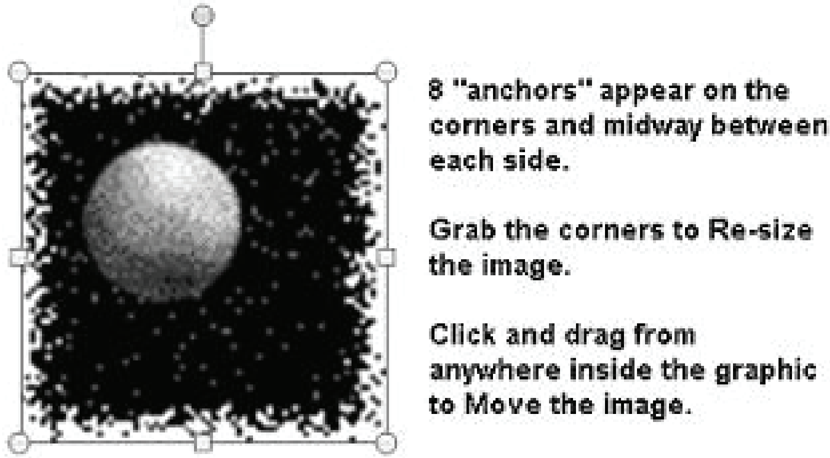
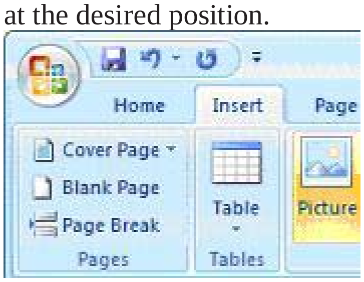


Figure P.6. Procedures for resizing and moving a clip art image

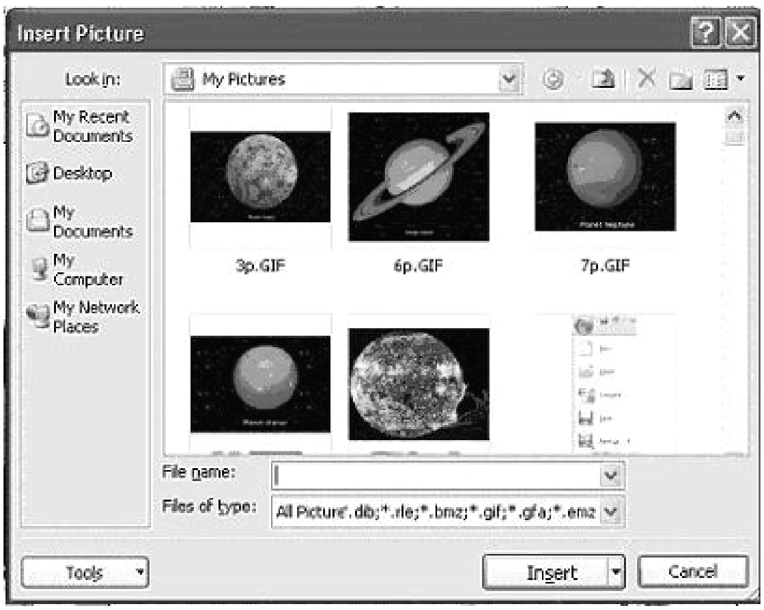


Inserting Pictures from the Internet. Digitized pictures are inserted into a document as easily as clip art. The *Solar System Study Guide* contains several pictures of the nine planets downloaded from the Internet. To **Insert Pictures** into a document, follow these steps.

- **Position the Cursor**. Before inserting a picture, the cursor must be moved to the location in the document where the image is to appear. Click the mouse button once to position the flashing cursor at the desired position.
- 

View the Contents of the Storage Media. From the menu, click ***Insert*** → ***Picture***. (see Figure P.7)

Figure P.7. Locating a picture on disk

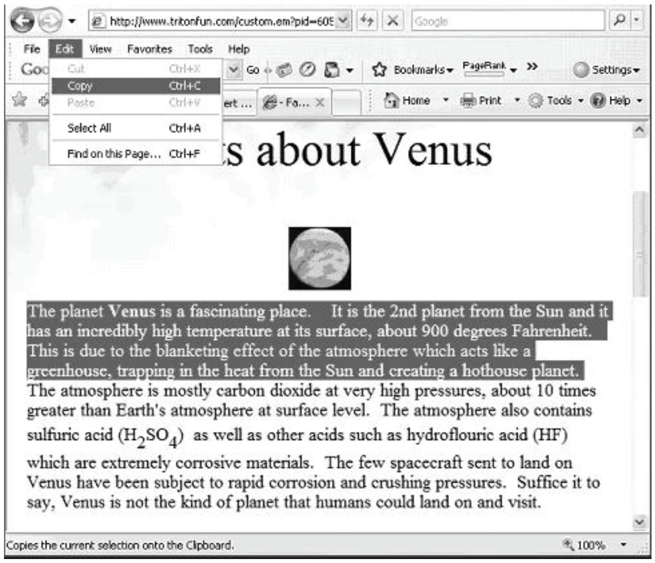


- **Select the File**. Double-click the file name, then the **Insert button** located at the bottom right of the dialog box. The image appears in the body of the document. Once inserted into a document, the picture may be resized, moved, copied, pasted, or deleted exactly as clip art.

Inserting Text from the Internet. So far, images have been the primary focus of the enhanced features of word processing. To be sure, the *Solar System Study Guide* contains numerous examples, most of them taken from actual web sites. However, textual content, too, may be harvested directly from web sites and there are numerous examples of how text information was taken from the various web sites dedicated to the solar system. To insert text, the easiest method is to cut and paste directly from the web into an awaiting document by following these steps.

- **Position the Cursor**. The cursor must be at the point in the document where the text is to appear. Click the mouse button once to position the flashing cursor at the desired position.
- **Open an Internet Session**. ***Launch Netscape or Internet Explorer or Safari*** (or the web browser of your choice) and locate an appropriate web site containing lesson content text. Identify several sentences or even an entire paragraph appropriate for the target document.
- **Select the Desired Text**. Position the cursor to the left of the desired body of text to be captured. ***Click and drag the cursor down and to the right*** until all the desire text has been highlighted (See Figure P.8). Practice selecting text until the movement of the mouse becomes second nature.
- **Copy the Text to the Clipboard**. Copy the desired text onto the clipboard by clicking on the double document (copy) icon. Keep in mind that clicking the copy icon results in no visible action on the screen.
- **Restore Microsoft Word®.** Return to the document by locating the screen or by clicking the application on the Task Bar at the bottom of the screen.

Figure P.8. Copying text to the clipboard



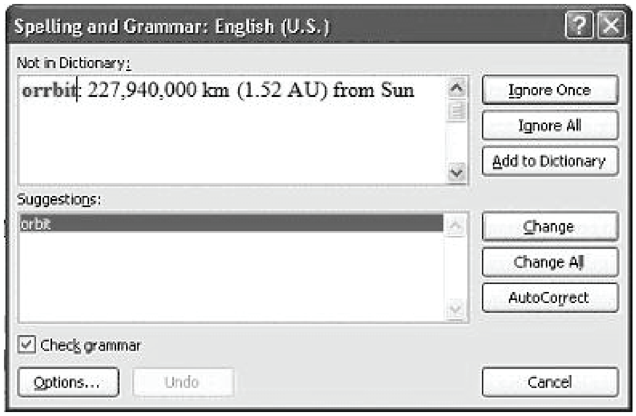
- **Paste the Text into the Document**. Click the clipboard icon to insert the text into the document. Web pages usually require some reformatting changes to make the text presentable. For example, the font size of the copied text may be too big or too small. Simply use the features learned earlier in the chapter to make these changes.

- **Save the Changes**. After inserting text, images, or clip art, save the document. There are simply too many steps to risk a loss of power or disk errors. To save the document, *click the Save icon* on the Office Button. If the file has never been saved, the Save As dialog box appears. Set the location by *clicking the Save In box* until the correct folder appears or e*nter a new File Name* for the document, then *click the Save button*.

Spell Checking a Document. Microsoft Word automatically checks spelling and grammar and corrections are easily made. Follow these steps.

- **Check spelling and grammar on Demand.** Spelling and grammatical errors may be checked any time by clicking the **Review → Spelling & Grammar** icon. This method is most useful when proofing an entire document.
- **Making Corrections**. The Spelling and Grammar dialog box contains two windows. (see Figure P.9). The top window identifies unrecognized words. The word may even be spelled correctly, but the Spell Checker simply does not recognize the word and therefore highlights it for action. The bottom window is the attempt to suggest the correct spelling. Usually its guesses are right on the

Figure P.9. Spell and grammar check window



mark. Other times, however, the suggested change may be wrong or even humorous. There are still some things a computer cannot do as well as a human and second-guessing misspelled words is one of them. If the choices offered are inappropriate, there are two options.

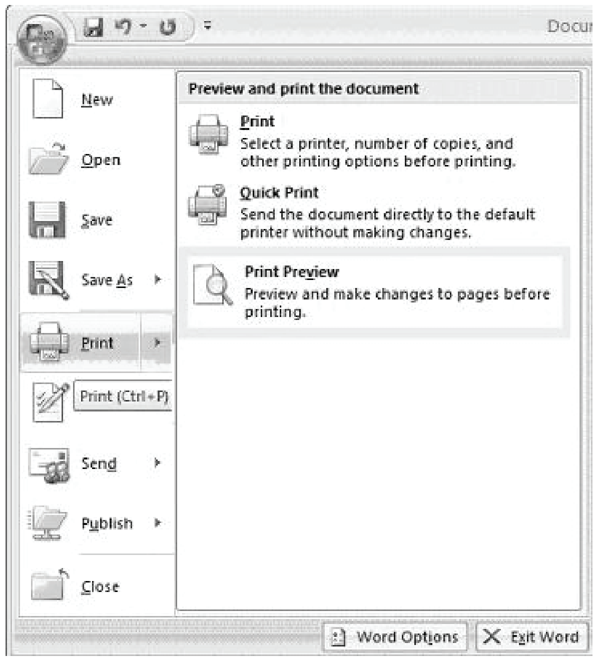
- First, ignore the choices. **Ignore All** disregards all “misspellings” of the highlighted word for the remainder of the document.
- Second, **Add to Dictionary** the new word to the personalized custom dictionary so that all further encounters with the same word will be considered correct.
- If one of the choices offered is suitable, click the desired suggestion in the bottom window, then the **Change** button. **Change All** finds and replaces the word whenever it is encountered throughout the remainder of the document.

Grammar Checking a Document. Selecting the **Check Grammar** box verifies the grammatical structure of each sentence. The most common grammatical errors made by users are extra spaces between words, subject/verb agreements, passive voice, punctuation, and repeated words.

Printing the Document. After editing is complete, the document is ready for hard copy. Before sending the document to the printer, Word has a feature called the Print Preview that is highly recommended.

- **Print Preview**. To view the document as it will look when printed, click **Print** → **Print Preview** on the Office Button (see Figure P.10). Editing is not permitted while in the print preview mode. To exit Print Preview and return to the document, click **Close**.
- **Print**. Click the **Print** icon from the Office Button to produce the dialog box shown in Figure P.11. The two most common options used to print a document are the Print Range and Number of Copies.
- **Print Range**. **All** prints every page in the document; **Current Page** prints only the page on which the cursor is presently positioned; and, **Pages** allows the user to enter a range of pages.
- **Copies**. Enter the Number of Copies to be printed. Requesting **Collate** prints the each copy from first to last page then repeats the process for additional copies keeping all the pages in order.

Figure P.10. The print preview menu



CONSTRUCTING THE HYPER BOOK LESSON: INTRODUCTION

To be successful, the hyper book is created in an environment rich in word processing, graphics, and the Internet. However, its implementation does not depend on sophisticated computer hardware or even state-of-the-art computers. For these reasons, the hyper book is introduced first among the models of technology-based instruction that will follow in Part IV of the Engine for Designing Technology-based Instruction. The remainder of this chapter demonstrates text-based design along with a mastery of advanced word processing features. Combine these skills with the use of technology resources harvested from the Internet to produce the hyper book lesson. The additional word processing features necessary to create the hyper book format include word art, text color, tables and columns, and hyperlinks.

Author's Note: A version of the *Solar System Hyper Book* may be found in Appendix B and can be used to examine the features and commands discussed throughout this chapter. Readers may create their own hyper book as these options are explained or download the hyper book directly from the author's web site at: http://academics.rmu.edu/~tomei/Hyperplanets.doc.

Word Art. Word Art combines the features of simple text with the graphic effects of color, size, and shape while offering more sophisticated and visually appealing hard copy for classroom applications. Word Art produces a graphic-like image in effect making pictures from words and is especially appropriate for cover pages and illustrations (see Figure P.12).

- To create Word Art, click the ***Insert → Word Art*** menu. Choose from among the 24 available styles offering various colors, sizes, and shapes (see Figure P.13). Highlight the selected box then ***click OK.***

Figure P.11. The print menu

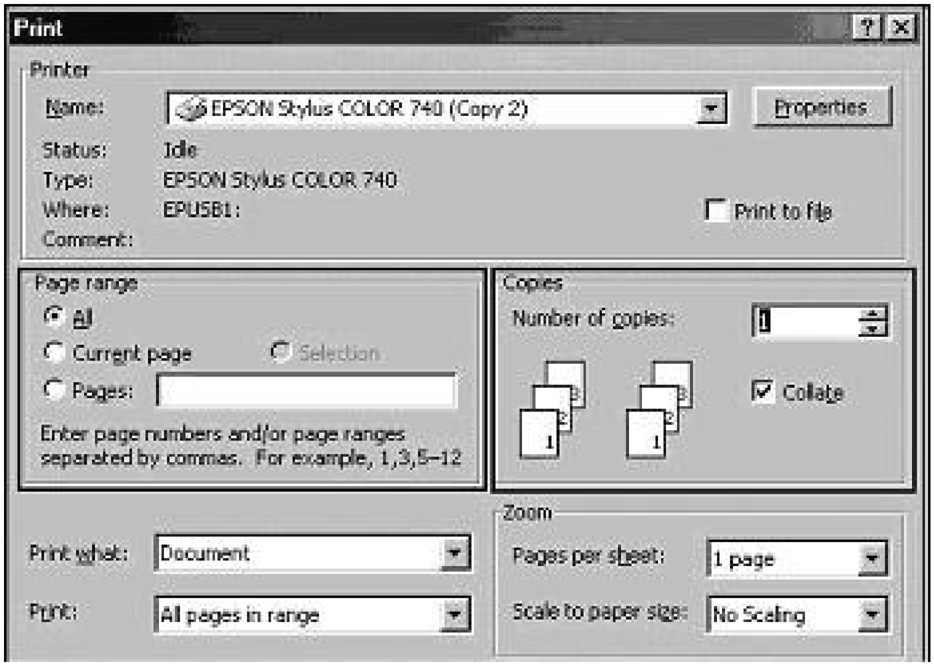
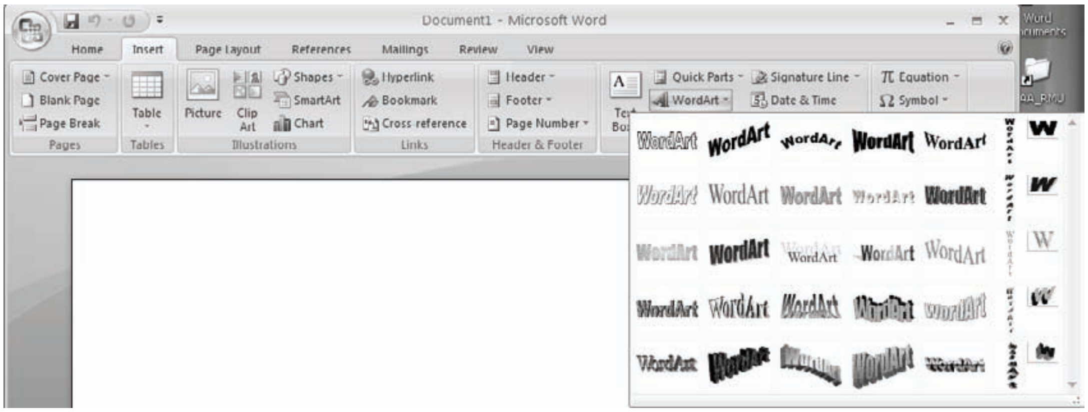


Figure P.12. Hyper book front page with word art

Instructions. Each fourth grade student will receive their own copy of this Student Workbook. You are encouraged to explore the subject of this lesson with other members of your class. For this particular lesson, group interaction, assistance, and cooperation are at least as important as the material you will be studying. Be sure to turn in all of the material requested to your teacher. If at any time you encounter difficulty, immediately notify your teacher and the facilitator of the Exploration.

Figure P.13. Word art gallery



- In the **Edit WordArt Text** dialog box, ***enter the desired text.*** Also, select the Font, Font Size, or Appearance options and ***click OK*** to place the text on the page. The same rules apply to resize, move, and edit as they did to images and clip art discussed earlier in this chapter.
- After text is inserted into the document, the Word Art styles bar is displayed for additional editing and formatting. Click to revise the contents, access the gallery, change colors and format, integrate basic shapes, rotate the text on the page, wrap the Word Art within regular text, or align Word Art on the page.

Text Color. Another simple but effective visual enhancement is the use of text color. Student instructions are generally displayed in blue (see Figure 12 again). Once students grasp this visual clue, they are on the lookout for elements within a workbook exercise requiring a response. To change the color of text, highlight the target words with a mouse click and drag.

-  Click the ***Font Color*** icon on the home tool bar located at the top of the window. To use the color currently shown under the "**A**," simply click the icon. To change to another color, click the down arrow and select from among 40 primary colors or click ***More Colors*** to select from the rainbow. Text color may be edited for appearance (bold, italics, or underline) and its font or font size changed to suit the designer.

Tables. A table (see Figure P.14) is composed of rows and columns of cells filled with text or graphics. It organizes and presents information and has a variety of other applications. Tables are excellent for aligning numbers within columns, creating individualized page layouts, and arranging text and graphics. To create a table, move the cursor to the target location within the document.

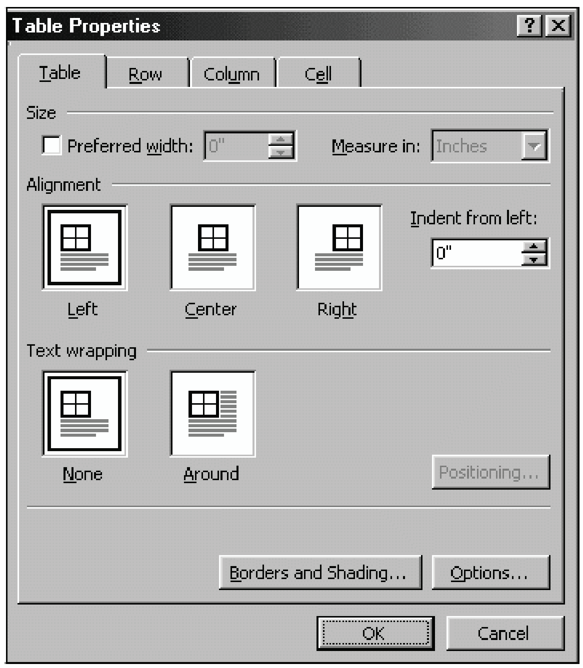
- 

Click ***Insert → Table*** on the home tool bar at the top of the window. Click and drag the mouse to select the desired number of rows and columns. A cell holds either text or images and may be accessed using the mouse or Tab key to move from one cell to the next.

Figure P.14. Tables (taken from the Hyper Book)

What was the Name of your Planet?	**Describe your Planet Here (Size, Distance from the Sun, Year, etc.)**	**Inner or Outer Planet?**	**Draw a picture of your Planet Here**

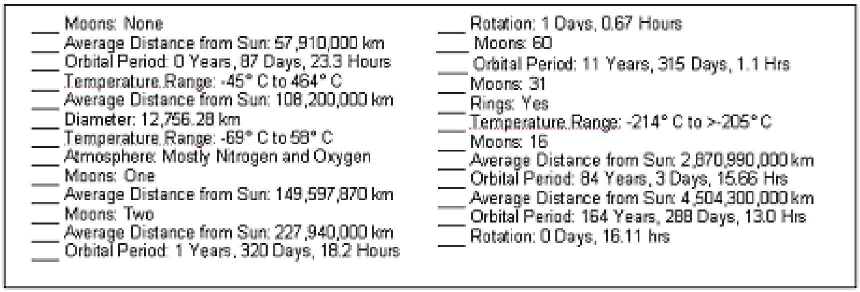
Figure P.15. Table properties



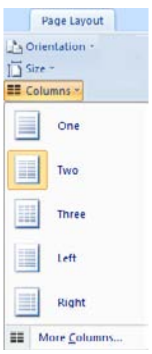
- ***Table Properties*** presents options for alignment and text wrapping for the entire table or any of its component rows, columns, and cells. Use the ***right mouse button*** to access the dialog box (see Figure P.15).

Columns. Columns, like tables, also organize information; the primary difference is the flow of the text. While tables present information horizontally in blocks, columns align text vertically across the page (see Figure P.16). Newspaper articles are examples of text presented in columnar format. To

Figure P.16. Columnar text

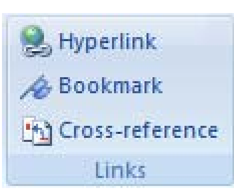

___ Moons: None
___ Average Distance from Sun: 57,910,000 km
___ Orbital Period: 0 Years, 87 Days, 23.3 Hours
___ Temperature Range: -45° C to 464° C
___ Average Distance from Sun: 108,200,000 km
___ Diameter: 12,756.28 km
___ Temperature Range: -69° C to 58° C
___ Atmosphere: Mostly Nitrogen and Oxygen
___ Moons: One
___ Average Distance from Sun: 149,597,870 km
___ Moons: Two
___ Average Distance from Sun: 227,940,000 km
___ Orbital Period: 1 Years, 320 Days, 18.2 Hours
___ Rotation: 1 Days, 0.67 Hours
___ Moons: 60
___ Orbital Period: 11 Years, 315 Days, 1.1 Hrs
___ Moons: 31
___ Rings: Yes
___ Temperature Range: -214° C to >-205° C
___ Moons: 16
___ Average Distance from Sun: 2,870,990,000 km
___ Orbital Period: 84 Years, 3 Days, 15.66 Hrs
___ Average Distance from Sun: 4,504,300,000 km
___ Orbital Period: 164 Years, 288 Days, 13.0 Hrs
___ Rotation: 0 Days, 16.11 hrs

create Columns, enter the text initially in typical linear format. After completing data entry, ***select and highlight the text*** to be placed into columns.

- 

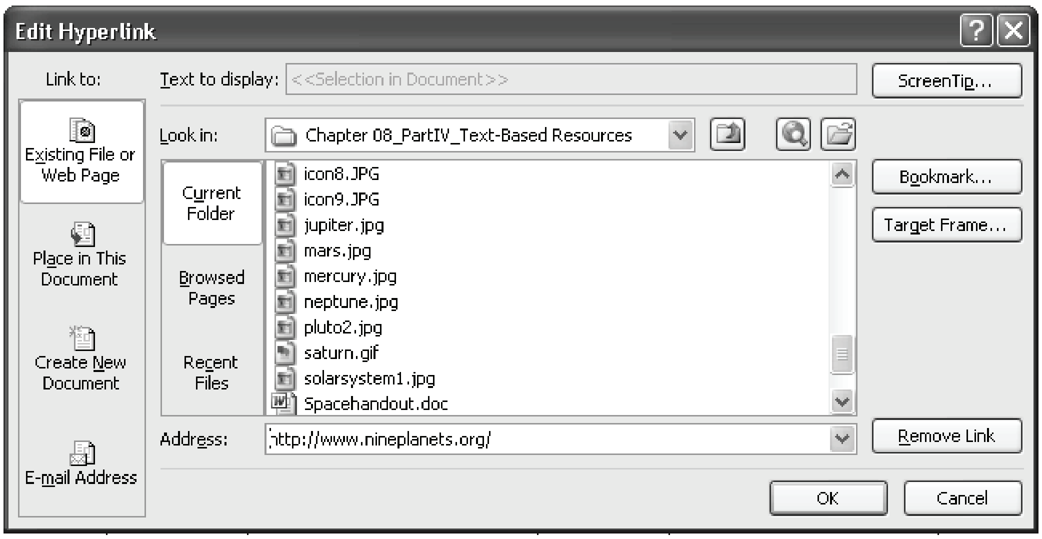
On the Page Layout home tool bar, ***click Columns.*** Select the desired number of columns. For Hyper Book applications, no more than two or three columns are recommended. The selected text is immediately reformatted. Use the Undo command if the results are unacceptable.

Hyperlinks. A "hyperlink" connects users to other documents, presentations, and web sites. Hyperlinks assume that the document is online; otherwise, there is no reason to include this feature. To insert a hyperlink, enter and select the text to serve as the link.

- 

On the **Insert** tool bar, click t ***Insert → Hyperlink*** from the pop-down menu.
- To link to an Internet site, ***enter the Web page name*** and prefix the URL with **http://**. ***Click OK***. (see Figure P.17). Typically, the hyperlink displays as blue text . To link to a file (i.e., another document, presentation, etc.) enter the file name without a prefix or use the ***Look in: → File*** to locate the target file.
- ***Save*** the document.

Figure P.17. Insert/edit hyperlink



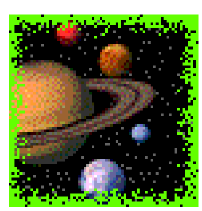
Supplement 1a: Creating a Windows Shortcut for Microsoft Word

Creating a Shortcut. A “shortcut” offers an easy path to the most popular software applications. Follow these steps to create a shortcut.

- Locate the target application in the ***Start*** → ***All Programs*** menu. ***Right click the mouse*** to open the pop-down menu. Scroll to the ***Create Shortcut*** option and ***left click*** to create the shortcut.
- 

Using the *left mouse button, click and drag the new shortcut to the Desktop*. Notice that the icon is marked with a small arrow. Click the new shortcut to launch the application.

Supplement 1b: The Solar System Study Guide: Planets of the Solar System



The Solar System Study Guide

Planets of the Solar System

Student Name: ____

Date of the Lesson: _____________________

Teacher: ________________

Instructions: Complete each of the Planet Fact Sheets tables by filling in the correct information taken from http://www.nineplanets.org/

Material taken from the following sources (copyright permission received): www.kidscosmos.org/kid-stuff
http://www.nineplanets.org/
http://www.nasa.gov/

Planet Page 1

Mercury

Mercury is a battered and baked planet just larger than Earth's moon. Evidence of heavy bombardment from the chaos of the formation of the solar system is left in the hundreds of craters and resulting lava flows on this small, barren planet. Mercury is the closest planet to the Sun and the eighth largest. Mercury is slightly smaller in diameter than the moons Ganymede and Titan but more than twice as massive.

orbit: 57,910,000 km (0.38 AU) from Sun
diameter: 4,880 km
mass: 3.30e23 kg

Quick Facts about Mercury	
Topic	**Data**
Diameter	
Density	5.43 g/cm^3
Mass	3.303×10^{23} kg
Volume	6.084×10^{10} km^3
Temperature Range	-173° C to 427° C
Atmosphere	Some Hydrogen, Helium, Oxygen
Winds	
Moons	
Average Distance from Sun	
Orbital Period	
Rotation	
Tilt	0.00°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Slight

Class Notes: ______________________________________

____

Planet Page 2

Venus

Venus is the second planet from the Sun and the sixth largest. Venus' orbit is the most nearly circular of that of any planet, with an eccentricity of less than 1%.

orbit: 108,200,000 km (0.72 AU) from Sun
diameter: 12,103.6 km
mass: 4.869e24 kg

Quick Facts about Venus	
Topic	**Data**
Diameter	12,104 km
Density	5.25 g/cm^3
Mass	4.869×10^{24} kg
Volume	9.284×10^{11} km^3
Temperature Range	-45° C to 464° C
Atmosphere	97% Carbon Dioxide, Nitrogen
Winds	350 km/hr
Moons	None
Average Distance from Sun	
Orbital Period	
Rotation (Retrograde)	
Tilt	177.36°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Slight

Class Notes: ____

____

Planet Page 3

Earth

Earth, our home planet is teeming with life and wondrous things. We have studied Earth more than any other planet yet there is still more to be discovered.

Earth is the third planet from the Sun and the fifth largest:

orbit: 149,600,000 km (1.00 AU) from Sun
diameter: 12,756.3 km
mass: 5.972e24 kg

Quick Facts about Earth	
Topic	**Data**
Diameter	12,756.28 km
Density	5.515 g/cm^3
Mass	5.976 x 10^{24} kg
Volume	1.087 x 10^{12} km^3
Temperature Range	
Atmosphere	Mostly Nitrogen and Oxygen
Winds	483 km/hr
Moons	One
Average Distance from Sun	149,597,870 km
Orbital Period	1 Year, 0 Days, 0 Hours
Rotation	23 Hours 56.1 Min
Tilt	23.45°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Up to 362000 km from Surface

Class Notes: ______________________________________

____

Planet Page 4

Mars

Mars is the fourth planet from the Sun and the seventh largest:

orbit: 227,940,000 km (1.52 AU) from Sun
diameter: 6,794 km
mass: 6.4219e23 kg

Quick Facts about Mars	
Topic	**Data**
Diameter	6794.4 km
Density	3.94 g/cm^3
Mass	6.421 x 10^{23} kg
Volume	1.643 x 10^{11} km^3
Temperature Range	-140° C to 20° C
Atmosphere	Mostly Carbon Dioxide
Winds	Up to 100 km/hr
Moons	
Average Distance from Sun	227,940,000 km
Orbital Period	
Rotation	
Tilt	25.19°
Rings	No
Composition	Iron Oxides and Silicates
Magnetic Field	Slight

Class Notes: ____

____

Planet Page 5

Jupiter

Jupiter is the fifth planet from the Sun and by far the largest. Jupiter is more than twice as massive as all the other planets combined (the mass of Jupiter is 318 times that of Earth).

orbit: 778,330,000 km (5.20 AU) from Sun
diameter: 142,984 km (equatorial)
mass: 1.900e27 kg

Quick Facts about Jupiter	
Topic	**Data**
Diameter	142,984 km
Density	1.33 g/cm³
Mass	1.900×10^{27} kg
Volume	1.377×10^{15} km³
Temperature Range	-163° C to >-121° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 150 m/s
Moons	
Average Distance from Sun	778,330,000 km
Orbital Period	
Rotation	0 Days, 9.925 Hours
Tilt	3.13°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Extends 1,600,000 km

Class Notes: ____

____

Planet Page 6

Saturn

Saturn is the sixth planet from the Sun and the second largest:

orbit: 1,429,400,000 km (9.54 AU) from Sun
diameter: 120,536 km (equatorial)
mass: 5.68e26 kg

Quick Facts about Saturn	
Topic	**Data**
Diameter	120,536 km
Density	0.69 g/cm^3
Mass	5.688 x 10^{26} kg
Volume	8.183 x 10^{14} km^3
Temperature Range	-191° C to >-130° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 400 m/s
Moons	
Average Distance from Sun	1,429,400,000 km
Orbital Period	29 Years, 167 Days, 6.7 Hours
Rotation	0 Days, 10.233 Hours
Tilt	25.33°
Rings	
Composition	Hydrogen and Helium
Magnetic Field	Extremely strong

Class Notes: ____
____

Planet Page 7

Uranus

Uranus is the seventh planet from the Sun and the third largest (by diameter). Uranus is larger in diameter but smaller in mass than Neptune.

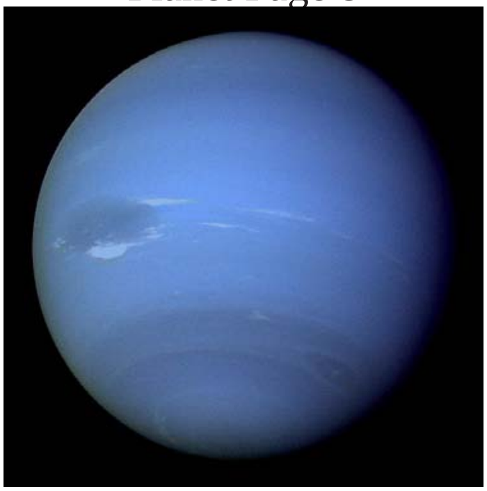
orbit: 2,870,990,000 km (19.218 AU) from Sun
diameter: 51,118 km (equatorial)
mass: 8.683e25 kg

Quick Facts about Uranus	
Topic	**Data**
Diameter	51,118 km
Density	1.29 g/cm^3
Mass	8.686 x 10^{25} kg
Volume	6.995 x 10^{14} km^3
Temperature Range	-214° C to >-205° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 160 m/s
Moons	
Average Distance from Sun	
Orbital Period	84 Years, 3 Days, 15.66 Hours
Rotation	0 Days, 17.25 Hours
Tilt	97.86°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Extends 15 times planet radius

Class Notes: ______________________________________

____

Planet Page 8



Neptune

Neptune is the eighth planet from the Sun and the fourth largest (by diameter). Neptune is smaller in diameter but larger in mass than Uranus.

orbit: 4,504,000,000 km (30.06 AU) from Sun
diameter: 49,532 km (equatorial)
mass: 1.0247e26 kg

Quick Facts about Neptune	
Topic	**Data**
Diameter	49,572 km
Density	1.64 g/cm^3
Mass	1.024×10^{26} kg
Volume	6.379×10^{14} km^3
Temperature Range	-223° C to >-220° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 2400 m/s
Moons	
Average Distance from Sun	4,504,300,000 km
Orbital Period	164 Years, 288 Days, 13.0 Hours
Rotation	0 Days, 16.11 Hours
Tilt	28.31°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Up to 20 times its radius

Class Notes: ____
____

Planet Page 9

Pluto

Pluto orbits beyond the orbit of Neptune (usually). It is much smaller than any of the official planets and now classified as a "dwarf planet". Pluto is smaller than seven of the solar system's moons (the Moon, Io, Europa, Ganymede, Callisto, Titan and Triton).

orbit: 5,913,520,000 km (39.5 AU) from the Sun (average)
diameter: 2274 km
mass: 1.27e22 kg

Quick Facts about Pluto	
Topic	**Data**
Diameter	2320 km
Density	2.05 g/cm^3
Mass	1.290 x 10^{22} kg
Volume	6.545 x 10^9 km^3
Temperature Range	-240° C to -218° C
Atmosphere	Methane
Winds	Not Measurable
Moons	
Average Distance from Sun	5,913,520,000 km
Orbital Period	
Rotation	6 Days, 9.25 Hours
Tilt	122.52°
Rings	None
Composition	Frozen Methane and Other Ices
Magnetic Field	None

Class Notes: ____

____

After you complete the Interactive Lesson later, mark your answers here on this page.

What Did You Learn? A Review…

Think About the Following Questions and Put Your Answers on Your Planets Worksheet.

	True	False
1. The inner planets are closer to the sun		
2. Mercury is the hottest of the planets		
3. Venus is the closest in size to the Earth		
4. Earth is the only planet in our solar system known to harbor life.		
5. Most scientists agree that there was once large amounts of water on the planet Mars.		
6. The meteor belt is located between Mars and Jupiter		
7. Hurricane-like storms called the Great Red Spot are located on Jupiter		
8. Galileo first observed Saturn with a telescope in 1610		
9. Neptune was the first planet located by mathematical predictions instead of regular observations		
10. Pluto is no longer considered an official planet		

38

Supplement 1c: The Solar System Hyper Book

Instructions. Each fourth grade student will receive their own copy of this Student Workbook. You are encouraged to explore the subject of this lesson with other members of your class. For this particular lesson, group interaction, assistance, and cooperation are at least as important as the material you will be studying. Be sure to turn in all of the material requested to your teacher. If at any time you encounter difficulty, immediately notify your teacher and the facilitator of the Exploration.

Student Name: ______________________________________

Date of the Lesson: ____________________

Teacher: _______________

Introduction to the Topic. You already know quite a lot about the solar system having seen several movies in our classroom and reading the books you checked out of the school library last week. You have also been on the Internet at least three times in computer class so you should know how to point and click on a link to access a Web site.

Feel free to explore the subjects presented in this Hyper Book at your own pace and in consonance with your own personal learning goals. The questions being asked are designed to guide you through the lesson objectives to ensure that you experience the full range of goals and performance objectives targeted by your teacher. You do not have to complete the questions in the order they are presented. But you should complete all of the questions.

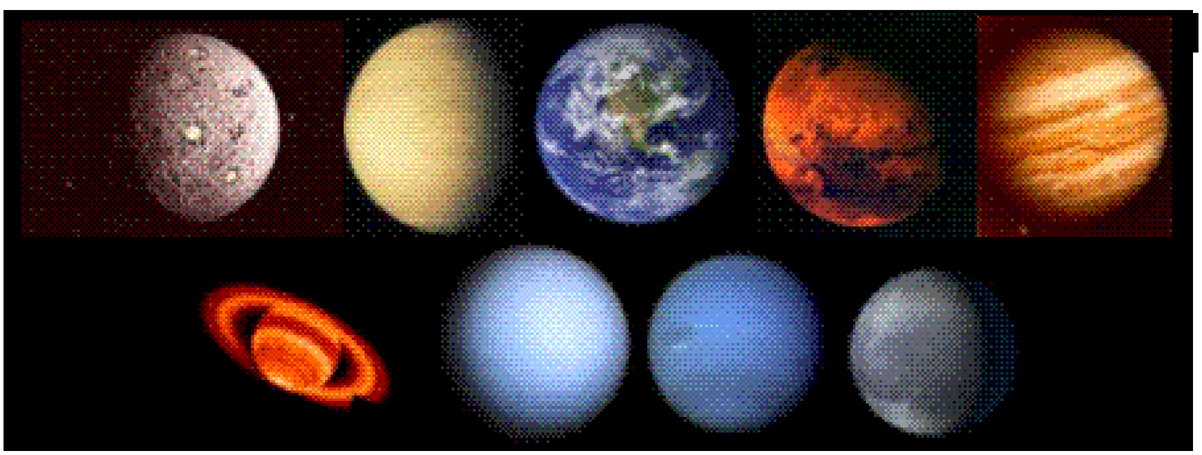
Time. Students will have two 40-minute class periods to complete this lesson. Complete the Hyper Book as you encounter the answers to the questions throughout the lesson.

Lesson Goals. Your lesson will help you:

- Select a favorite planet
- Distinguish between inner and outer planets in the solar system
- Identify planets by sight and features
- Share your ideas about planets
- Learn about planets and the solar system on your own

Learning Objective 1: **Students will examine the Planet Cards provided in the Hyper Book, draw a circle around their favorite planet, and explain why this is their favorite.**

Student Exercise 1: Examine the Planet Cards in the Hyper Book and **draw a circle around your favorite planet**.



Student Assignment:

Identify your Favorite Planet: ____

Now, **explain why this is your favorite planet** on the lines below…

____

____

____

____

____

____

***Learning Objective 2*: Students will locate a specific planet by searching provided Web sites and complete the following information.**

Student Exercise 2: Find one planet of your choice using one of the following web sites. When you decide on which planet you like the best, **complete the information below**. Your teacher will help you use the computer to find the site.

www.kidscosmos.org/kid-stuff
http://www.nineplanets.org/
http://www.nasa.gov/

Student Assignment:

What was the Name of your Planet?	Describe your Planet Here (Size, Distance from the Sun, Year, etc.)	Inner or Outer Planet?	Draw a picture of your Planet Here

Learning Objective 3: **Students will identify anything about planets that you already know from the following list of characteristics.**

Student Exercise 3: Here is a list of planet characteristics. **Place a check next to the characteristics** that match your favorite planet.

Student Assignment:

___ Moons: None
___ Average Distance from Sun: 57,910,000 km
___ Orbital Period: 0 Years, 87 Days, 23.3 Hours
___ Temperature Range: -45° C to 464° C
___ Average Distance from Sun: 108,200,000 km
___ Diameter: 12,756.28 km
___ Temperature Range: -69° C to 58° C
___ Atmosphere: Mostly Nitrogen and Oxygen
___ Moons: One
___ Average Distance from Sun: 149,597,870 km
___ Moons: Two
___ Average Distance from Sun: 227,940,000 km
___ Orbital Period: 1 Years, 320 Days, 18.2 Hours
___ Rotation: 1 Days, 0.67 Hours
___ Moons: 60
___ Orbital Period: 11 Years, 315 Days, 1.1 Hrs
___ Moons: 31
___ Rings: Yes
___ Temperature Range: -214° C to >-205° C
___ Moons: 16
___ Average Distance from Sun: 2,870,990,000 km
___ Orbital Period: 84 Years, 3 Days, 15.66 Hrs
___ Average Distance from Sun: 4,504,300,000 km
___ Orbital Period: 164 Years, 288 Days, 13.0 Hrs
___ Rotation: 0 Days, 16.11 hrs

Learning Objective 4: **Students will cut out "trading cards." Not all cards are provided to each student. Students will identify duplicate cards and trade with classmates to obtain desired cards.**

Student Exercise 4. At the end of this Workbook are some Planet Cards. You do not have ALL the cards, but you do have a couple of the same planets, so you may **trade with your classmates to complete the set**.

Student Assignment: Cut out, collect, and trade with others in your class.

Learning Objective 5: Learning about planets on your own

Student Exercise 5: Please evaluate this lesson on the Solar System. **Circle your answer**. And be sure to **turn in your Workbooks** to the teacher when you are done.

Student Assignment:

Yes / No a. Did you enjoy using computers to find new information about Planets?

Yes / No b. Did you discover information about planets that you did not know before? If so, name at least one or two new things you learned.

1. ____

2. ____

c. What is your experience as a computer user? Check one…

____ (1) I have a computer at home and can get to the Internet

____ (2) I have a computer at home but have never used the Internet

____ (3) I want one of these for Christmas!

____ (4) I only use a computer at school

Additional Activities for the Hyper Book Lesson

Internet Sites

Planet Facts:
URL: **http://www.kidzone.ws/planets/index.htm**

Interactive Solar System Facts about the Planets and Sun
URL: **www.apples4theteacher.com/starwarp2.html**

Amazing Facts about the Planets and the Solar System
URL: **www.solarspace.co.uk/Amazingfacts.php**

Solar System Exploration: Planets
URL: **solarsystem.nasa.gov/planets/index.cfm**

F9 Kids - About the Planets

URL: **kids.f9.net.uk/flash/planets/about_planets.html**

Cool Science Facts: Planets

URL: **www.coolsciencefacts.com/2007/planets.html**

Astronomy Quiz : Planets - Facts

URL: **www.syvum.com/cgi/online/serve.cgi/squizzes/astronomy/planets_facts_1.html**

Videotapes (These Tapes are in the School Library)

Bill Nye: The Solar System, TV, 50 minutes, taken from Bill Nye TV Shows: facts, surprise celebrity guests, hot music videos, and fabulous experiments

Planets! 60 minutes, Vestron, 1985,1987, Host Christopher Reeve

Planets: Fun, Facts, and Fantasy, Volume 1, 30 minutes, Diamond Entertainment Corporation Nature Series, 1991

Planets: Fun, Facts, and Fantasy, Volume 2, 30 minutes, Diamond Entertainment Corporation Nature Series, 1991

Where Did the Planets Come From? 31 minutes, Golden Book Video, 1992

When the Sun Ruled - a T.L.C. Series - 5 Parts. 1 hour each.

Audio resources (These Tapes are in the School Library)

Search for the Origins of the Solar System, Cassette Tape, 58 minutes

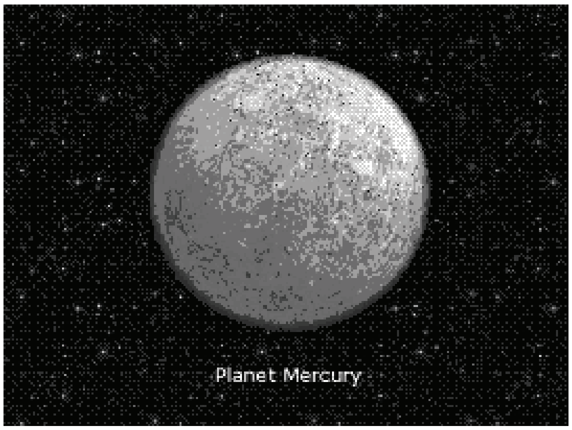
Planet of Life, Cassette Tape, 26 minutes

Return of the Solar System, Cassette Tape, 60 minutes, VideoSaurus/Midwich Entertainment, 1991

Other text-based materials (These Books are in the School Library)

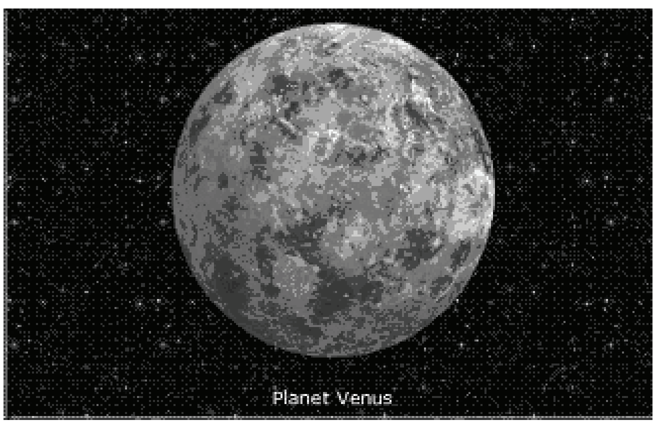
The Solar System /With Planet Stickers, Tor Books; ISBN: 0812534921
Planet Day. By Diane Dawson Hearn; Simon & Schuster (Juv); ISBN: 0027434850
Planets in Our Solar System : An Interactive Guide to the Solar System. By Dougal Dixon; Dorling Kindersley; ISBN: 1564586839
The Planets Question and Answer Book. By Sylvia Funston, Planet Project; Little Brown & Co (Juv Pap); ISBN: 0316570214
Planet Worlds : New Discoveries. By Don Lessem; Boyds Mills Pr; ISBN: 1563975971
The Solar System National Museum (New True Books). By David Petersen; Little Brown & Co; ISBN: 0516410741

PLANET Cards



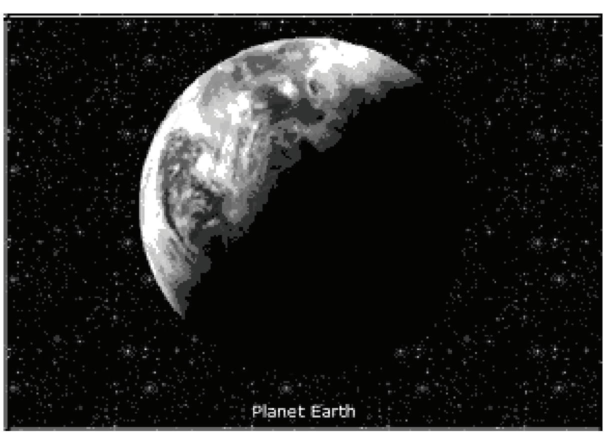
Mercury

- Distance from Sun: 36 million miles
- Diameter: 3,032 miles
- Average Temperature: 333° F
- Surface: Silicate rock
- Revolution: 88 days
- Day: 175.94 days
- Number of moons: 0
- Neat Fact: Closest planet to the Sun.



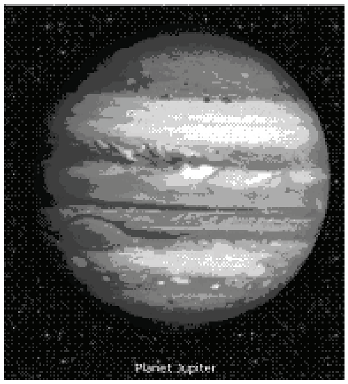
Venus

- Distance from Sun: 67 million miles
- Diameter: 7,521 miles
- Average Temperature: 867° F
- Surface: Silicate rock
- Revolution: 224.7 days
- Day: 116.75 days
- Number of moons: 0
- Neat Fact: Rotates in the opposite direction from the other planets.



Earth

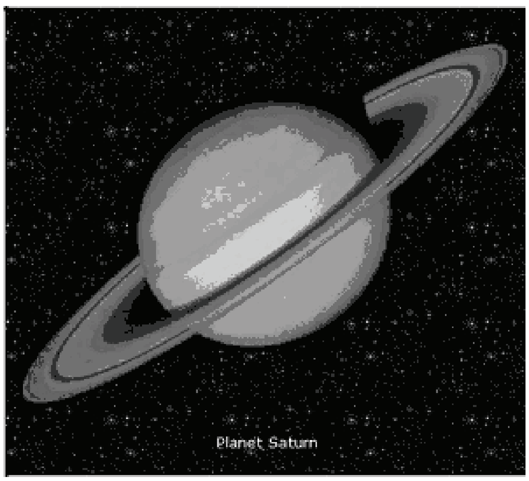
- Distance from Sun: 93 million miles
- Diameter: 7,926 miles
- Average Temperature: 59° F
- Surface: Water, basalt, and granite rock
- Revolution: 365.25 days
- Day: 24 hours
- Number of moons: 1
- Neat Fact: Travels around the Sun at a speed of >66,000 miles per hour.



Jupiter

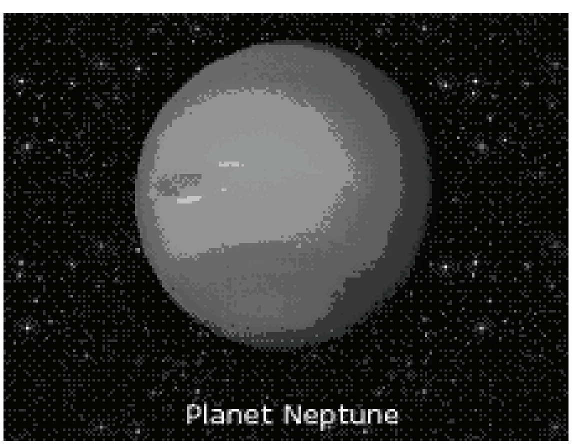
- Distance from Sun: 484 million miles
- Diameter: 88,732 miles
- Average Temperature: -162º F
- Surface: Liquid hydrogen
- Revolution: 11.9 years
- Day: 9 hours 55 minutes 30 seconds
- Number of moons: 63

Neat Fact: The four largest moons were found by Galileo in 1601; the others were discovered in 2003.



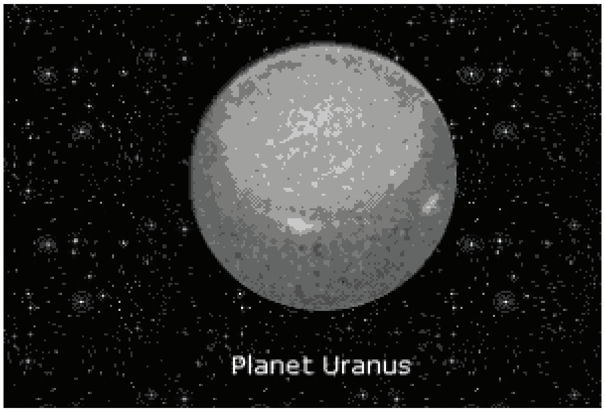
Saturn

- Distance from Sun: 887 million miles
- Diameter: 74,975 miles
- Average Temperature: -218º F
- Surface: Liquid hydrogen
- Revolution: 29.5 years
- Day: 10 hours 39 minutes 23 seconds
- Number of moons: 47
- Neat Fact: Galileo discovered the rings around Saturn with a simple early telescope.



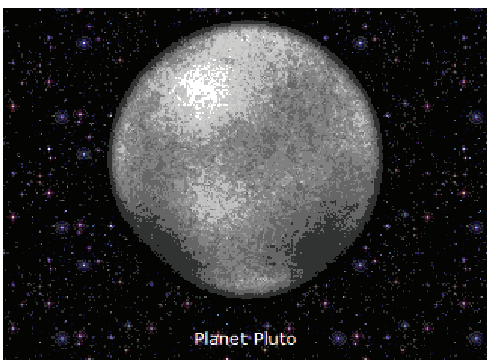
Neptune

- Distance from Sun: 2.8 billion miles
- Diameter: 30,603 miles
- Average Temperature: -330º F
- Surface: Liquid hydrogen and helium
- Revolution: 164.8 years
- Day: 16 days 6 hours 37 minutes
- Number of moons: 13
- Neat Fact: Neptune can have winds up to 2400 miles per second.



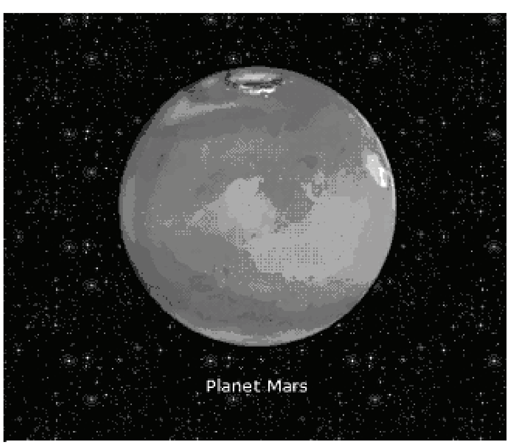
Uranus

- Distance from Sun: 1.8 billion miles
- Diameter: 31,763 miles
- Average Temperature: -323º F
- Surface: Liquid hydrogen and helium
- Revolution: 84 years
- Day: 17 hours 14 minutes 23 seconds
- Number of moons: 27
- Neat Fact: Its north pole stays dark for 42 years at a time.



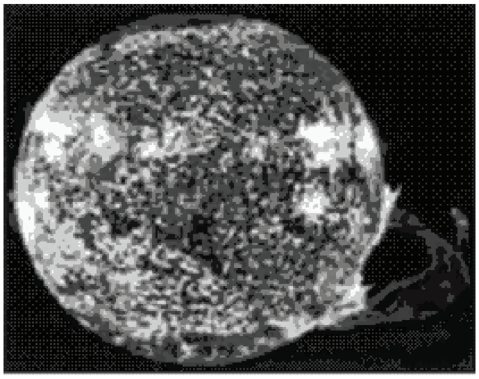
Pluto

- Distance from Sun: 3.6 billion miles
- Diameter: 1,485 miles
- Average Temperature: -369º F
- Surface: Rock and frozen gases
- Revolution: 247.7 years
- Day: 6 days 9 hours 17 minutes
- Number of moons: 3
- Neat Fact: Some scientists do not consider Pluto to be an actual planet.



Mars

- Distance from Sun: 142 million miles
- Diameter: 4,213 miles
- Average Temperature: -81° F
- Surface: iron-rich basaltic rich
- Revolution: 687 days
- Day: 24 hours 39 minutes 35 seconds
- Number of moons: 2
- Neat Fact: The largest volcano in the Solar System is on Mars. It is called Olympus Mons.



Sun

- Mass (Earth = 1){ 332,830
- Radius: 695,000 kns
- Average Temperature: 6000° C
- Age: 4.5 billion years
- Neat Fact: Light from the Sun takes 8 minutes to reach Earth,

PRIMER TWO
VISUAL-BASED MATERIALS

INTRODUCTION

The second instructional manual for developing technology-rich resources offers a **Primer for Visual-Based Materials**. As with the previous editions, this primer consists of two interdependent sections that move teachers through the development of elementary and advanced materials.

In this primer, **Section I. Constructing Visual-Based Presentations** begins with a look at the features, commands, and practical examples for building a classroom presentation using Microsoft Power Point. Many teachers have created their own visual lecture and may feel comfortable with the basic features of graphics presentations systems. If so, consider reviewing this section to validate your mastery of these instructions. As before, there is much to be gained by looking at Supplement 2b to the Primer that contains a practical example of a completed presentation using the features explained in Section I.

Section II. Constructing the Interactive Lesson presents the advanced features of Power Point that moves the presentation from a classroom, teacher-focused slideshow to an interactive, student-controlled learning experience. Supplement 2c provides the slides that make an interactive lesson possible and enhance innovative teaching and self-paced learning.

Launching Power Point®. Access to Power Point® is made easier with a desktop shortcut. If a shortcut or alias is available on the desktop, ***double click the Power Point® icon*** to launch the application. If not, follow the instructions for creating a shortcut located in Supplement 2a.

CONSTRUCTING VISUAL-BASED PRESENTATIONS

Launching Power Point. Access to Power Point is made easier with a desktop shortcut. If a shortcut or alias is available on the desktop, ***double click the Power Point icon*** to launch the application. If not, *click* the *Start Button* on the Task Bar, scroll to *Programs*, then *Microsoft Power Point*.

Opening Presentations. Power Point opens with a New Presentation window named "Presentation1." Slides and text may be entered directly into this new presentation and saved to the hard disk or jump drive. The easiest way to construct a presentation is to use one of the pre-loaded templates rather than starting with a Blank Presentation. From the ***Office Button***, click on ***New*** presentation, and from the available templates, select ***Presentations → Academics → Student presentation***. See Figure P.1 as we proceed with the following explanations.

The templates provided offer the user a fast way to create presentations without starting from scratch. The student presentation template, for example (see Figure P.2), creates a presentation with nine slides. The first slide is a presentation title followed by an overview slide, and project description. Several

Figure P.1. Using a Power Point template

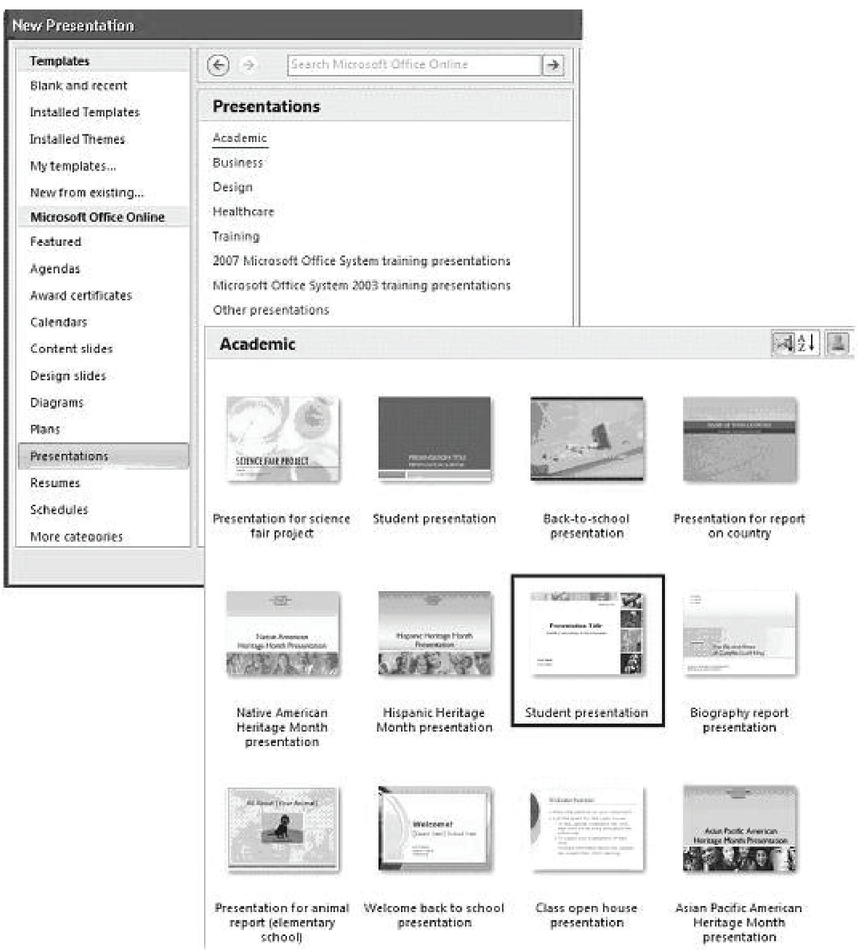
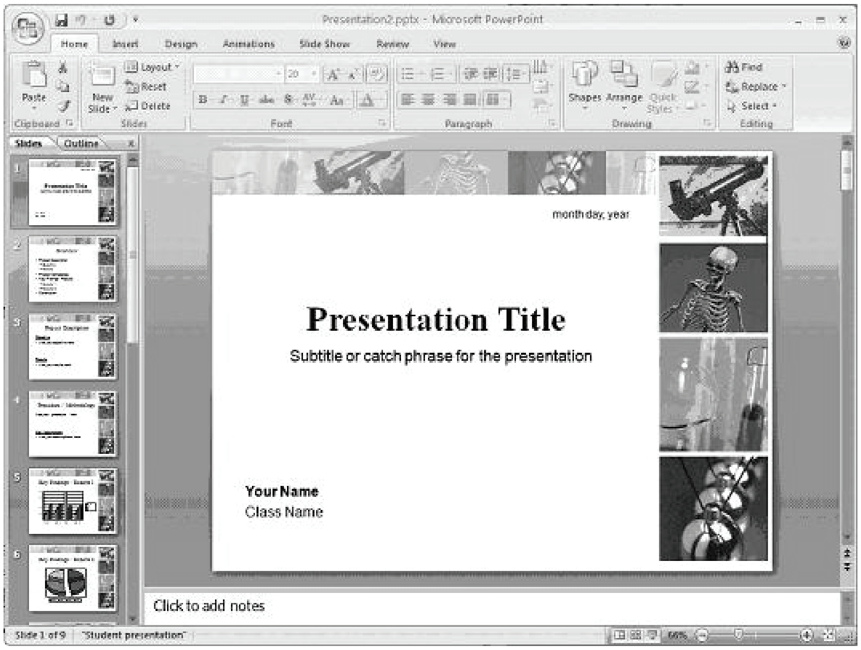


Figure P.2. Student presentation template



slides are created for key findings and results followed by a conclusions and a questions/ discussion slide. For the classroom instructor (traditional or online), creating a presentation is simplified greatly when starting with this boilerplate and adding new content into an existing slide structure. In addition to Student Presentation, Power Point provides a host of additional templates and there are even more available from Microsoft on the web.

Viewing a Presentation. Power Point uses a series of four view modes which appear under the view tab at the top of the screen. From left to right, the views include:

- 

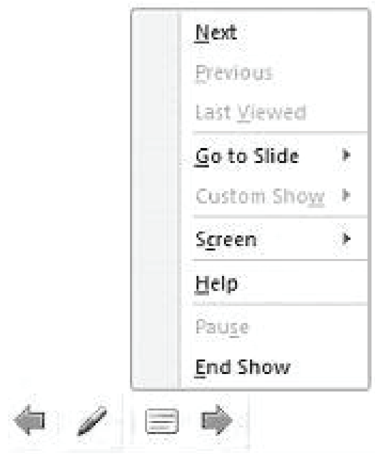
Normal View that provides tabs for either a ***slide view*** or ***outline view*** (i.e., text-only) of the presentation.
- 

Slide Sorter View that offers a handy, user friendly feature to assist in building transitions effects and arranging slides in a planned instructional sequence.
- 

Notes Page View that simultaneously displays current slides and any notes/ comments desired by the presenter.
- 

Slide Show View that displays the actual presentation on-screen.

Figure P.3. Slide show button



For practice, ***click the Slide Show View*** and follow these steps to advance through the presentation.

- **Advance to the next slide.** Click the mouse, press the space bar, use the Up (Forward) and Down (Back) arrows, or press the Page Up (Forward) or Page Down (Back) keys to move through the slide presentation.
-  **Use the Pointer.** One of the most popular features of the Slide Show is the use of an on-screen pointer. Drag the mouse across a slide until the slide show button appears on the bottom left of the screen. The image is faint so look closely. Click the button then ***Pointer Options → Pen***. The cursor changes from the arrow to a pen. ***Click and drag*** the mouse around the screen underlining important words, circling key phrases, or drawing arrows to critical bullets. The drawing is temporary and disappears with the next slide.
- **Options.** After viewing the final slide in the show, Power Point ends the presentation and restores the screen to the previous view mode. A show may also be terminated at any time by pressing the Escape key or clicking End Show from the Action Button (see Figure P.3).

Editing the Presentation. Keep the newly created presentation on the screen as the basic editing features are introduced. Practice each skill. Remain in the ***Normal View*** before continuing with this exercise.

Selecting Text. Before editing, text must be highlighted or "selected." To select:

- **A Bullet**. Place the cursor anywhere in the middle of the bullet sentence and ***triple-click*** the mouse to highlight the entire word.
- **A Word**. Position the cursor on the desired word and ***double-click*** the mouse button.
- **A Paragraph**. Click and drag the mouse to highlight a string of text or a part of or the entire paragraph.

Bold, Underline, Italics, and Shadow. Power Point® includes a number of options for **Appearance** commands, all of which appear under the Home Tab at the top of the screen.

- 

Click the **Bold** icon, **Italics**, and **Underline** to see how they affect the look of the selected bullet. Power Point® also provides a **Strike-through** and **Shadow** command. Notice that the buttons change appearance to indicate that the feature is ON. A second click toggles the feature OFF.

Left, Center, Right and Columns. To the right of the BIU icons are the **Alignment** functions.

- 
Left alignments line the text along the left margin. **Centering** is accomplished by clicking the middle icon and the **Right** alignment moves text to the outside margin. **Justify** spaces each line of text to both the left and right margins. Finally, in this version of Power Point® 2007, the option for establishing columnar text is provided; simply select one, two, three, or more **Columns**.

Changing Fonts and Font Size. Fonts and font size have an important role in visual material. Some presentation are designed with so much information they are difficult, if not impossible, to read. Others use font sizes that demand the eye of an eagle to read from a distance. While 10 and 12 pitch is acceptable for hard copy documents, 24 to 36 pitch is more appropriate for visual presentations.

- 

The pop-down menus for changing Fonts and Font Size appear in the Home Tab. Click the down arrow next to the **Font** window to view the available formats and follow the same procedure to set a new **Font Size**. In addition, an Increase Font Size ($A^{\wedge}$) and Decrease Font (A^{v}) Size button will grow or shrink text one size at a time.

Moving Text. Practice the **Cut, Copy, and Paste** commands to move text to other locations in the presentation.

- 

Cut, Copy, and Paste. From the Home tab, find the icons that look like a pair of scissors, two identical documents, and a clipboard. They are in the same location as the word processor and, of course, have the same purpose. The scissors **Cut**, or delete the selected text. The twin documents **Copy** text or images and the clipboard **Pastes** the text into a new location.

The Undo Command. After any editing changes, a click of the Undo button at the very top of the toolbar reverses the operation and returns the text to its former appearance.

- 
Click the icon to ***Undo the last action.*** To undo an action, click the left arrow icon. Undo is an important feature that saves time and recovers user mistakes.

Adding a New Bullet/Sub-Bullet. To add a new bullet, place the cursor immediately after the preceding bullet. For example, to add another agenda item to the third slide, position the cursor after the word ***"each."*** Hit the **Enter** key and Power Point will place another bullet at this location.

Promoting/Demoting Bullets. ***Highlight the new bullet*** and locate the icons that Promote/Demote text in the Paragraph sub-tab.

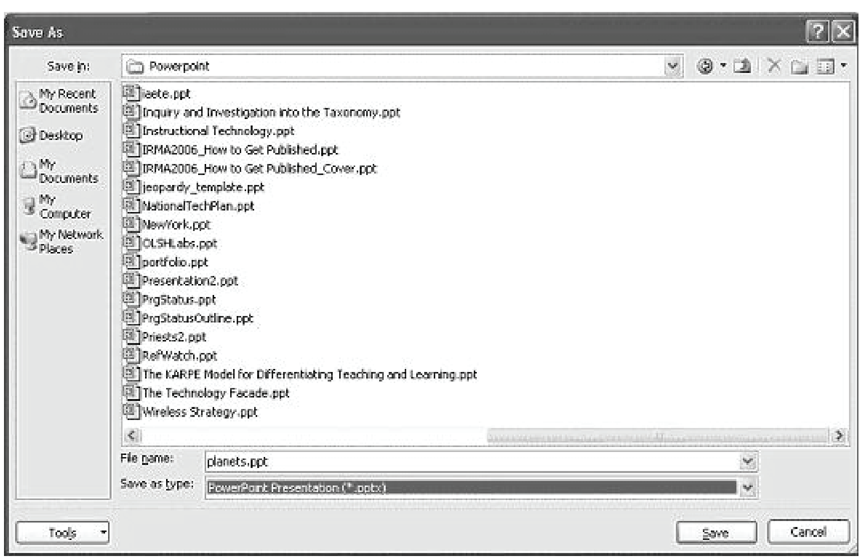
-  Click on the right arrow to **Demote** the bullet, effectively creating **sub-bullets** up to five levels deep.
-  The left arrow **Promotes** each bullet until it reaches the status of a new slide.

Saving a Presentation. Presentations should be saved after each slide is created or modified. The process takes only a single mouse click and saves considerable time in the event of a power outage, mechanical failure, or computer virus.

-  To Save the document, ***click the Save icon*** (diskette) on the Toolbar or select the ***File → Save*** Office Button menu. If the file has never been saved, the **Save As** dialog box appears.
- Set the location by clicking the ***Save In box*** until the correct folder appears and ***enter a new File Name*** for the presentation. ***Click the Save button*** (Figure P.4).

Summary. Visual-based materials at their simplest are used more and more by teachers. The presentations examined so far in this chapter are relatively easy to design and fairly straightforward to present

Figure P.4. Save As dialog box



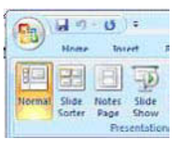
in a classroom environment. Take heart, the more complicated elements of visual-based instructional technology are forthcoming.

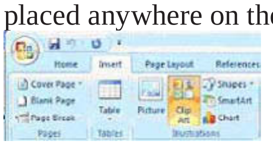
Enhanced Graphics Presentation Features. When examining various features of Power Point, it is easier to discuss editing, moving, inserting, and printing features while using a completed presentation already prepared as a guide. **Supplement 2b** provides an excellent demonstration of how this graphics package can be used to construct appropriate visual-based content material.

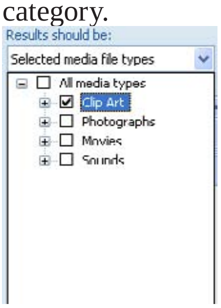
Author's Note: To construct a personal version of ***Planet Presentation*** as features and commands are discussed throughout this chapter, reproduce Supplement 2b by entering the content as these options are explained or download this presentation directly from the author's web site at: http://academics.rmu.edu/~tomei/planets.ppt and practice the new capabilities needed to fully integrate visual-based materials.

The ***Planet Presentation*** is a series of one-slide introductions to each of the nine planets. Let's explore some of the basic features as they pertain to the construction of a straightforward visual-based presentation.

Inserting Clip Art. The Clip Art Gallery offers a variety of pictures, images, sounds, and video clips. To insert clip art into a presentation:

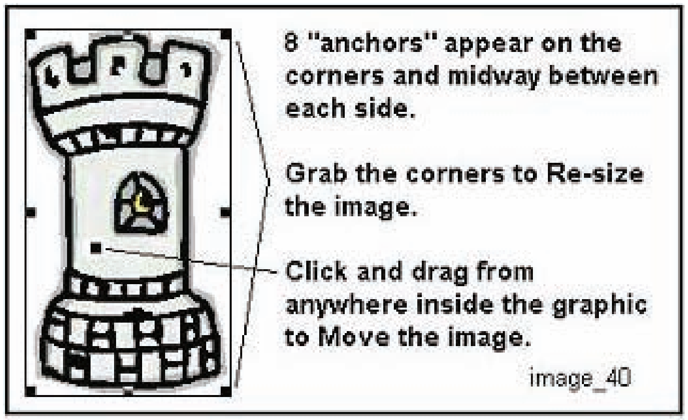
- 

Enter the Normal View. Before inserting clip art, it is best if ***Power Point is in the Normal View mode.***
- **Select the Slide**. Move to **Slide 1** where a piece of clip art already appears. The cursor may be placed anywhere on the selected slide.
- 

Select the Insert Tab. The clip art icon is found in the Insert Tab at the top of the screen. Click on ***Insert → Clip Art*** to display the contents of images available in each category.
- 

Select a Category. Select **Clip Art** in the search window and scroll through the available images and locate one appropriate for the instructional material under consideration.
- **Select the Image**. Click the **Insert button** to insert the image into the body of the document. Once there, the image may be resized or moved as desired.
-  **To Resize Clip Art**. Click anywhere on the image to activate the "anchors;" square boxes which appear on the perimeter (see Figure P.5). Place the cursor on one of the four <u>corner anchors</u> to transform the cursor from a pointer to a diagonal arrow. Hold the mouse button and drag diagonally to resize the image proportionally. The anchors appearing in the mid-perimeter locations stretch the image horizontally or vertically.

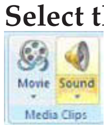
Figure P.5. Procedures for resizing and moving a clip art image

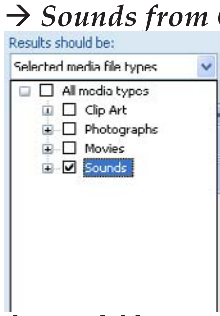


-  **To Move Clip Art**. Move the mouse anywhere inside the desired image. The cursor changes from a pointer to a four-way arrow. Hold the mouse button and drag the image to a new location on the slide.
- **Cut, Copy, and Paste**. Select the clip art by clicking the image. Click the **Cut** (scissors) icon to delete it; **Copy** the image to the clipboard; or, **Paste** it into a new location.
- ***Run the Slide Show to view the images.***

Inserting Sounds from the Gallery. To insert a digitized sound clip into presentations, follow these procedures.

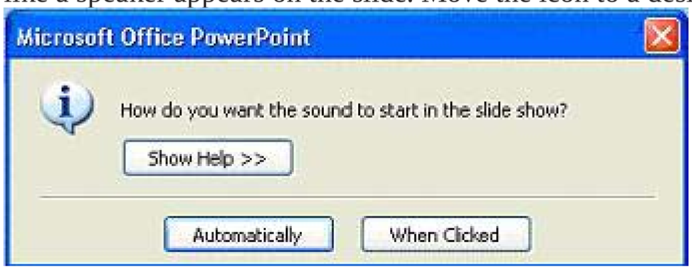
- 

Enter the Normal View. Before inserting a sound clip, it is best if ***Power Point is in the Normal View mode.***
- **Select the Slide**. Remain on **Slide 1**. Place the cursor anywhere on a selected slide.
- 

Select Sound from the Insert Tab. From the Insert Tab menu, click ***Insert → Sounds → Sounds from Clip Organizer*** to view the Sound Gallery contents.
- 

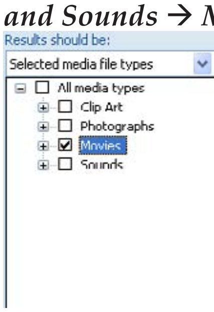
Select the Category. Select **Sounds** in the search window and scroll through the available images and locate one appropriate for the instructional material under consideration.

- 

Select the Sound. Scroll down the gallery (or search) to locate the "**Spaceship**" clip. Double-click the icon or ***click the icon once*** then the ***Insert button***. An image that looks like a speaker appears on the slide. Move the icon to a desired location on the slide.
- 

Select either "**Automatically**" to have the sound begin playing when the slide appears, or "**When Clicked**" to force the learner to click the speaker icon to hear the sound clip.
- ***Run the Slide Show to listen to the sounds***.

Inserting Movies from the Gallery. Inserting a video clip from the Gallery follows the same procedure.

- **Enter the Normal View**. Before inserting a movie clip, it is best if ***Power Point is in the Normal View mode***.
- **Select the Slide**. Go to **Slide 2.** Place the cursor anywhere on a selected slide.
- **Select Movie from the Insert Tab**. From the Insert Tab menu, click ***Insert → Movies from Clip Organizer*** to view the Movie Gallery contents.
- **Select the Option from the Insert Menu**. From the pop-down menu, click ***Insert → Movies and Sounds → Movies from Gallery*** to view the movie clip Gallery contents.
- 

Select the Category. Select **Movies** in the search window and scroll through the available images and locate one appropriate for the instructional material under consideration. Do not expect feature length movies from the Gallery. Most of the clips are actually "animated gifs," short cartoons lasting barely 2-3 seconds. However, they do add motion to a presentation.
- 
Select the Movie. Double-click the movie icon or ***click a movie icon once*** then the ***Insert button***. An icon appears on the slide depending on the inserted clip. Move the icon to a desired location on the slide.

- *Run the Slide Show to view the movie.*

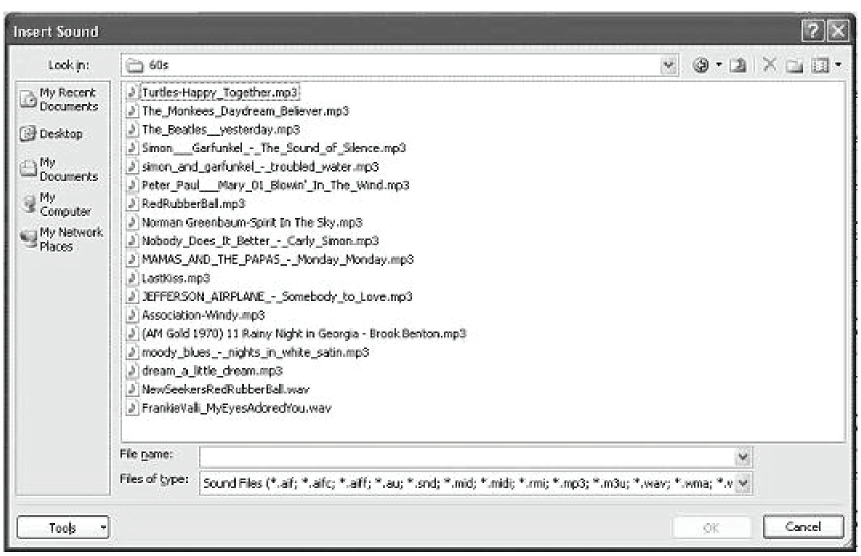
Inserting Pictures, Sounds, and Movies from the Internet. Images, sounds, and video clips harvested from the Internet may also be included in a presentation.

- **Enter the Normal View**. As before, it is best to be in the ***Normal View mode*** when inserting images, sounds, or movies.
- **Select the Slide**. Move to the target slide.
- **Select the Option from the Insert Menu**.
  - To Insert Pictures: ***click Insert → Picture.***
  - To Insert Sounds: ***click Insert → Sound → Sound from File.***
  - To Insert Movies. ***click Insert → Movie → Movie from File.***
- **Select the File**. ***Double-click on the file name or click the file icon and OK*** (see Figure P.6). The image, speaker icon, or video clip icon appears on the selected slide.
- ***Run the Slide Show to view the multimedia***.

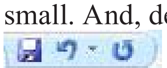
Inserting Text from the Internet. To insert text, the easiest method is to cut and paste directly from the web into an awaiting document by following these steps.

- **Enter the Normal View**. Before inserting a movie clip, it is best to be in the ***Normal View mode***.
- **Select the Slide**. Move to the target slide.
- **Minimize Power Point**. Use the **Minimize** icon to place the application on the Task Bar.

Figure P.6. Insert from file

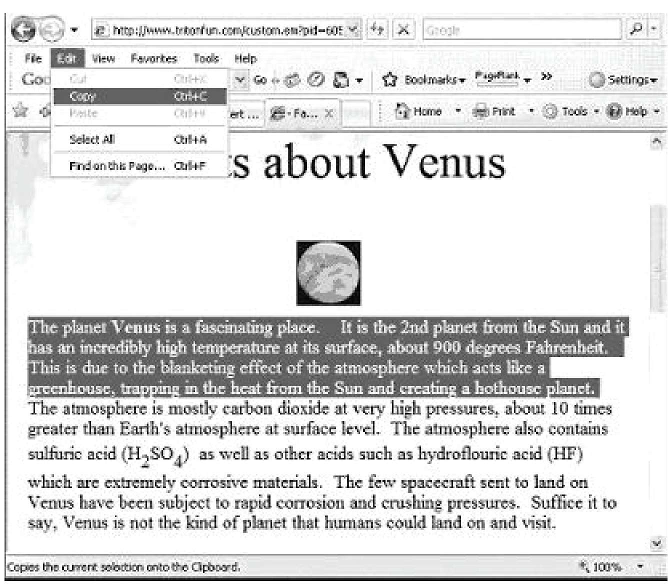


- **Open an Internet Session**. ***Launch Netscape or Internet Explorer or Safari*** (or the web browser of choice) and locate an appropriate web site containing lesson content text. Identify several sentences or even an entire paragraph appropriate for the target document.
- **Select the Desired Text**. Position the cursor to the left of the desired body of text to be captured. ***Click and drag the cursor down and to the right*** until all the desire text has been highlighted (See Figure P.7). Practice selecting text until the movement of the mouse becomes second nature.
- **Copy the Text to the Clipboard**. Copy the desired text onto the clipboard by clicking on the double document (copy) icon. Keep in mind that clicking the copy icon results in no visible action on the screen.
- 

Create a Text Box on the Slide. Using the Insert Tab at the top of the screen, ***click the Text Box icon***. Move the mouse to the target slide. Click and drag to establish the boundaries for the textual information – make it big enough to hold the selected text. A window opens when the mouse button is released.
- **Paste the Text into the Text Box**. Use the ***Paste*** pop-down menu to insert text.
- **Reformat the Text.** Make the text fit within the box. Change the font size if it is too big or too small. And, delete any superfluous spaces and line feeds.
-  **Save the Presentation**.

Inserting Hyperlinks into a Slide. Hyperlinks connect the presentation to an Internet site and may be tied to any object on a slide such as text, clip art, and images. Using hyperlinks avoids prob-

Figure P.7. Copying text to the clipboard



lems such as sending students to improper sites; avoiding the “dark side” of the Internet; eliminating unproductive searching and surfing; and. overcoming obstacles to the discovery process (e.g., typing skills). To insert a hyperlink,

- **Enter the Normal View**. Before inserting a movie clip, it is best to be in the ***Normal View mode***.
- **Select the Slide**. Move to the target slide. To practice this skill, advance to slide 17 (see Figure P.8) and examine the links provided in the planets presentation.
- **Select the text or image** to serve as the hyperlink. Enter the text or insert the image to be used as the link. Highlight the link or the click on the image.
- 

Click the ***Insert → Hyperlink***. For example, in the top link in Figure 9.9, ***Planet Facts*** carries the http://www.kidzone.ws/planets/index.htm **URL** (see Figure P.9). It may be a long address, but this is a great site for elementary school students seeking information about the solar system. Be sure to include the http:// prefix to indicate a link to the Internet. If the http:// prefix is omitted, the link will attempt to locate the target file on the host computer. Actually, omitting the prefix is an excellent way to provide a hyperlink to a document file, another presentation, or to a spreadsheet to provide the learner supplemental information.
- ***Click OK*** to retain the link.
-  **Save the Presentation**.

Figure P.8. Slide showing hyperlinks

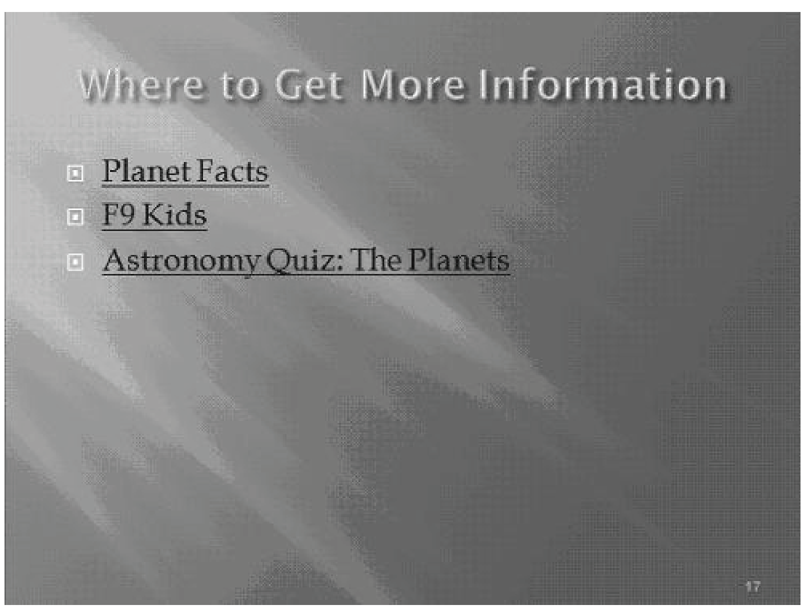
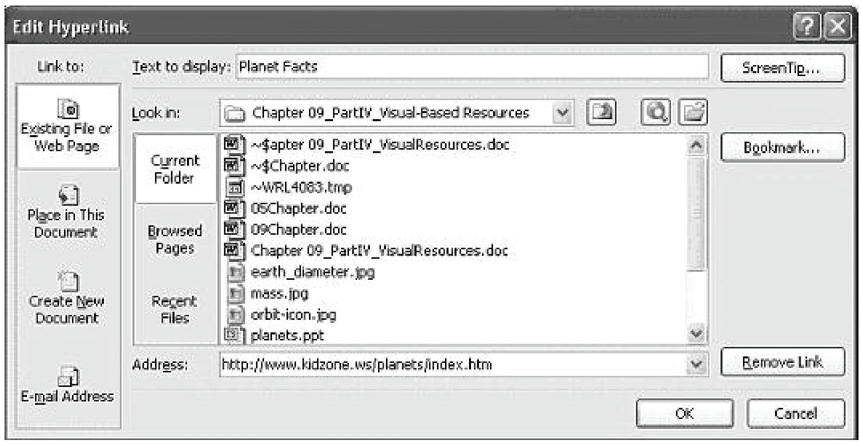


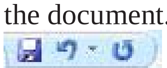
Figure P.9. Edit hyperlink dialog box



- ***Run the Slide Show*** and click on the link to launch the web browser and test the hyperlinks. Notice that a hyperlink is a different color (usually blue) from the rest of the text.

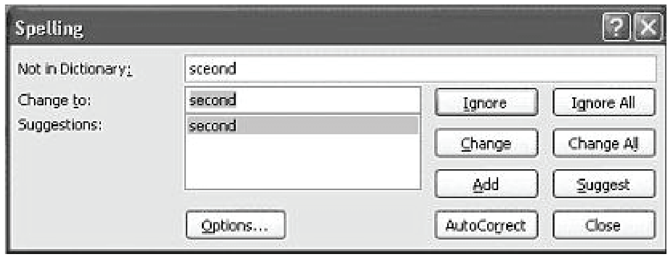
Spell Checking the Presentation. Power Point® checks spelling; however, the options are more limited than the word processor and grammar checking is not available.

- 

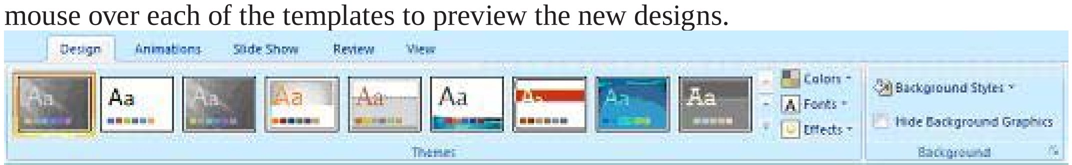
Check spelling on Demand. Spelling errors may be checked at any time by clicking on the Spelling icon. Spell check scrolls through every slide to identify errors. This method is useful when proofing an entire presentation.
- **Making Corrections**. The Spelling check dialog box is slightly different than Word (see Figure P.10); however, the differences are minor.
- The top window, **Not in Dictionary,** identifies the unrecognized word. Remember, the word may be spelled correctly but spelling check simply does not recognize it and therefore highlights it for action.
- The **Change to** window is the spelling check's attempt to suggest the correct spelling from the list that appears in the **Suggestions** window. Usually its guesses are right on the mark. If the choices are inappropriate, there are two options. First, **Ignore** the choices or **Ignore All** to disregard the same "misspelling" throughout the remainder of the document. Second, **Add** the new word to the personalized custom dictionary and all further encounters with the same word are considered correct.
- If one of the choices offered is suitable, click the desired **Suggestion**, then the **Change** button. **Change All** finds and replaces every occurrence of the word wherever it is encountered throughout the document.
-  **Save the Presentation**.

Selecting a Different Design Template. Power Point® comes with a wide variety of professionally designed templates. When a template is applied, the background color, font size, and font color may

Figure P.10. Spell checker dialog box



change. Before applying a template to a presentation, ***Save the presentation first*** so the original file is available should the results prove unsatisfactory. Another tip – change templates early in the design process before a considerable amount of text and images are inserted. To select a template, follow these instructions.

- **Enter the Normal View**. Before inserting a template, it is best to be in the ***Normal View mode***. A template may be applied in any mode; however, the Normal View displays the changes immediately.
- Click the ***Design Tab*** at the top of the screen. A series of design templates appears across the tab with more available with a scroll-down tab at the right side of the example templates. Roll the mouse over each of the templates to preview the new designs.
- 

Click on the desired template to convert all slides to the new scheme.
-  Click the ***Undo*** icon to return the slides to their original template.
-  ***Save the presentation***
- And, ***Run the Slide Show*** to view the results.

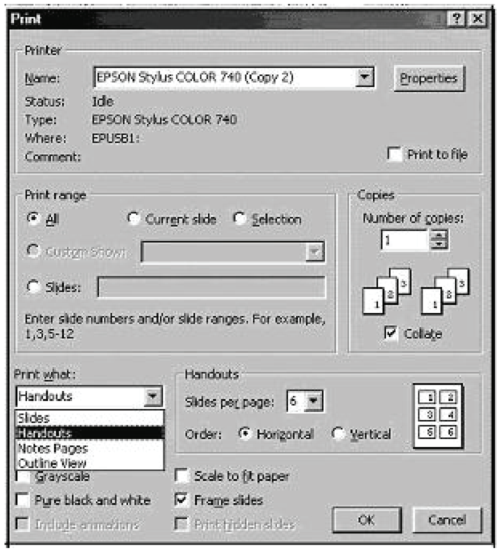
Printing the Presentation. After editing is complete, the presentation is ready to be printed using a few different features than the word processing counterpart.

- **No Print Preview**. There is no Print Preview; view the Slide Show to display the presentation before printing.
- **Print**. Use the ***Office Button*** to access the ***Print*** pop-down menu to produce the dialog box shown in Figure P.11.

The most common options when printing a presentation include: Print Range, Number of Copies, and Print What.

- **Print Range**. ***All*** prints every slide in the presentation; ***Current Slide*** prints only the single slide presently viewed; and, ***Slides*** allows the user to enter a range of slides.

Figure P.11. The print command dialog box



- **Number of Copies**. Enter the Number of Copies to be printed. Requesting the copies to be ***Collated*** prints them in order from first to last slide, then repeats the process again for additional copies.
- **Print What**. Another significant feature is the option to print Slides, Handouts, and Outlines. Click on ***Slides*** to print one slide on a page. Print multiple slides on a page by selecting ***Handouts*** 2, 3, 4, 6, or 9 slides to a page. The Handouts option is excellent for producing copies of slides for use in classroom situations.
- **Click OK** to print slides.

Summary. To create a visual-based classroom presentation, consider the specific learning objectives before attempting to construct lesson materials. A variety of visual materials, sounds, and video is available. Clip art offers hundreds of graphic images in its gallery. Images may be scanned from a book or downloaded from the Internet to assist learner understanding. Sounds and movies support student learning; however, using too many of these materials distract from an otherwise well-constructed lesson.

Power Point® offers a variety of presentation formats. In addition to an on-screen presentation, hard copy reproductions of the presentation facilitate note-taking, student questions, and lesson reviews.

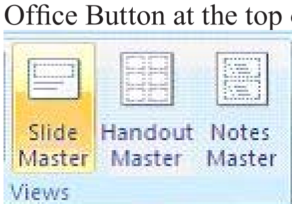
CONSTRUCTING THE INTERACTIVE LESSON: INTRODUCTION

An interactive lesson is a visual-based, classroom-centered teaching strategy appropriate for learners of all ages who benefit from concrete, sequential instruction imbedded with real-time assessment necessary to assure student learning. They take the form of self-paced, individualized learning opportunities embedded with learner assessment. In practice, these lessons are offered to all learners, but often for different reasons. Some need individualized instruction, others remedial instruction or additional practice, still others only enrichment activities.

Author's Note: To construct a personal version of the interactive lesson, *A Tour Through Our Solar System,* use **Supplement 2c** to enter the content as these options are explained or download this presentation directly from the author's web site at: http://academics.rmu.edu/~tomei/il_solarsystem.ppt and use Power Point to practice the new capabilities needed to fully integrate visual-based materials in the classroom as features and commands are discussed throughout this chapter.

A Tour Through Our Solar System is a self-paced exploration of the solar system and each of its nine planets, as well as the Sun and asteroids. Additional features, over and above those basic features presented earlier in the chapter, are necessary to create the interactive lesson. They include templates (and the master slide), word art, text color, drawing tools, and, most importantly, slide transitions and action settings. Earlier in the chapter, templates were changed as part of a standard presentation. With the interactive lesson, teachers are able to design their own templates. Let's explore some of these advanced features as they pertain to the construction of this more complex form of visual-based materials.

Templates and Master Slides. Creating new templates from images (either clip art or those downloaded from the Internet) offers the designer an unlimited number of choices for customizing the interactive lesson. However, the quality of the image, color scheme, and brightness make most images unacceptable as backgrounds. To create a *new template*, follow this process.

- **Open a New Presentation**. To create a new template, first open a new presentation from the Office Button at the top of the screen. Click *Office Button → New → Blank Presentation*.
- 

Enter the ***View → Slide Master***. From the View Tab, click on Slide Master to see all the various formats available for creating a master slide. Be sure to click on the first slide master in the left window; in that way, the format will be copied to all the various formats available and not just a single format at a time.
- **Insert an Image**. To create a new template, insert either a Picture or Clip Art as explained earlier in the chapter. This piece of clip art showing Saturn and several other planets in the solar system will suffice as an example. After inserting the image, resize the image to fill the entire slide and then double-click on the image (see Figure P.12). Notice that the anchors appear around the image and the Picture Tools Menu is at the top of the screen.
- **Recolor the Image to a Watermark**. Once an image is placed on the Master Slide, it must be re-colored. When an image is selected, the Picture Tool bar appears. From the Adjust options at the left, click on ***Recolor → Light Variations → Light*** icon shown in Figure P.13. Experiment with the variations offered, but for the background of a template, the lightest variation is usually the best. Notice that all formats have changed along the leftmost column indicating that all slides will have this background when this template is employed. However, the template design process is not finished.

Figure P.12. The Master Slide

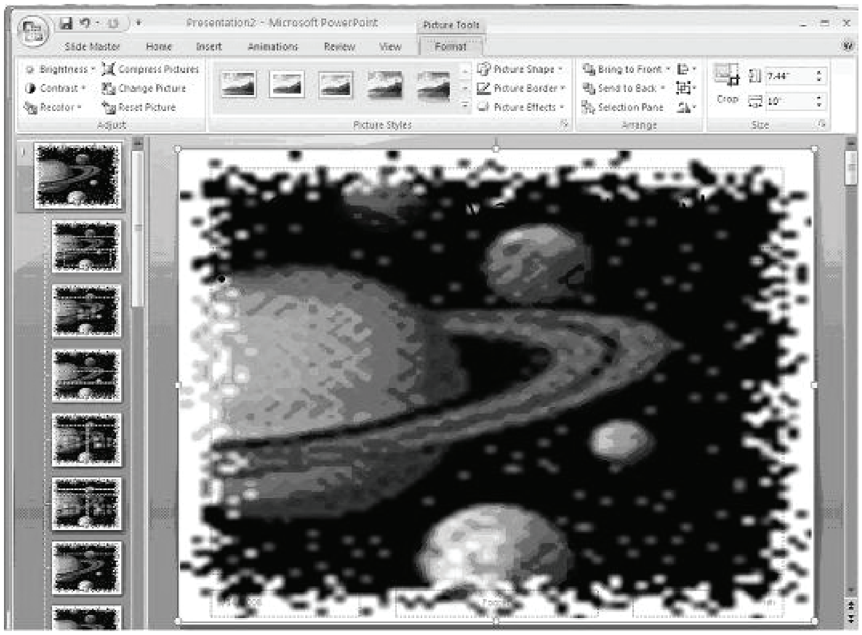


Figure P.13. Recolor the master slide image and place in background

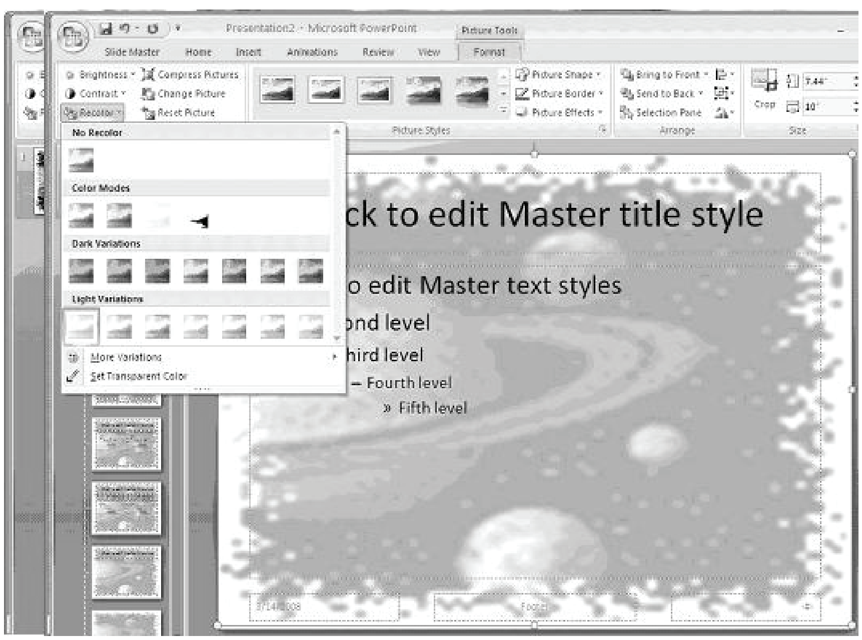
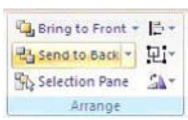
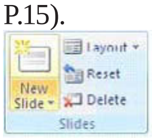


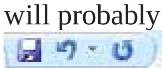
Figure P.14. Saving a new power point template

- 

Send the Image to the Background. Unless the new image is sent to the background, subsequent titles, bullets, and other images remain hidden. To send an image to the background, locate the Arrange options (see Figure 9.13 again) and click → ***Send to Back*** to position the image behind other elements on the slide.
- **Save the template**. From the Office Button, click on ***File*** → ***Save As*** and save the new format as a Power Point Template (see Figure P.14).

Using the New Template. Now that the template is built and saved, it can be used to create the presentation. From the Office Button,

- **Open a New Presentation and Select My Templates**. Simply open a new presentation and use one of the new templates my clicking ***Office Button*** → ***New*** → ***My Templates*** (see Figure P.15).
- 

Add Slides. From the Home Tab, add 12-15 New Slides to begin the presentation development. More can be added at a later time if needed – and for the interactive lesson, more will probably be required.
-  **Save the Presentation**

Word Art. Similar to the hyper book, Word Art offers more sophisticated and visually appealing text (see Figure P.16). Most of the required commands are the same with only a few notable exceptions. To insert Word Art onto a slide, follow these steps.

- **Enter the Normal View**. Before inserting clip art, it is best if ***Power Point is in the Normal View mode.***

Figure P.15. New presentation using My Templates

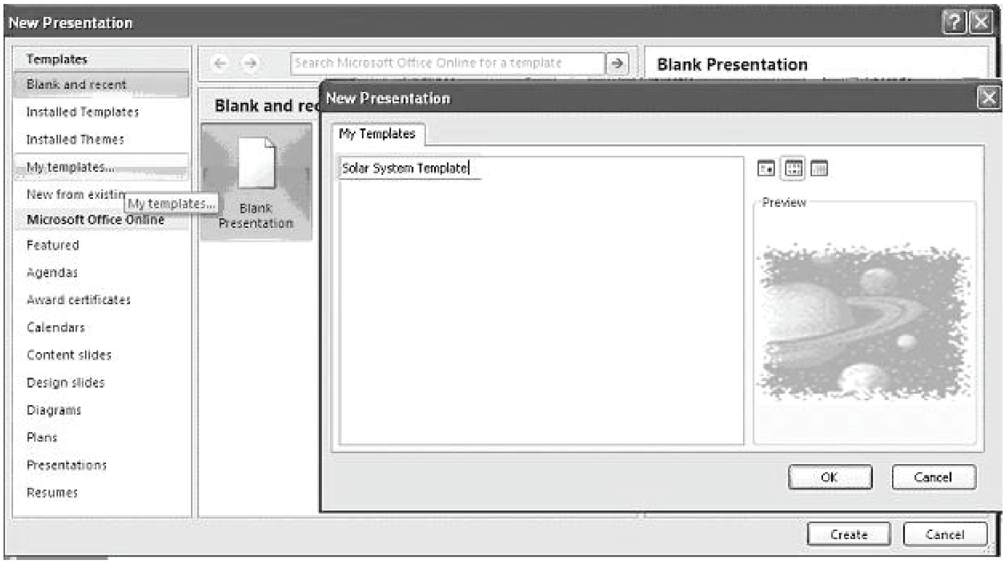
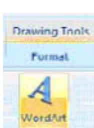
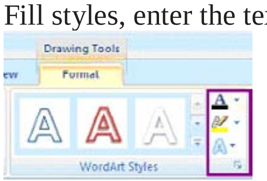


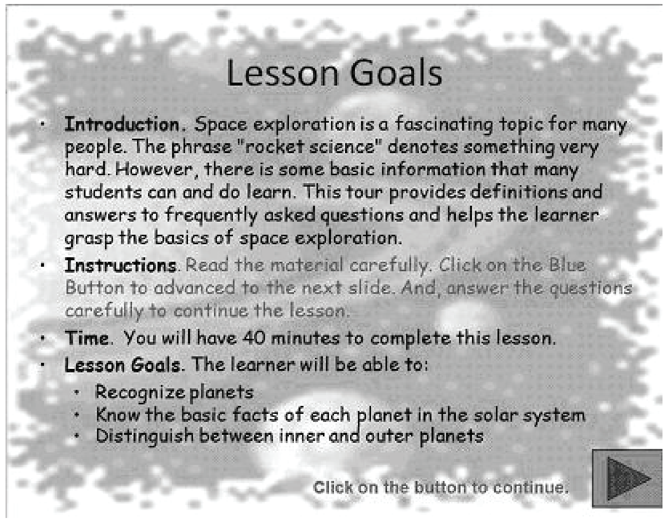
Figure P.16. Word art as title slide (lesson slide 18)

- 

On the **Drawing** Tool Bar, click the ***WordArt icon*** to open the Gallery. Or, click the ***Insert → Word Art*** from the menu at the top of the screen. Choose from among 30 available Fill styles, enter the text, and ***click OK.***
- 

From the Drawing Tools menu that appears, the Word Art text offers various colors, sizes, and shapes. Under the top right icon, click the down-arrow to change Gradient

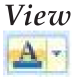
Figure P.17. Text color



or Texture. The middle right icon changes color, width, and line style. The bottom right icon adds visual effects. The same rules to resize, move, and edit apply to WordArt as they did to previous images and clip art.

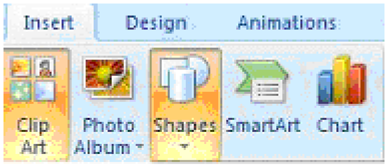
-  **Save the presentation**

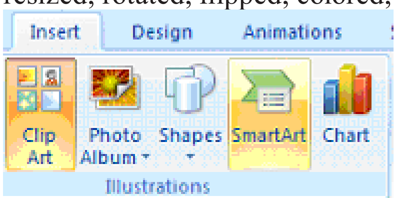
Text Color. Another simple but effective visual enhancement is the use of text colors. Student instructions throughout the Interactive Lesson are generally displayed in blue (see Figure P.17). Once students grasp this visual clue, they will be on the lookout for elements within the lesson requiring a response. To change the color of text, highlight the target words with a mouse click and drag and follow these steps.

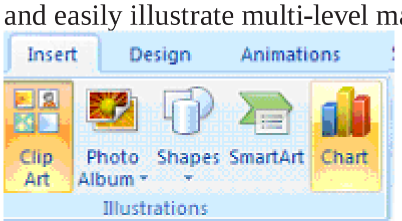
- **Enter the Normal View**. Before inserting clip art, it is best if ***Power Point is in the Normal View mode***.
-  Click the ***Font Color*** icon on the Drawing Tools menu located at the bottom of the document window. To use the color currently shown under the "**A**," simply click the icon. To change to another color, click the down arrow and select from among 40 primary colors or click ***More Colors*** to select from the rainbow. Colorized text may be edited for appearance (bold, italics, or underline) and its font or font size changed to suit the designer.
-  **Save the presentation**

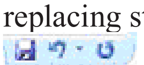
Drawing Tools. Drawing Tools provide pre-established Shapes, SmartArt Graphics, and Charts (bar, pie, line, area, and surface).

- **Enter the Normal View**. Before inserting clip art, it is best if ***Power Point is in the Normal View mode***.

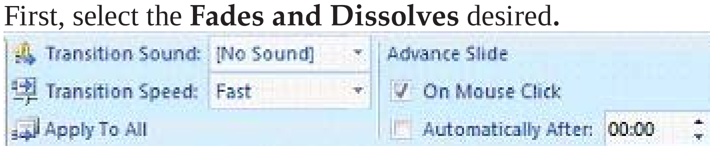
- 

Shapes. Power Point comes with a set of ready-made shapes (patterns, rectangles, arrows, and flowchart symbols) for use in presentations. The shapes may be resized, rotated, flipped, colored, and combined to make even more complex images.
- 

SmartArt Graphics is new to Office 2007 and includes a series of graphics that make it simple to create hierarchical charts, visually display complex relationships, and easily illustrate multi-level matrices and pyramids.
- 

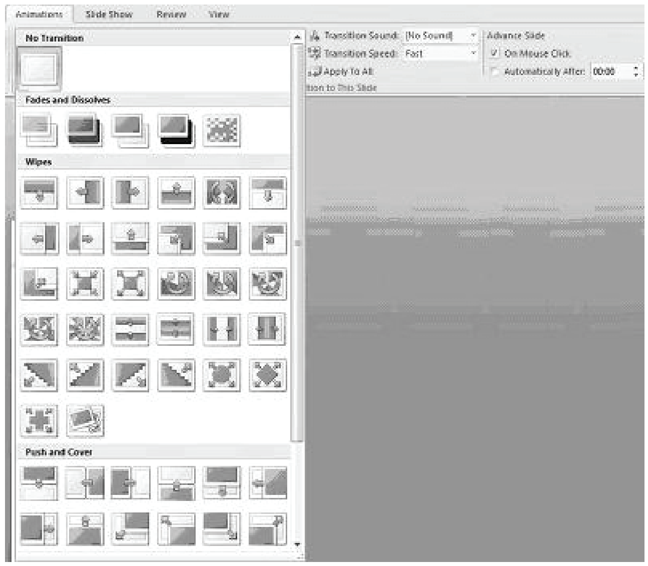
Charts. Users of Power Point often ran to Excel to prepare their bar, pie, line, area, and surface charts. With Power Point 2007, complex charts are now constructed using the same procedures as Excel. Using Charts takes a little practice replacing standard data with personalized figures and numbers.
-  **Save the presentation**

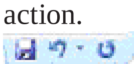
Slide Transitions. As each slide is displayed, transition effects provide the look and feel of a professional presentation. For a basic, no frills presentation, transitions should be held to a minimum. So much so, that they may not even be noticeable to the viewer. However, for an Interactive Lesson, exact control over the advancement of each slide is necessary.

- **Enter the Normal View**. Before inserting clip art, it is best if ***Power Point is in the Normal View mode***.
- Enter the transition mode by clicking ***Animations*** Tab at the top of the screen (see Figure P.18). First, select the **Fades and Dissolves** desired.
- 

Second, decide whether to include a **Transition Sound** that will be played when the slide is advanced. Refrain from using a sound that may be unsafe (e.g., a bomb or explosion) or too monotonous (e.g., applause or camera click).
- Next, the **Transition Speed** controls how quickly the transition occurs. A little experimentation will result in just the right speed.
- **Apply to All** sets the transition for all the slides; ignoring this command results in the transition affecting only the current slide.

Figure P.18. Slide animation (transition)



- Finally, the option of advancing slides **On Mouse Click** or **Automatically After** seconds expire allows the presentation to move as the user clicks the mouse button or automatically without user action.
-  **Save the presentation**. First, a word of caution. Transitions add life to an otherwise mundane presentation. However, they are easily overdone, making a presentation too flashy and overshadowing the learning objectives. Keep the transition effects, especially sounds, to a minimum.

Action Buttons. Power Point comes with built-in Action Buttons for Next Slide, Movies and Sound clips, Help and Information. Controlled movement within an interactive lesson is critical to its success. Learners must be guided through each slide and standard Shapes (as explained earlier) is the most effective method for doing so.

Standard Action Buttons. To demonstrate how to create these Action Buttons, look at Slide 1 in the interactive lesson and review these simple steps for creating standard Action Buttons.

- 

First, ***Insert → Shapes → Action Buttons***. A host of standard button is provided. From left to right, the first five buttons provide movement to the Previous, Next, First, Last, and Home (first) slides. There are also standard buttons for movie clips, sound bytes, documents, and help. There is even a blank button at the end of the menu of icons.
- ***Click an icon and drag to the slide*** to create any easy action button. Once the button is on the slide, it may be resized or moved using the same techniques for any image. It is imperative that every slide in the interactive lesson have a button for moving to another slide. Action buttons are the primary means for advancing a learner through a predetermined sequence of slides.

Customized Action Buttons. Personalized Action Buttons help assess student understanding during the interactive lesson. By creating a question with several possible responses, the presentation transfers the learner to fresh information if the response was correct or remedial information if more instruction is necessary.

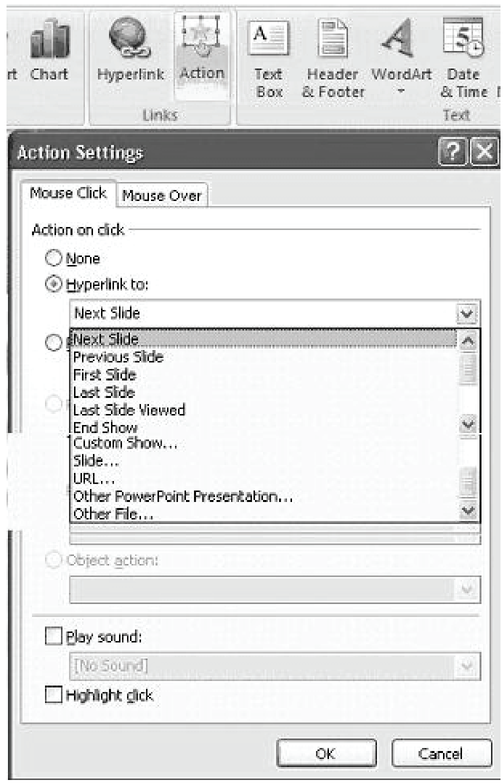
A carefully composed series of three slides is typically used to construct an assessment (see Slides 3, 4, and 5); the first presents the learner with a question, the second provides negative feedback for a wrong answer given, and the third offers positive feedback for a correct response. The 3-slide format is used throughout the interactive lesson, ***A Tour through Our Solar System.***

Examine **Slide 3** and the images of the four planets that represent the alternatives to the question posed. Each of the images becomes an Action Button, sending the learner to a particular slide when clicked. Since Mars, Venus, and Earth are incorrect, clicking one of these planets sends the learner to the Next Slide 4 ("Wrong"). Clicking on the correct answer, Mercury, moves to Slide 5 ("Right!").

- 

First, place the image on the slide that will serve as the Action Button and click to select the image. Any word, string of text, clip art, or photo image (in this case, the planets preceding each of the names) may function as an Action Button.
- Next, from Insert menu, select ***Insert→ Action→ Hyperlink to:*** (see Figure P.19).
- The options available for action include:
    - **Next Slide**. The lesson moves the learner to the next slide.
    - **Previous Slide**. The lesson moves to the preceding slide.
    - **First Slide**. The lesson moves to the first slide in the presentation.
    - **Last Slide**. The lesson moves to the end of the presentation.
    - **Last Slide Viewed**. The lesson returns to the most recently viewed slide. This option can be very important in an interactive lesson as it returns the learner to a slide that perhaps contained important information that the learner did not understand and offers a chance to review the material.
    - **End Show**. Terminates the presentation.
    - **Custom Show**. Presents an independent group of slides from the presentation or creates a hyperlink to a group of slides to give separate presentations to different target audiences.
    - **Slide** … Links directly to a specific slide number in the presentation and provides the most unmistakable movement. If slides are rearranged or new slides inserted into the presentation, the referenced slide here is revised to ensure that the action button moves the learner to the same targeted slide. Probably the best alternative action for designing and interactive lesson.
    - **URL…** Opens a window to insert a hyperlink directly to a web page. To review how to insert a hyperlink, re-examine ***Inserting Hyperlinks into a Power Point Slide*** earlier in this chapter.
    - **Other Power Point Presentation.** Links one presentation to another. Using this option is an excellent way to parse lessons into viable learning modules without making an interactive

Figure P.19. Creating a customized action button



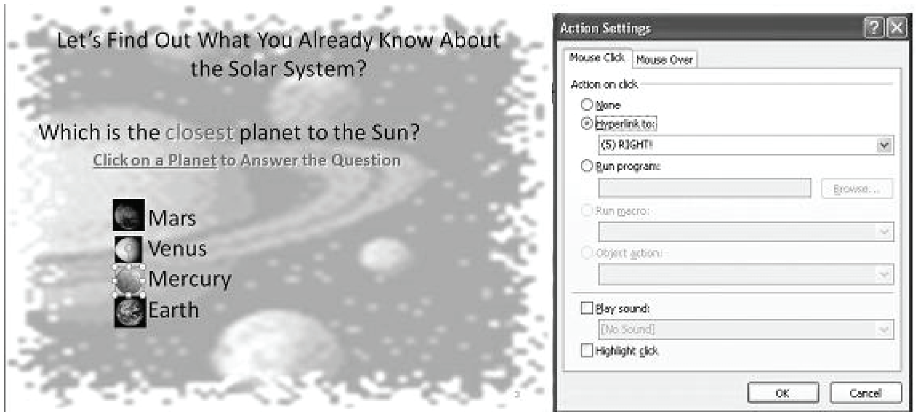
lesson file too large. Often used at the end of a presentation to branch to a new lesson, this option is also useful early in a lesson to send the learner to various remedial (or advanced) presentations based on a few introductory questions.

  - **Other File.** The final action links the learner to any file; it could be a text document (serving as an integral workbook), an application (i.e., educational software) that provides an additional learning exercise, or a spreadsheet with a homework assignment. Any file may be linked using this option.

- In Slide 3, the planet icons serve as the Action Buttons. It asks the question, "Which is the closest planet to the Sun?" Notice four possible answers. If the student selects either of the incorrect responses, the interactive lesson advances to Slide 4 containing the negative feedback "Wrong!" and reminds the learner that Mercury is indeed the closest planet to the Sun. The Action Button on Slide 4 moves the learner to Slide 6 and another question. A correct response of "Mercury" (see Figure P.20) triggers the action that advances to Slide 5, offers "Right!" feedback, and moves directly to subsequent Slide 6.

Consider for a moment, the possible paths that an interactive lesson could take as the result of an incorrect response to an assessment question such as the one shown in Slides 3, 4, and 5. If the learner responds incorrectly, there are *three possible paths*:

Figure P.20. Linking an action button to another slide



- First, as in Slide 4, the learner could be given the correct answer and be moved immediately to the next part of the lesson
- Second, if the content was critical to the learning objective, the learner could be sent back to the part of the lesson to re-teach the material. Actually, Slides 15, 16, and 17 do just that. If the learner does not answer this question correctly, he/she is returned to Slide 12 which re-starts that part of the lesson and all content slides must be reviewed and the question re-taken. Only a correct response allows the learner to continue t he lesson.
- Third, the learner could be allowed to try again – sending the lesson back to the question to attempt another answer. Slides 23, 24, and 25 demonstrate this approach, sending the learner back to Slide 23 to try the question again and again until the correct response is entered.

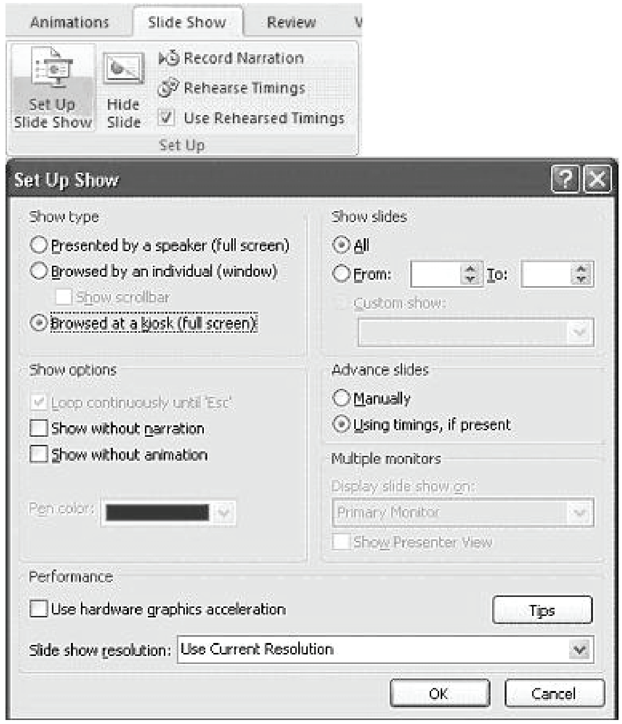
  Each of these three approaches is somewhat different in its purpose and each approach is readily implemented by using the Action Buttons within an interactive lesson.

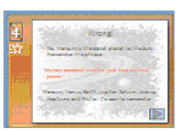
Hide Slide. In a typical presentation, learners view slides sequentially from the first slide to the final slide. There are times, however, when the designer wants the individual to see certain slides only under special circumstances. A formative assessment question is a good example. Unless feedback slides are hidden, they will be viewed as the presentation unfolds and cause unnecessary confusion. In ***A Tour through Our Solar System,*** feedback slides are hidden using the following steps.

- **Enter the Normal View**. Before hiding a slide, it is best if ***Power Point is in the Normal View mode***.
- 

  Click on ***Slide Show*** → ***Hide Slide***.

Figure P.21. Activating the kiosk feature



-  Once hidden, the null icon (a diagonal slash through the slide number) appears. The only way to view this slide during a presentation is to access it using an Action Button and the kiosk browser.

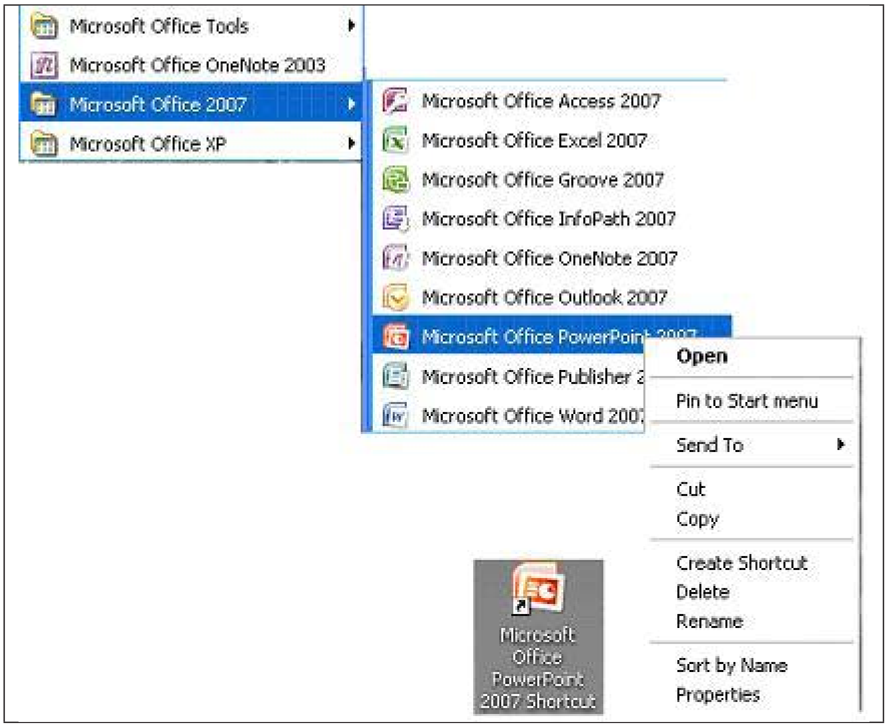
The Kiosk Browser. Kiosks are self-running presentations found at many amusement parks, trade shows, and conventions. The kiosk feature supports unattended slide shows that run continuously, restart automatically, or require the learner to manually advance the slides. **It is this use of the Kiosk Mode that makes the interactive lesson possible.**

When setting up a presentation to run at a kiosk, remember to also Advance Slide Automatically After a specific number of seconds, use navigation hyperlinks, or place an Action Button on each slide. Otherwise, the self-running presentation will not advance beyond the first slide.

- Creating a kiosk is done by clicking ***Slide Show* → *Set Up Show* → *Browsed at a Kiosk*** (see Figure P.21). **This feature should remain off during the construction** of the presentation for ease of troubleshooting.

As a final reminder, each slide must contain a way to advance the presentation, either an action button, a hyperlink, or automatic timing; otherwise the ***Escape*** key is the only way for the instructor to end the show. The Kiosk feature ensures that the student does not skip around the presentation.

Supplement 2a. Creating a Windows Shortcut for Microsoft Power Point



Creating a Shortcut. A "shortcut" offers an easy path to the most popular software applications. Follow these steps to create a shortcut.

- Locate the target application in the ***Start → All Programs*** menu. ***Right click the mouse*** to open the pop-down menu. Scroll to the ***Create Shortcut*** option and ***left click*** to create the shortcut.
- 

Using the ***left mouse button, click and drag the new shortcut to the Desktop***. Notice that the icon is marked with a small arrow. Click the new shortcut to launch the application.

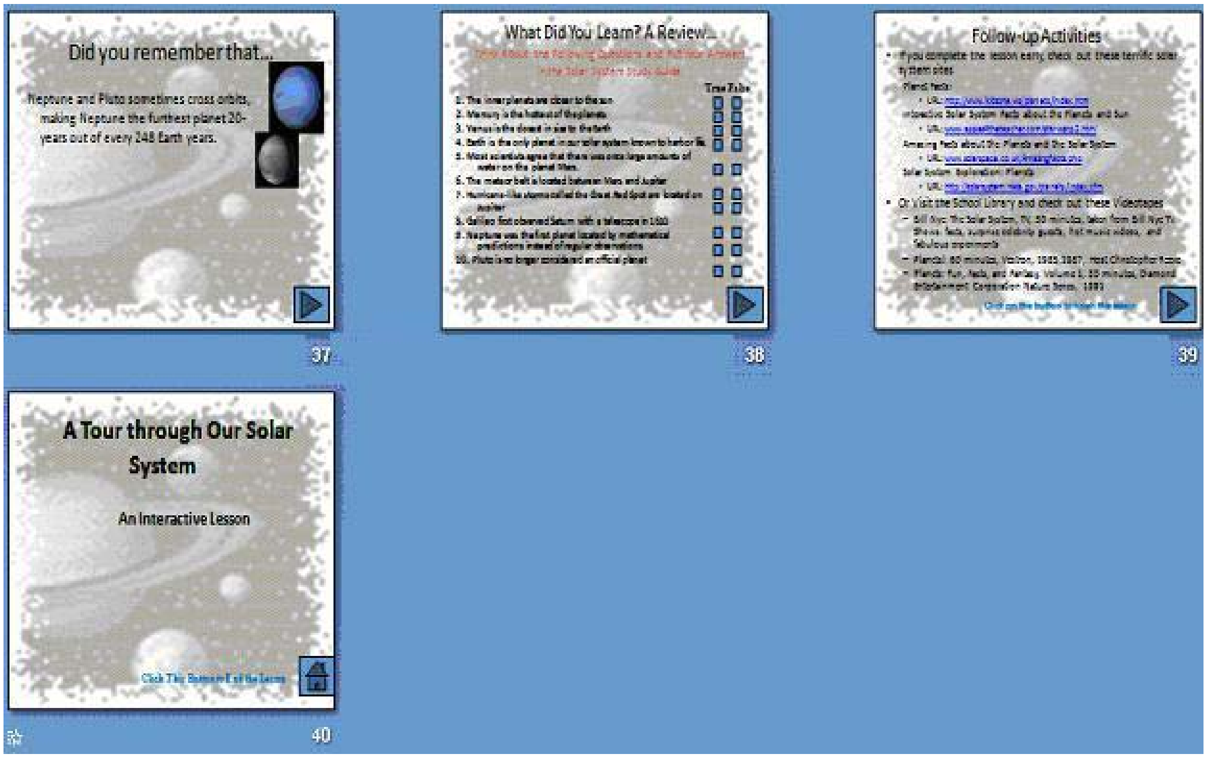
Supplement 2b. Classroom Presentation, Planets of the Solar System


JUPITER
Jupiter is the fifth planet from the Sun and by far the largest. Jupiter is more than twice as massive as all the other planets combined (the mass of Jupiter is 318 times that of Earth).
10
SATURN
Saturn is the sixth planet from the Sun and the second largest.
11
URANUS
Uranus is the seventh planet from the Sun and the third largest (by diameter). Uranus is larger in diameter but smaller in mass than Neptune.
12
NEPTUNE
Neptune is the eighth planet from the Sun and the fourth largest (by diameter). Neptune is smaller in diameter but larger in mass than Uranus.
13
PLUTO
Pluto orbits beyond the orbit of Neptune (usually). It is much smaller than any of the official planets and now classified as a "dwarf planet". Pluto is smaller than seven of the solar system's moons (the Moon, Io, Europa, Ganymede, Callisto, Titan and Triton).
14
15
Summary
Planets of the Solar System
Inner Planets
Outer Planets
16
Planet Facts
E9 Kids
Astronomy Quiz: The Planets
17

Supplement 2c: Interactive Lesson


The Sun
The Sun is about 4 1/2 billion years old and is expected to remain more or less the way it is now for about another 5 billion years.
The middle of the Sun is at least 20 million degrees. The "surface" of the Sun (what we see) is only 5800 degrees.
13
The Sun
Periodically the Moon will move directly in front of the Sun. When it does, it blocks the light coming from the Sun. If it blocks out the Sun totally, we call this a total eclipse. If the Moon only blocks part of the Sun, it is a partial eclipse.
14
Answer this Question About the Sun
Which of the following facts about the Sun is not correct?
Click on a Sun to Answer the Question
The Sun is already over 4 billion years old
The Sun is about 93 million miles from Earth
The Sun is about 10 million degrees on its surface
When the Moon moves in front of the Sun, it is called an eclipse
15
Nope! This is Correct!
These are very important facts to remember as we start our lesson about the Solar System.
You need to review this material.
Click on the button to return to the Sun.
16
RIGHT!
The center of the Sun is about 10 million degrees. It's a cool 6000 degrees on its surface
You are ready to go on to the next part of the lesson.
Click on the button to explore
17
The Inner Planets of the Solar System
18
Mercury
19
Venus
20
Earth
21
Mars
22
Review of the inner Planets
Which of the following planets is NOT one of the Inner Planets of the Solar System?
Click on a Planet to Answer the Question
Mars
Jupiter
Mercury
Earth
23
Nope! The choice you selected IS an Inner Planet in the Solar System
We just finished examining the four Inner Planets. Concentrate on the question and try it again by clicking on the arrow.
24


RIGHT!
As we will see shortly, Jupiter is considered one of the Outer Planets.
Before proceeding to the next part of the lesson on the Outer Planets, let's look at part of the Solar System that lies between Mars and Jupiter – ASTEROIDS!
25
Asteroids are rocky fragments left over from the formation of the solar system about 4.6 billion years ago. Most of these fragments of ancient space rubble - sometimes referred to by scientists as minor planets - can be found orbiting the Sun in a belt between Mars and Jupiter. This region in our solar system, called the Asteroid Belt or Main Belt, probably contains millions of asteroids.
Now on to the Outer Planets....
26
The Outer Planets of the Solar System
27
Jupiter
The most massive planet in our solar system, with four planet-sized moons and many smaller moons. Jupiter forms a kind of miniature solar system.
28
Saturn
Saturn's rings are the most extensive and complex in the solar system, extending hundreds of thousands of kilometers from the planet. Saturn is the second biggest planet, but it's also the lightest planet. Approximately 886 million miles from the Sun, Saturn is composed of 97 percent hydrogen gas. It takes Saturn approximately 29.5 Earth years to orbit around the sun. The second largest planet in the solar system was first observed by Galileo with a telescope in 1610.
29
Uranus
Once considered one of the blander-looking planets, Uranus has been revealed as a dynamic world with some of the brightest clouds in the outer solar system and 11 rings. The first planet found with the aid of a telescope, Uranus was discovered in 1781 by astronomer William Herschel. The seventh planet from the Sun is so distant that it takes 84 years to complete one orbit. Uranus, with no solid surface, is one of four gas giant planets.
30
Neptune
31
Pluto
On August 24, 2006, the International Astronomical Union (IAU) formally downgraded Pluto from an official planet to a dwarf planet. According to the new rules a planet meets three criteria: it must orbit the Sun, it must be big enough for gravity to squash it into a round ball, and it must have cleared other things out of the way in its orbital neighborhood. The latter criteria removes Pluto from further consideration as a planet. Pluto is about two-thirds the diameter of Earth's Moon.
32
Review of the Outer Planets
The largest planet in the Solar System is which of the Outer Planets?
Saturn
Uranus
Jupiter
Neptune
33
Nope! There is a bigger planet in the Outer Solar System
Try again by clicking on the arrow.
34
RIGHT!
Jupiter is the largest planet in our solar system -- more than 12 Earths could line up across it! In theory, scientists plan on using the planet's gravity to accelerate spacecraft so they can reach Saturn, Uranus and Neptune
35
Review of the Outer Planets
True or False. Pluto is always the furthest planet from the Sun in our Solar System?
True
False
36



PRIMER THREE
WEB-BASED MATERIALS

INTRODUCTION

This **Primer for Web-Based Materials** is provided as an addendum to The Engine for Designing Technology-Based Instruction. The primer consists of two interdependent sections that move the teacher of traditional, adult, and distance learners through a series of step-by-step instructions for **Section I, Constructing the Basic Web Page** and **Section 2, Constructing the Virtual Tour Lesson.** The primer begins with the fundamentals of launching an Internet browser and guides the user through the basics of editing, moving text, saving and browsing a web page. Novice teachers should become familiar with Section I. More advanced teachers may disregard this section of the primer and focus their attention on the advanced applications of the Virtual Tour. Use the supplements to practice building web pages as well as designing and constructing the Virtual Tour.

Launching Netscape Composer. Composer is most easily accessed from inside Netscape and access to Netscape is made easier with a desktop shortcut. If a shortcut or alias is available on the desktop, ***double click the Netscape icon*** to launch the application. If not, follow the instructions for creating a shortcut located in Supplement 3a.

CONSTRUCTING THE BASIC WEB PAGE

Netscape Navigator opens to a pre-selected home page. However, it is Netscape **Composer** that actually edits, moves, and inserts features. Learning the fundamentals of web page development is easier when using an actual web page as an example. **Supplement 3b** to this primer provides an excellent demonstration of how Netscape Composer can be used to construct web-based content material appropriate for teaching. The ***Solar System Home Page*** may also be downloaded directly from the author's web site at: http://academics.rmu.edu/~tomei/SolarSystem HomePage.htm to practice the new capabilities needed to fully integrate web-based materials into a lesson. Let's explore some of the basic features of Netscape Composer as they pertain to the construction of a straightforward web page.

Launching Netscape Composer. Click the ***File → Edit Page*** pop-down menu within Navigator to enter Composer (see P3. 1).

Editing Text on a Web Page. The editing features of Composer resemble a word processor. However, Netscape is not affiliated with the Microsoft Corporation; therefore, the icons vary to avoid copyright infringements (see Figure P3.2). There are a few other differences between Microsoft Office and Netscape Composer that should be noted.

To practice editing, use the ***Solar System Home Page*** and scroll to the last paragraph under the **Introduction.** Locate the text "These nine planets travel in the same direction" (see Figure P3.3).

Figure P3.1. Entering Netscape Composer

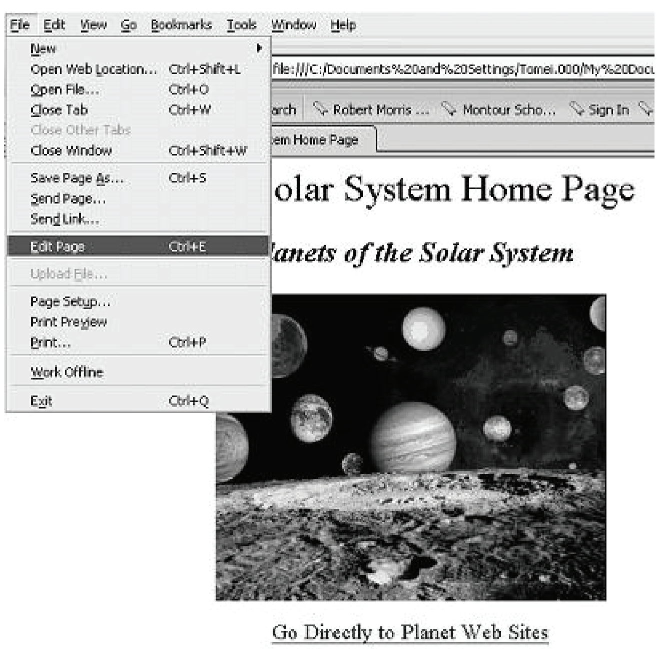


Figure P3.2. The Netscape Composer tool bar

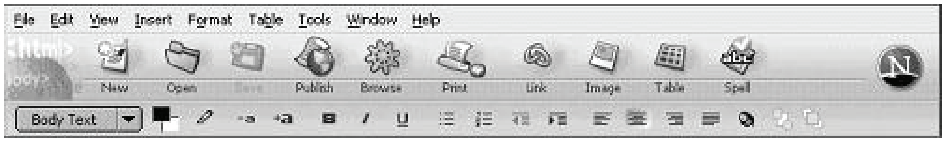
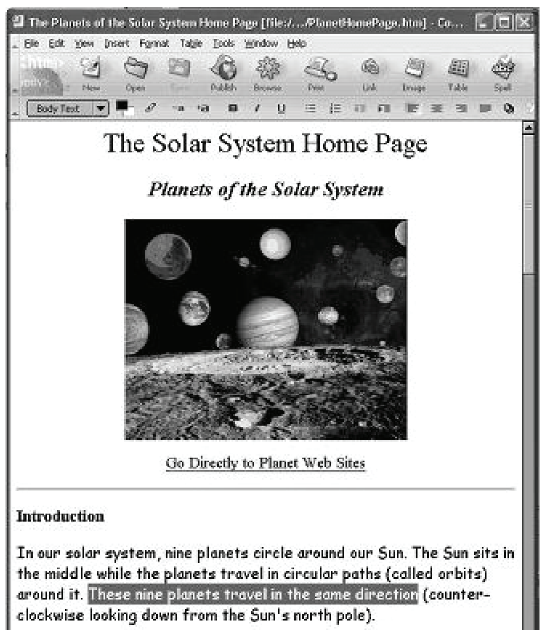
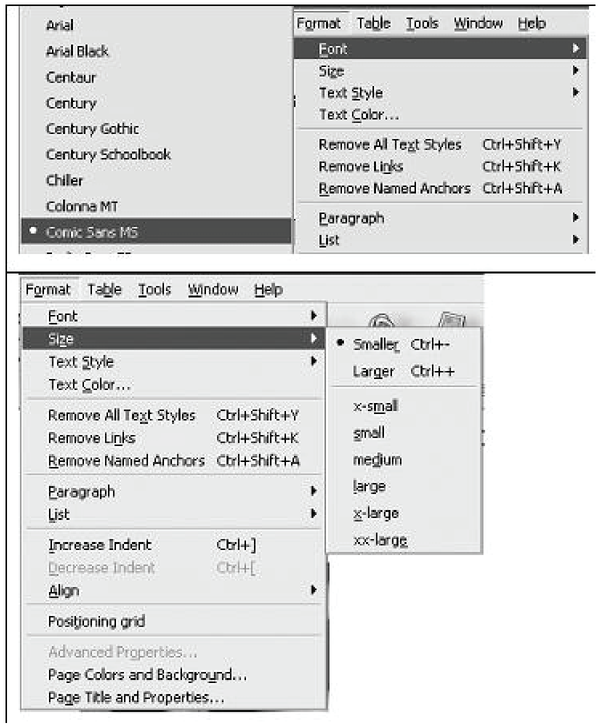


Figure P3.3. Editing text using Composer

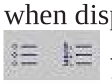


- **Selecting Text**. Before editing, text must be highlighted (or "selected"). To select:
  - **A Word**. Position the cursor on the desired word and ***double-click*** the mouse button.
  - **A Sentence or Paragraph**. ***Click and drag*** to select a phrase, sentence, or paragraph.
-  **Bold, Underline, Italics, and Remove Style.** Editing commands control the **Appearance** of the text. Click the **Bold** icon, **Italics**, and **Underline** to see how these commands affect the look of the selected text. Notice that the buttons change their appearance when clicked to indicate that this feature is ON. A second click toggles the feature OFF. Practice these editing features using the ***Solar System Home Page***.
-  **Left, Center, Right, and Justify.** The **Alignment** function is located to the right side of the Tool Bar. Click to select **Left** alignment which aligns text along the left margin. **Centering** is accomplished by clicking the second icon and **Right** alignment (third icon) moves text to the outside margin. The final icon justifies the text on the web page and aligns both the left and right-hand margins.
- **Changing Font and Font Size**. Changing font and size are provided under the Format menu see Figure P3.4). **Format → Font** provides numerous choices for font style, the most popular being

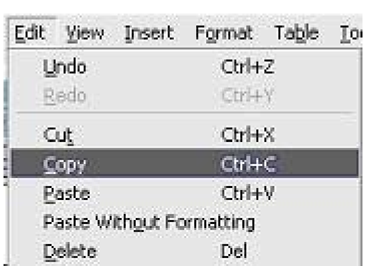
Figure P3.4. Changing text style and size



Arial, Times New Roman, and Comic Sans (particularly excellent font for web pages). Font Size is also accessed under **Format → Size** and offers extra-small to extra-large characters.

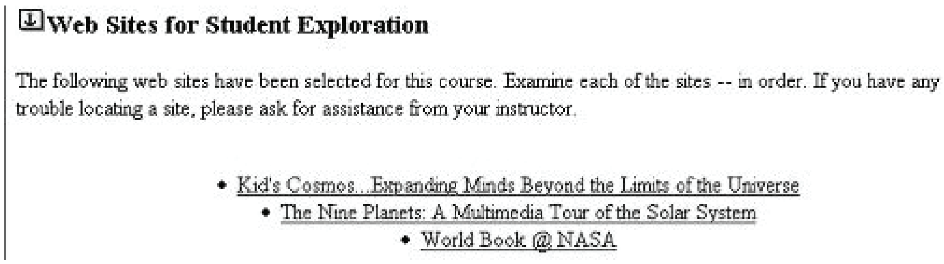
-  **Indents Forward and Back.** Use Indent to move text or images across the page. The spacebar will not accomplish the desired effect because Internet browsers ignore blank spaces when displaying the contents of a web page. ***Indent the heading Instructions*** for practice.
-  **Bullets and Numbered Lists** insert a bullet on the selected line. The **Numbered List** icon initially inserts a (#) pound sign symbol and substitutes the appropriate number when the web page is actually viewed in the browser. Locate the ***Web Sites for Student Exploration*** and select these three lines of text. Add ***Bullets*** to each of the addresses as shown in Figure P3.5.

Moving Text on a Web Page. Cut, Copy, and Paste commands move text within the page. Practice using the following commands on the ***Solar System Home Page***.

- 

Cut, Copy, and Paste is accomplished via the Edit pop-down

Figure P3.5. Bullets in Netscape Composer



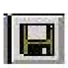
menu. There are no longer any icons in Composer for these operations. **Cut** deletes the selected text and **Copy** places text or images on the clipboard. **Paste** moves the clipboard contents to a new location.

Undo Command. The experimental aspect of building an interactive web page is very important. Web browsers "paint" the computer screen based on the background, image location, text placement, and size of the window specified. Most changes produce the desired effects, sometimes they do not. However, the Undo command is available to reverse any action that produces unacceptable results.

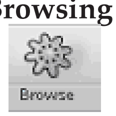
- 

To reverse a previous action, click the ***Edit* → *Undo*** command. As with cut, copy, and paste, there is no Undo icon.

Saving a Web Page. When creating or revising web pages, it is highly recommended to save after each element is created or modified. The process takes only a single mouse click and saves considerable time in the event of a power outage, mechanical failure, or computer virus.

-  To Save a Web page, click the **Save** icon on the Toolbar or select ***File* → *Save*** from the File menu. If the file has never been saved, the **Save As** dialog box appears.
- Set the location by ***clicking the Save In box*** until the correct folder appears and ***enter a new File Name*** for the page. Click the ***Save button***.

Browsing a Web Page. Following each save, **Browse** the changes before going further.

- 

Click the Browse icon to open Netscape Navigator and display the current version of the changes. Composer remains open in the background for continued editing.

CONSTRUCTING THE VIRTUAL TOUR LESSON: INTRODUCTION

To construct a personal version of the virtual tour, ***A Virtual Tour of Our Solar System,*** either use

Supplement 3c and enter the content as these options are explained or download this presentation directly from the author's web site at : http://academics.rmu.edu/~tomei/SolarSystemVirtualTour.html and use Netscape Composer to practice the new capabilities needed to fully integrate web-based materials in the classroom as features and commands are discussed throughout the remainder of this chapter.

A Virtual Tour of Our Solar System is a self-paced web excursion of the solar system and each of its nine planets, as well as the Sun and asteroids. Additional Netscape Composer features, over and above those basic features presented earlier in the chapter, are necessary to create the virtual tour. So, let's begin.

Page Properties. Web pages include a title (See Figure P3.5) at the top left of the web page window. Although the author information never really appears, it is included in the page source code to document the name of the page designer for security purposes.

Page Colors and Background addresses the visual composition of a web page and provides background colors or images increasing the appeal to the viewer. To enter page properties, click ***Format → Page Colors and Background*** from the tool bar (see Figure P3.6).

Colors and Background Tab. Normal text, link t ext, and backgrounds are set to predefined colors using this feature. For the page designer, the use of colors is an excellent tool for interacting with the user of the page. For example,

- **Normal Text** is typically viewed in black. To change the default, select a new color from the rainbow of available choices. Two cautions are in order. First, do not use the same color that is used by another type of text. Doing so introduces unnecessary confusion. Second, do not use a color that blends with the background; that makes the page difficult to read.
- **Link and Active Link Text.** Hyperlinks are displayed in their own unique color – usually blue. The color selection may be changed but keep in mind that most users expect to see blue hyperlinks.
- **Followed Link Text.** Browsers automatically change the color of any visited hyperlinks to distinguish viewed sites from new ones. Do not set this option to the same color as the Active Link. Some web pages will set this option to the same color as the page background, making it appear as though the hyperlink has disappeared once the site has been visited. Simply select a followed link text color that is the same as the background color making it look as if the link has vanished.
- **Background Color and Background Image**. To set the background color, click the current color box and select a new color. Or, to place an image on the background, enter an image file

Figure P3.5. Page properties

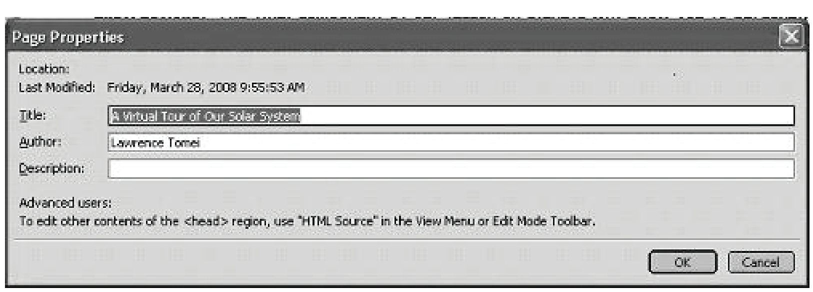
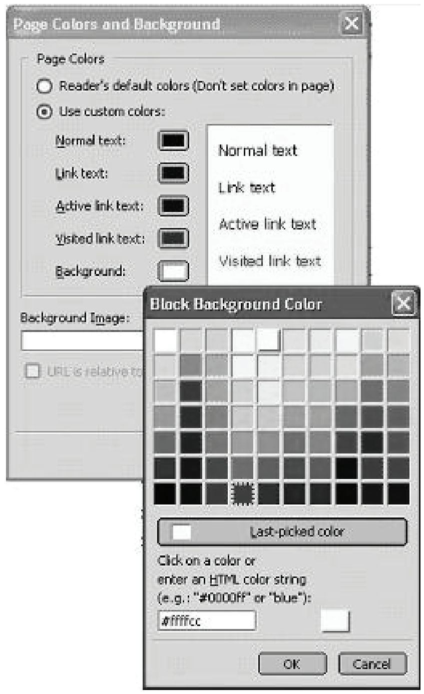


Figure P3.6. Page properties: colors and background

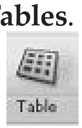


name as the ***Background Image*** or click the ***Choose File*** button to locate the file.

-  **Save** the web page.

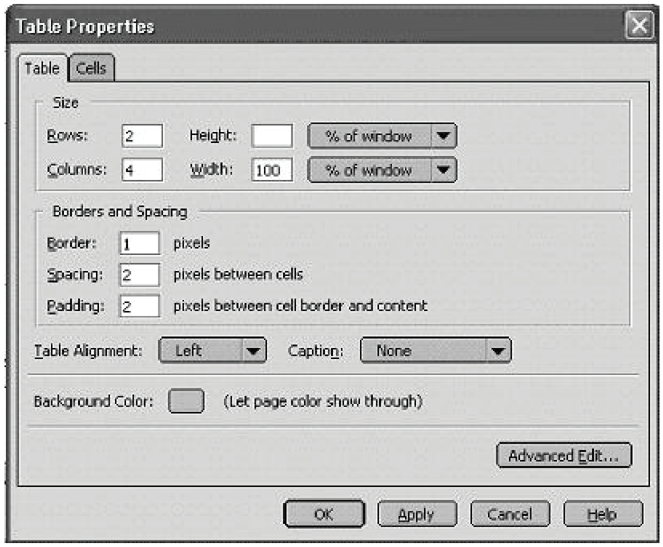
Horizontal Lines. To create a horizontal line for visual separation of content material, position the cursor on the web page and click ***Insert → Horizontal Line*** on the Tool Bar.

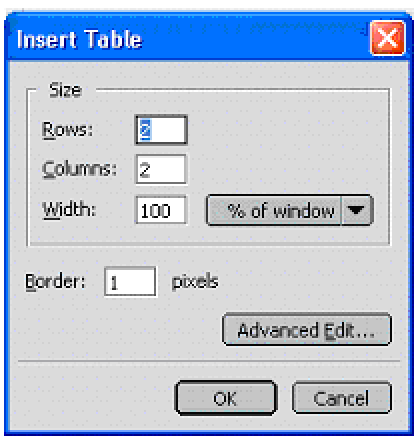
Tables. One of the easiest and most popular organizational tools for web page design is the Table.

- 

To insert a table, move the cursor to the desired location on the web page and click the ***Table icon*** on the Tool Bar or ***Insert → Table*** from the pop-down menu.

Figure P3.7 Table properties



- 

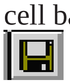
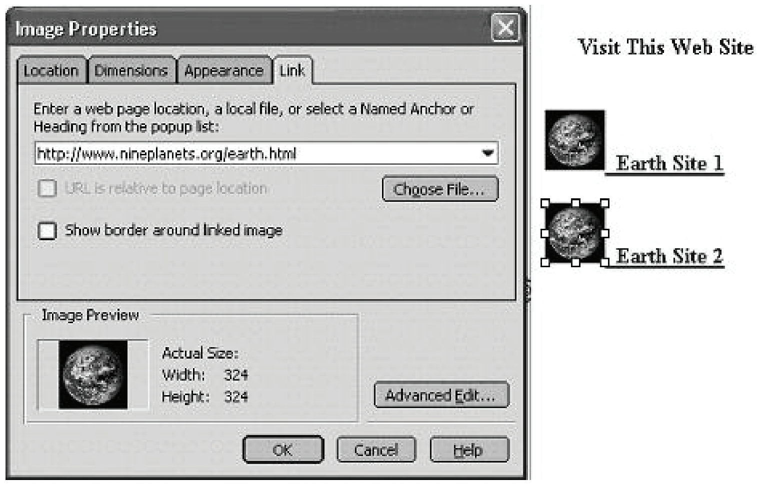
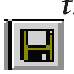
 Insert Tables provides user-defined numbers of rows and columns as well as establishes the width of the table with respect to the web page.
- The **Table Properties** dialog box (see Figure P3.7) provides the parameters of a new table. The virtual tour uses tables to arrange the planets and the assessment information.
- **Table Alignment** may be set to Left, Center, or Right. The example shows a table placed at the left of the web page.
- **Border** defaults are set at one pixel. Changing the number of pixels affects the thickness of the borders.
- **Table Height and Width** allows the table to fill 100 percent of the available web page.
- **Table Background Color** provides a color backdrop or an actual image behind each cell in the table. Normally, cells should contain the same background as the rest of the web page; however, cell backgrounds may be altered for emphasis and effect.
-  Click ***OK*** to accept the table properties and ***Save*** the page.
- **Cells Tab**. Properties of each individual cell in the table may be adjusted by clicking on the cell

Figure P3.8. Linking an image to a Web page or file



tab and completing the respective options.

Image Hyperlinks. Earlier chapters detailed the procedures for creating text-based, visual-based, and email hyperlinks. For the virtual tour, images oftentimes make the best links to amplified sites. To convert an ordinary image into an active link, insert an appropriate image onto the web page and click the image to indicate a hyperlink. For example, a text link to “Earth Site 2” is provided in the virtual tour. Clicking the earth icon allows the designer to link the icon to the same URL giving the user an option to click the image or the text link to open the Image Properties dialog box (see Figure P3.8).

- **Inserting the Link**. Click the image first, then click the ***Link icon*** from the Tool Bar or the **Insert → Link** pop-down menu. In the Dialog box, locate the **Link Tab**.
  - To ***enter an external link***, the URL must begin with the “http://” tag. For example, to send a learner to a site, the address must include http://www.nineplanets.org/earth.html
  - To ***enter an internal link***, the “http://” prefix is omitted from the URL. An internal link sends the learner to another web page usually created by the teacher. For an internal link to work correctly, the file name <u>must</u> be located in the same physical directory or on the same physical diskette. ***If the target html file, along with every image it displays, is not in the same directory, the page will not load properly.***
-  Click ***OK*** to accept the table properties and ***Save*** the page.

Inserting Animated Graphics. Animated graphics are a series of individual images scrolled rapidly by a web browser to give the effect of a moving picture – much like a cartoon. They are particularly effective in Power Point presentations and web pages. Many Internet sites offer animated gifs ready for harvesting. Some favorites are included in Table 1.

In the virtual tour, the image of the blinking stars at the top of the page is an animated graphic. Of course, the animation only works when viewing the page in the *browser* (the image does not animate in Composer). Procedures for inserting animated graphics onto a web page are the same as any other

Table 1. Sites for harvesting animated graphics

Internet Site Name	URL
Bells & Whistles	**http://www.bellsnwhistles.com/**
Free Graphics	**http://www.freegraphics.com/04_Animated_Graphics**
AnimatedGIF.net	**http://www.animatedgif.net/**

Figure P3.9. Inserting an animated graphic

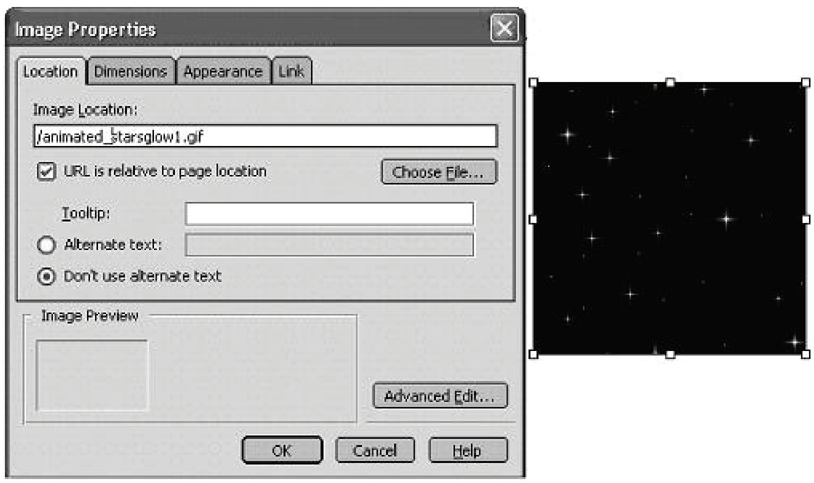


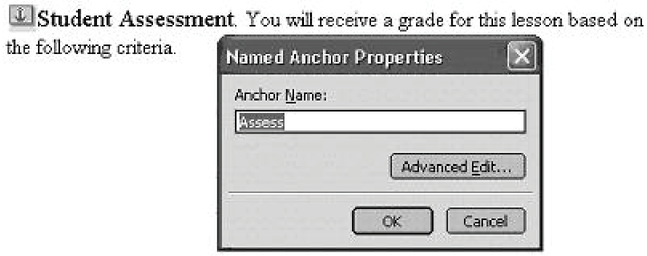
image. First move the cursor to the desired location for the new image.

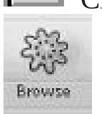
- ***Click the Image icon*** from the Tool Bar menu or **Insert →Image** from the pop-down menu (see Figure P3.9).
- ***Click the Choose File*** button to open a dialog box containing the file names of available images. ***Click OK*** to insert the image.
-  Click ***OK*** to accept the properties and ***Save*** the page.
- 

Preview the animated graphic. ***Click the Browse*** button to revert to Netscape Navigator and view the animated graphic. **Note: animated graphics do not work in Netscape Composer. Browsing with Navigator displays the on-screen animations.**

Creating Targets. A target is an "intra-page" link, navigating the user up and down a lengthy web page. A three-step process is required to create an active target. First, the target itself must be placed on the web page. Second, a corresponding link to that target must be created. Third, the link to the target must be established. Follow these steps.

Figure P3.10. Creating targets



- **Decide Where to Place the Target**. For the example virtual tour, a target has been placed at the beginning of **Student Assessment** (see Figure P3.10). Usually, targets are placed at the beginning of a line.
- ***Click Insert → Named Anchor*** to view the properties menu. Enter an ***Anchor Name*** up to 30 characters in the properties window. In the example, the target is called "**Assess**." ***Click OK*** to see the anchor icon appear; again, the icon is visible only in Netscape Composer and disappears when previewing the page in Navigator.
- **Create the Corresponding Link,** either text or image. At the top of the virtual tour, as part of the Learning Objective, is a line of text that reads "**Check out the Assessment rubric at the end of the Tour**." ***Highlight*** the words "***Assessment Rubric***" that will become the link.
- ***Click Insert → Link*** and select a named anchor from the pop-down rather than entering a URL or file name (see Figure P3.11). Click ***OK*** to insert the link.
-  Click ***OK*** to accept the properties and ***Save*** the page.
- 

Browse the operation of the target. **Keep in mind that targets, like other special features, work only in Netscape Navigator.**

Saving Files and Managing Folders. Designing web pages, especially for the virtual tour, is much easier when following a few simple tips. When creating a web-based lesson, keep all associated files, including the html file itself and any images that appear on the web page, *in the same physical folder*. Internet browsers tend to look for hyperlinks, images, and files in the same location as the web page. Difficulty in locating files often results in error messages and missing links. The "rule of thumb" for creating web pages is to group all elements in the same folder.

Author's Note: Download the full 24.2 megabyte Netscape 7.2 Suite (containing Composer) and not the abridged (Netscape only) package. The current Netscape Browser Archive web site is http://browser.netscape.com/releases. Just in case Netscape decides to terminate access to their package, a copy of the installer software has also been placed at the author's web site at: http://academics.rmu.edu/~tomei/NSSetup-Full.exe.

There is no longer any official support from Netscape for these versions. But, version 7.2 is a tried and true application and its authoring package Composer makes any risks more than acceptable. While other authoring tools are available (and most interact with the developer in much the same way with

Figure P3.11. Linking targets

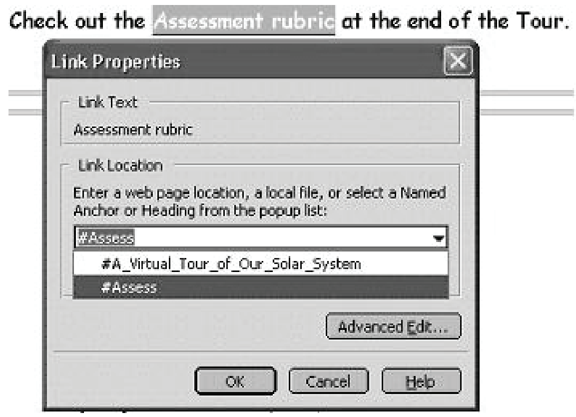
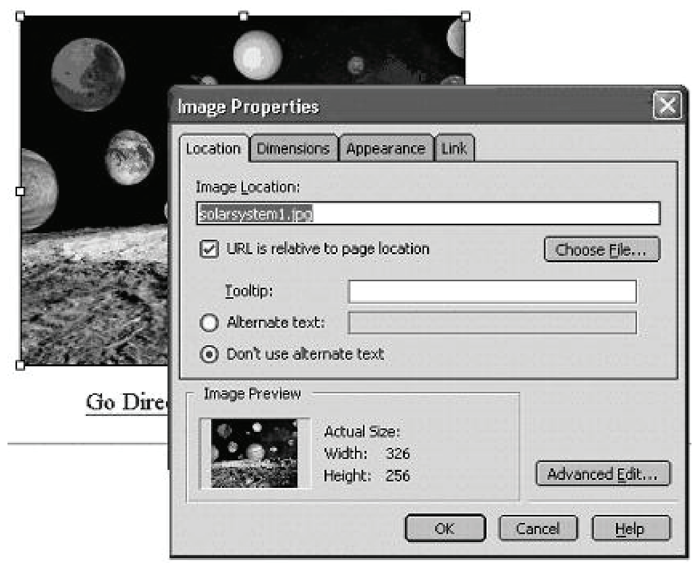


Figure P3.12. Image properties



many of the same capabilities), *the remainder of this chapter assumes use of Netscape Composer* as the features and commands necessary to create instructional web pages are explored followed by the more sophisticated virtual tour.

Perhaps our insistence on a freeware package built into a personal web browser will encourage Netscape, Microsoft, and Adobe to reconsider their course.

Enhanced Features of Netscape Composer. Images, text, and hyperlinks downloaded from Internet sites spark student interest to support the learning objectives of the teacher. Hyperlinks, in particular, connect to sites appropriate for remedial and enrichment activities and offer new venues for student research and exploration.

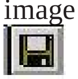
Author's Note: To construct a working copy of ***The Solar System Home Page*** as features and commands are discussed throughout this chapter, either use Appendix M and enter the content as these options are explained or download this page directly from the author's web site at: http://academics.rmu.edu/~tomei/SolarSystemHomePage.htm and practice the new capabilities needed to fully integrate web-based materials.

Inserting Images from the Internet. Digitized pictures may be inserted onto a web page using the Main menu bar after positioning the cursor at a desired location.

- 

To **Insert Images**, click the **Image** icon or ***Insert → Image*** from the pop-down menu. For practice, scroll to the top of the ***Solar System Home Page*** and click the image of the solar system to launch the **Image Properties** dialog box (see Figure P3.12).
- **Important Tip**. It is highly recommended that images be placed in the same folder as the web page being created. Such practice will greatly reduce problems when moving pages to different locations (e.g., web sites) or computers. Again, the *web page and all associated files should be maintained in the same computer folder.*
- **Choose File**. The dialog box displays the image name and location; in this case, **solarsystem1.jpg**. Double-click Choose **File** to browse the computer for another image.
- **Dimensions**. The original size of the image is provided in the **Dimensions** tab and may be resized by entering a new **Height** or **Width** value. Always click the **Constrain** box to recalculate the new dimensions proportionately. Click **Original Size** to return the initial image dimensions.
- Click **OK** to insert the Image.

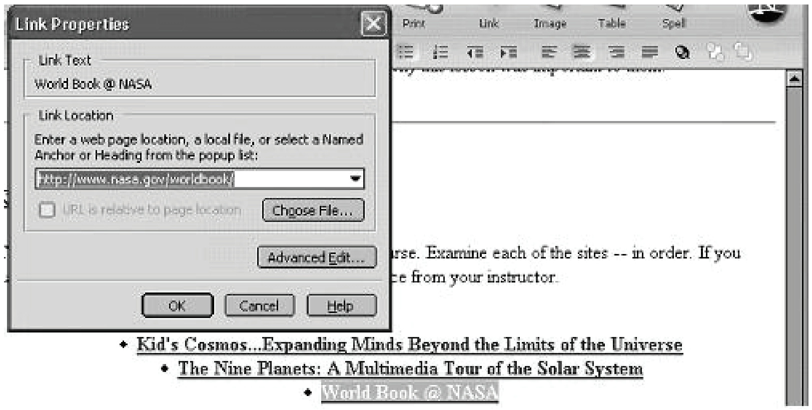
Other Image Commands. The **Cut, Copy, and Paste** commands act the same for images as textual material.

- Select the image and use the ***Edit → Cut*** menu to delete the picture.
- ***Click Edit → Copy*** to send the image to the clipboard followed by ***Edit → Paste*** to copy the image to a new location.
-  **Save** the **Page**. ***File→ Save*** the Web Page.

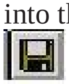
Inserting Text from the Internet. Images are an essential component of a successful web page. After all, multimedia is a key advantage of using the Internet. Yet, textual information retains its rightful place in the online teaching and learning experience. To **Insert Text**, the easiest method is to **Cut and Paste** directly into an awaiting Composer page by following these steps.

- **Move** the cursor to the desired location where the text will be inserted.
- **Minimize Netscape Composer** to place the application on the Task Bar.
- **Open a second Netscape Navigator Session** containing the text to be captured.
- **Locate and Select the Desired Text**. ***Position the cursor*** to the left of the desired body of text and ***click and drag the cursor*** down and to the right until all the desire text has been highlighted. Practice selecting text until the movement of the mouse becomes second nature.
- **Copy the Text to the Clipboard**. Copy the desired text to the clipboard using the familiar ***Edit → Copy*** pop-down menu.
- **Maximizes/Restore Netscape Composer**. ***Return to Composer*** by reversing the minimize

Figure P3.13. Adding a text hyperlink

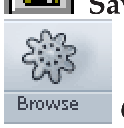


process. Locate the application on the **Task Bar** at the bottom of the screen and double-click to bring the window to the front.

- **Paste the Text onto the Web Page**. Use the ***Edit* → *Paste*** pop-down menu to insert the text into the desired location.
-  **Save the Web Page**.

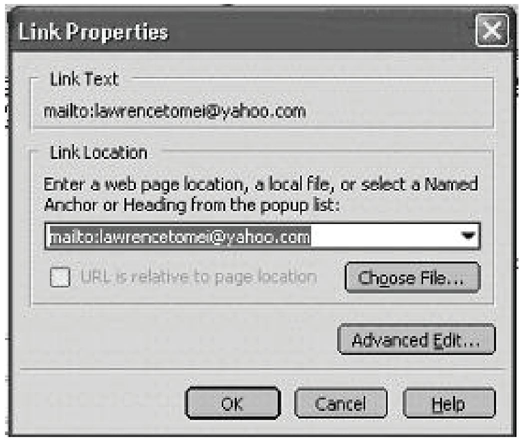
Inserting Hyperlinks onto a Web Page. Hyperlinks connect web pages to other instructionally-rich Internet sites. The use of hyperlinks avoid many of the problems associated with the World Wide Web, such as sending students to invalid or removed sites, avoiding the "dark side" of the Internet, eliminating unproductive searching and surfing, and overcoming obstacles to the discovery process (e.g., minimal typing skills). To insert a hyperlink, follow these steps.

- **Create the text link**. For this example, add the text ***"World Book @ NASA"*** to the current list of Web Sites for Student Exploration (see Figure P3.13).
- **Select the text** to serve as the hyperlink. Click and drag to highlight the entire string of text as the hyperlink.
- 

Inserting the Link. Click the ***Link*** icon from the Menu bar or the ***Insert* → *Link*** pop-down menu. In the dialog box, locate **Link Location** and enter the URL: **http://www.nasa.gov/worldbook/.** Notice that the text link changes from black to blue indicating a hyperlink (see Figure 10.7). Be sure to prefix the URL with **http://** to cause the browser to seek the link on the Internet and not look for a file on a local computer.
-  **Save** the web page.
- 

Click the Browse icon to test the connectivity to the selected site.

Figure P3.14. Creating an email link



Preparing the Address Block. The Address Block informs viewers of the policies regarding use of the web-based material and should include the following elements.

Author Citation. Regardless of whether the material on the web page is copyright protected, providing an author citation offers immediate access for those viewers who wish to contact the author either for permission, assurances, or comments.

Author's Name and Affiliation. Self-explanatory.

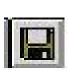
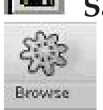
Author's Email Address. Move to the address block area at the bottom of the web page. Create an email link by following these instructions.

- Click the **Link** icon from the tool bar or the ***Insert*** → ***Link*** pop-down menu (see Figure P3.14). In the **Link Location**, enter the tag "**mailto://**" (mailto is all one word – no spaces) followed by the email address. The resulting text link on the web page changes color indicating a hyperlink.

Affiliation's Name and Email Address provides important information in the event that the link is removed. Viewers of the page will still be able to contact the author to request assistance.

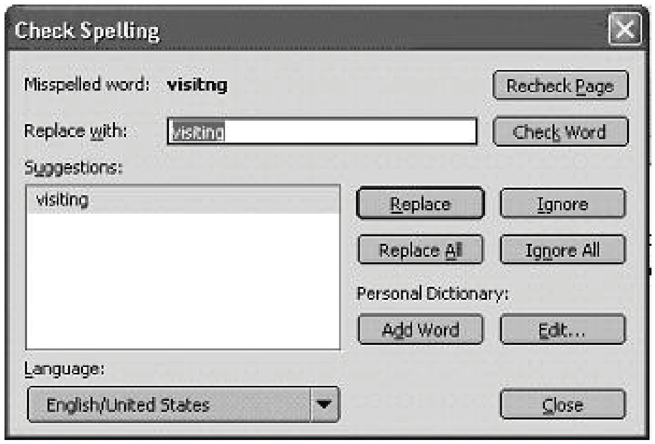
Copyright or Fair Use Statement. Some web page designers upload their materials with the expressed intent that they be used by their peers and colleagues. In either case, a copyright restriction or fair use statement is appropriate in the Address Block.

Created and Revised Date. For copyright protection, it is imperative that both dates be included. The **Created Date** establishes the initial publication of the page and confirms the first date under which copyright or fair use restrictions apply. The **Revised Date** alerts the viewer that changes have been made to a previous version.

-  **Save** the web page.
- 

Click the Browse icon to test the connectivity to the mail server.

Figure P3.15. Check spelling dialog box



Spell Checking the Web Page. Netscape Composer checks spelling; however, when compared to the previous applications, its features are very limited. For example, there is no Auto Correct feature and no grammar checking.

- 

Check spelling and grammar on Demand. Spelling errors are checked by clicking the **Spelling** icon. Each word on the web page is examined in an attempt to locate and identify errors.
- **Making the Corrections**. The Spelling dialog box for Composer offers slightly different features than the word processing version (see Figure P3.15).
- The top window identifies items not found in the dictionary. The word may be spelled correctly or it may be a word derivative preferred for instructional emphasis. Spellcheckers may not recognize the word and therefore highlight it for action.
- The **Suggestions** window attempts to recommend the correct spelling from a list of possible words. Usually its guesses are right on the mark. If the choices are inappropriate, there are two options. First, **Ignore** the word or **Ignore All** which disregards the same "misspelling" throughout the remainder of the document. Second, add the new word to the personalized dictionary by clicking **Add Word** and all further encounters with the same word are considered correct.
- If one of the choices offered is suitable, click the desired **Suggestions**, then click the **Replace** button. **Replace All** finds and replaces the word whenever it is encountered throughout the remainder of the document.

Printing the Web Page. After editing is complete, the web page is ready to be printed.

- 

Print. *Click the Print icon* or **File → Print** pop-down menu to produce the Print dialog box. The two most common options when printing a hard copy document are print range and number of copies.

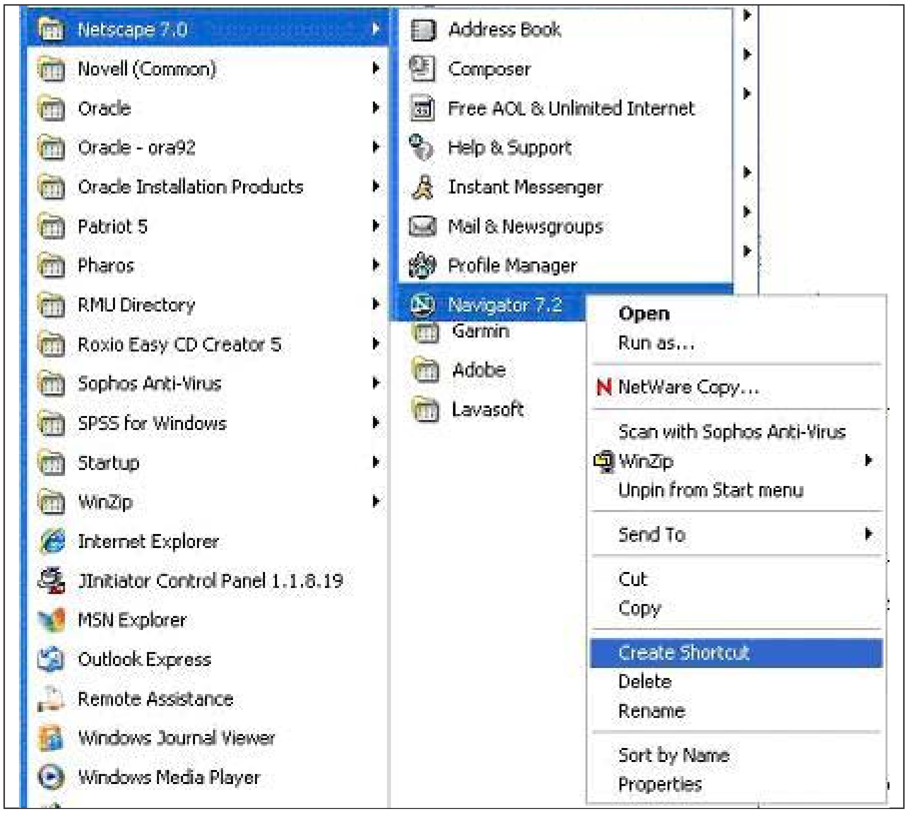
- **Print Range**. **All** prints the entire web page. **Pages** allow the user to enter a range of pages.
- **Copies**. Enter the Number of Copies to be printed.

Summary. Before concluding this introduction to web pages, a few more tips are in order. First, develop the objectives of the lesson <u>before</u> constructing any instructional materials. Designing web pages from prepared learning objectives ensures that the instructor considers the specific questions, key resources for the student research, and final learning outcomes to be generated from the lesson.

When creating new pages, begin by harvesting existing pages that closely resemble the final desired product. For example, the ***Solar System Home Page*** is an excellent boilerplate for future web pages. It is far easier to edit an existing page than to design a new one from scratch.

When designing a web page, consider centering images and tables on the page to present a tailored appearance. Use bullets, numbered lists, and tables to display data, save often and preview immediately, and use short file names with no special characters and no spaces.

Supplement 3a: Creating a Windows Shortcut for Netscape



Creating a Shortcut. A "shortcut" offers an easy path to the most popular software applications. Follow these steps to create a shortcut.

- Locate the target application in the ***Start → All Programs*** menu. ***Right click the mouse*** to open the pop-down menu. Scroll to the ***Create Shortcut*** option and ***left click*** to create the shortcut.
- 

Using the ***left mouse button, click and drag the new shortcut to the Desktop***. Notice that the icon is marked with a small arrow. Click the new shortcut to launch the application.

The inner solar system contains Mercury, Venus, Earth, and Mars. These four planets are closest to the Sun.

The outer solar system contains Jupiter, Saturn, Uranus, Neptune, and Pluto.

The inner planets are separated from the outer planets by the Asteroid Belt.

Instructions

Visit the images for each of the planets above so you can readily identify the planet by its photo. Also, scroll down to the Web Sites for Student Exploration below and visit each of the sites to learn more about the nine planets.

Lesson Objectives

Objective I: Using a personal computer and Web address list, students will **navigate** the Internet locating two specific Planet web sites and, **locate, download, and print** at least two images of your favorite planets.

Objective II: After visiting each of the given web sites, a student will add at least one Class Note of important facts to each of the nine planet worksheets found in the "**The Solar System Study Guide**."

Objective III: Given a web address, students will share a **3-5 minute presentation** on their Favorite Planet and discuss why the planet is their favorite and why this lesson was important to them.

Web Sites for Student Exploration

The following web sites have been selected for this course. Examine each of the sites -- in order. If you have any trouble locating a site, please ask for assistance from your instructor.

Kid's Cosmos...Expanding Minds Beyond the Limits of the Universe

The Nine Planets: A Multimedia Tour of the Solar System

World Book @ NASA

Student Assessment

You will receive a grade for this lesson based on the following criteria.

Assessment	Possible Points	Percent of Points
Attendance and Participation	250 points	25%
Web Site Navigation	500 points	50%
Workbook	250 points	25%
Total Possible	**1000 points**	**100%**

Created and Maintained by Lawrence Tomei, Instructor
Email Address: mailto:lawrencetomei@yahoo.com
Astronomy 100
State Cyber College

Fair Use Statement

Permission is granted for unrestricted of the materials found on this Web Page. Author requests that any materials (text or images) acquired from these pages for inclusion in related resources carry a citation of the Author.

Created: 03/15/08
Revised: 06/01/08

Supplement 3b:The Solar System Web Page: Planets of the Solar System

The Solar System Home Page

Planets of the Solar System

Go directly to the Planet Web Sites for Student Exploration

Introduction

In our solar system, nine planets circle around our Sun. The Sun sits in the middle while the planets travel in circular paths (called orbits) around it. These nine planets travel in the same direction (counter- clockwise looking down from the Sun's north pole).

The solar system is made up of two parts:

Supplement 3c: A Virtual Tour of Our Solar System

A Virtual Tour of Our Solar System

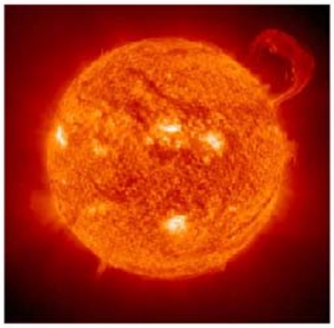
Introduction to the The Virtual Tour. Your tour of the Solar System has already taken you on a journey among the stars. You know quite a lot about the solar system having read the ***Solar Systems Handbook*** and completed the ***Solar System Hyper Book***. Plus, the class viewed the ***Planets of the Solar System*** presentation and you each completed ***A Tour of the Solar System*** interactive lesson. The class has viewed several movies and read many books from the school library. You have also been on the Internet at least three times in computer class so you should know how to point and click on a link to access a Web site.

Instructions. The final component of our lesson on planets will allow you to personally explore the solar system they way YOU want to learn. You are in control of the tour from start to finish. You may visit each planet in their order from the Sun to Pluto or you may decide to skip around the planets from smallest to largest. Learn as much as you can about each of the planets and have fun exploring the solar system at your own pace. Select a planet (or the Sun or Asteroid Belt). Learn some of the most important facts and then visit the best web site to learn even more.

Time. This learning experience will not be timed. You will have an opportunity to take the virtual tour at various times over the next two weeks. You may continue your exploration during study halls in the school library computer lab, at home in the evenings, or before or after school in any of the computer classrooms. It should take you at least four hours to visit each of the planet web sites provided in the Virtual Tour; longer if you explore some of the many sites that are linked to these primary pages.

Lesson Goals. The purpose of the Virtual Tour is to expand your understanding of the planets and appreciation of the vastness of our solar system. In addition, the Tour should help you acquire additional facts and information about each of the planets for your Handbook and Hyper Book.

Learning Objective. To document that you have visited each of the web sites below, please print the home page (first page only) for each of these sites and submit a portfolio of the 11 pages to your instructor at the conclusion of your Tour. Check out the Assessment rubric at the end of the Tour.

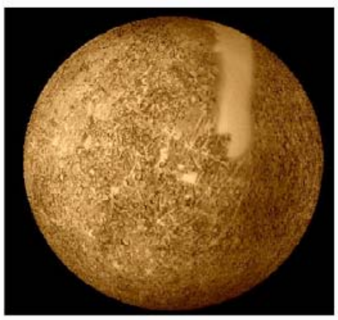


Quick Facts about the Sun	
Topic	Data
Diameter	1,391,940 km
Mass	1.989×10^{30} kg
Surface Temperature	6400 K
Interior Temperature	15.6×10^{6} K
Rotation	25 Days
Composition	Hydrogen and Helium
Magnetic Field	Very Large and Active

Visit This Web Site

Sun Site 1

Sun Site 2



Quick Facts about Mercury	
Topic	Data
Diameter	4879.4 km
Density	5.43 g/cm^3
Mass	3.303×10^{23} kg
Volume	6.084×10^{10} km^3
Temperature Range	-173° C to 427° C
Atmosphere	Some Hydrogen, Helium, Oxygen
Winds	None
Moons	None
Average Distance from Sun	57,910,000 km
Orbital Period	0 Years, 87 Days, 23.3 Hours
Rotation	58 Days, 15.5 Hours
Tilt	0.00°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Slight

Visit This Web Site

Mercury Site 1

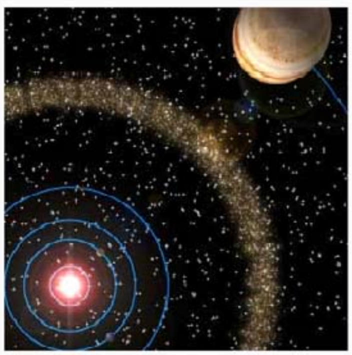
Mercury Site 2

Quick Facts about Mars	
Topic	**Data**
Diameter	6794.4 km
Density	3.94 g/cm^3
Mass	6.421 x 10^{23} kg
Volume	1.643 x 10^{11} km^3
Temperature Range	-140° C to 20° C
Atmosphere	Mostly Carbon Dioxide
Winds	Up to 100 km/hr
Moons	2
Average Distance from Sun	227,940,000 km
Orbital Period	1 Years, 320 Days, 18.2 Hours
Rotation	1 Days, 0.67 Hours
Tilt	25.19°
Rings	No
Composition	Iron Oxides and Silicates
Magnetic Field	Slight

Visit This Web Site

Mars Site 1

Mars Site 2



Quick Facts about Asteroids and Meteors (Common Meteors)	
Name	**Date Seen**
Lyrids	April and June
Perseids	August
Orionids	October
Taurids	November
Leonids	November

Visit This Web Site

Asteroids Site 1

Asteroids Site 2

Quick Facts about Venus	
Topic	**Data**
Diameter	12,104 km
Density	5.25 g/cm^3
Mass	4.869 x 10^{24} kg
Volume	9.284 x 10^{11} km^3
Temperature Range	45° C to 464° C
Atmosphere	97% Carbon Dioxide, Nitrogen
Winds	350 km/hr
Moons	None
Average Distance from Sun	108,200,000 km
Orbital Period	0 Years, 224 Days, 16.8 Hours
Rotation (Retrograde)	243 Days, 0.5 Hours
Tilt	177.36°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Slight

Visit This Web Site

Venus Site 1

Venus Site 2

Quick Facts about Earth	
Topic	**Data**
Diameter	12,756.28 km
Density	5.515 g/cm^3
Mass	5.976 x 10^{24} kg
Volume	1.087 x 10^{12} km^3
Temperature Range	-69° C to 58° C
Atmosphere	Mostly Nitrogen and Oxygen
Winds	483 km/hr
Moons	One
Average Distance from Sun	149,597,870 km
Orbital Period	1 Year, 0 Days, 0 Hours
Rotation	23 Hours 56.1 Min
Tilt	23.45°
Rings	None
Composition	Iron Core, Silicate Surface
Magnetic Field	Up to 362000 km from Surface

Visit This Web Site

Earth Site 1

Earth Site 2

Quick Facts about Jupiter	
Topic	**Data**
Diameter	142,984 km
Density	1.33 g/cm^3
Mass	1.900 x 10^{27} kg
Volume	1.377 x 10^{15} km^3
Temperature Range	-163° C to >-121° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 150 m/s
Moons	60
Average Distance from Sun	778,330,000 km
Orbital Period	11 Years, 315 Days, 1.1 Hours
Rotation	0 Days, 9.925 Hours
Tilt	3.13°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Extends 1,600,000 km

Visit This Web Site

Jupiter Site 1

Jupiter Site 2

Quick Facts about Saturn	
Topic	**Data**
Diameter	120,536 km
Density	0.69 g/cm^3
Mass	5.688 x 10^{26} kg
Volume	8.183 x 10^{14} km^3
Temperature Range	-191° C to > 130° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 400 m/s
Moons	31
Average Distance from Sun	1,429,400,000 km
Orbital Period	29 Years, 167 Days, 6.7 Hours
Rotation	0 Days, 10.233 Hours
Tilt	25.33°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Extremely strong

Visit This Web Site

Saturn Site 1

Saturn Site 2

Quick Facts about Uranus	
Topic	**Data**
Diameter	51,118 km
Density	1.29 g/cm^3
Mass	8.686 x 10^{25} kg
Volume	6.995 x 10^{13} km^3
Temperature Range	-214° C to >-205° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 160 m/s
Moons	16
Average Distance from Sun	2,870,990,000 km
Orbital Period	84 Years, 3 Days, 15.66 Hours
Rotation	0 Days, 17.25 Hours
Tilt	97.86°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Extends 15 times planet radius

Visit This Web Site

Uranus Site 1

Uranus Site 2

Quick Facts about Neptune	
Topic	**Data**
Diameter	49,572 km
Density	1.64 g/cm^3
Mass	1.024 x 10^{26} kg
Volume	6.379 x 10^{13} km^3
Temperature Range	223° C to > 220° C
Atmosphere	Hydrogen, Helium, Methane
Winds	Up to 2400 m/s
Moons	13
Average Distance from Sun	4,504,300,000 km
Orbital Period	164 Years, 288 Days, 13.0 Hours
Rotation	0 Days, 16.11 Hours
Tilt	28.31°
Rings	Yes
Composition	Hydrogen and Helium
Magnetic Field	Up to 20 times its radius

Visit This Web Site

Neptune Site 1

Neptune Site 2

About the Author

Lawrence A. Tomei is the Associate Provost for Academic Affairs and Professor of Education, Robert Morris University. Born in Akron, Ohio, his articles and books on instructional technology include: Online and Distance Learning (2008), Integrating ICT Into the Classroom (2007), Taxonomy for the Technology Domain (2005), Challenges of Teaching with Technology Across the Curriculum (2003); Technology Facade (2002); Teaching Digitally: Integrating Technology Into the Classroom (2001); and, Professional Portfolios for Teachers (1999).

Index

D

E

F

G

H

I

J

K

L

R

S

T