DEVELOPING ACCESSIBLE MUSEUM CURRICULUM: THE RESEARCH,
DEVELOPMENT AND VALIDATION OF A HANDBOOK FOR MUSEUM
PROFESSIONALS AND EDUCATORS

by

ANN ELLIOTT

B.S., Wartburg College, 1981
M.S., Kansas State University, 1989

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Educational Leadership
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2007

Abstract

The purpose of this study was to create a handbook for school and museum educators to support their development of curriculum materials that provide meaningful access to diverse learners. The handbook was developed using the research and development methodology (R&D) developed by Borg and Gall (1989). The steps in the R&D cycle used in this study included:

(1) Research analysis and proof of concept; a proof of concept consisted of interviews with three national experts in the areas of accessibility, education, and museum education to determine the need for the resource.

(2) Product planning and design; information was gathered through a literature review, curriculum materials derived from a collaborative partnership between Kansas State University and the Negro Leagues Baseball Museum were used as examples.

(3) Product development; a prototype of the handbook was created.

(4) Preliminary field test; the handbook was evaluated by five national leaders in the fields of education, accessibility, and museum education.

(5) Product revision; revisions were made based on feedback from the preliminary field test.

(6) Main field test; seven potential users from the areas of education and museum education reviewed the handbook.

(7) Operational product revision; feedback from the main field test was used for final revisions.

Conclusions:

1. There was a need for a resource to assist professionals in the design of curriculum materials that were accessible to diverse learners in both the school and museum setting.

2. The handbook was useful to both intended audiences. Museum educators found the handbook expanded their thinking to include cognitive accessibility. School educators reported the handbook increased their skills in designing learning activities for diverse learners.

3. The handbook provided specific instructions in the applications of differentiated instruction and universal design to curriculum developed for museums.

4. Physical accessibility was accepted as an important concern for museum educators. This awareness provided a useful bridge to cognitive accessibility.

5. Cognitive accessibility was accepted as an important concern for school educators. The handbook increased their skills in reaching diverse learners.

6. Both museum and school educators appreciated the technology resources that prompted reviewers' expanded thinking.

DEVELOPING ACCESSIBLE MUSEUM CURRICULUM: THE RESEARCH,
DEVELOPMENT AND VALIDATION OF A HANDBOOK FOR MUSEUM
PROFESSIONALS AND EDUCATORS

by

ANN ELLIOTT

B.S., Wartburg College, 1981
M.S., Kansas State University, 1989

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Educational Leadership
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2007

Approved by:

Major Professor
Dr. Gerald Bailey

Copyright

ANN ELLIOTT

2007

.

Abstract

The purpose of this study was to create a handbook for school and museum educators to support their development of curriculum materials that provide meaningful access to diverse learners. The handbook was developed using the research and development methodology (R&D) developed by Borg and Gall (1989). The steps in the R&D cycle used in this study included:

(1) Research analysis and proof of concept; a proof of concept consisted of interviews with three national experts in the areas of accessibility, education, and museum education to determine the need for the resource.

(2) Product planning and design; information was gathered through a literature review, curriculum materials derived from a collaborative partnership between Kansas State University and the Negro Leagues Baseball Museum were used as examples.

(3) Product development; a prototype of the handbook was created.

(4) Preliminary field test; the handbook was evaluated by five national leaders in the fields of education, accessibility, and museum education.

(5) Product revision; revisions were made based on feedback from the preliminary field test.

(6) Main field test; seven potential users from the areas of education and museum education reviewed the handbook.

(7) Operational product revision; feedback from the main field test was used for final revisions.

Conclusions:

1. There was a need for a resource to assist professionals in the design of curriculum materials that were accessible to diverse learners in both the school and museum setting.

2. The handbook was useful to both intended audiences. Museum educators found the handbook expanded their thinking to include cognitive accessibility. School educators reported the handbook increased their skills in designing learning activities for diverse learners.

3. The handbook provided specific instructions in the applications of differentiated instruction and universal design to curriculum developed for museums.

4. Physical accessibility was accepted as an important concern for museum educators. This awareness provided a useful bridge to cognitive accessibility.

5. Cognitive accessibility was accepted as an important concern for school educators. The handbook increased their skills in reaching diverse learners.

6. Both museum and school educators appreciated the technology resources that prompted reviewers' expanded thinking.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

CHAPTER I: Introduction to the Study

Introduction

The role of museums in American society has been to help us discover our humanness. This discovery process has involved investigating, recording and interpreting the world around us and our part in that world. Through their collections and programs, museums have offered encounters that have stimulated curiosity, given pleasure, and increased knowledge (American Association of Museums, 2002). The fact that museums have embraced goals that included education has made partnerships between museums and schools logical, and the number of such partnerships has been increasing. In a study released in 2002, the Institute of Museum and Library Services reported that over a billion dollars annually were spent by museums to support kindergarten through twelfth grade education (p. 1). Results from this survey revealed an increase in the number of students, teachers, and schools served by museums since 1991 (p. 2).

One of the outcomes of partnerships between museums and schools has been the creation of meaningful and diverse sets of curriculum (Institute of Museum and Library Services, 2002). Kansas State University and the Negro Leagues Baseball Museum have had a partnership since 1998. In 2005 graduate students began to create standards-based curriculum for teaching secondary social studies using the Negro Leagues as a platform. This process was enhanced when lesson plans were augmented with supportive materials that expanded the learning experience to diverse groups of learners. The materials were designed using the principles of universal design for learning and differentiated instruction.

When museum professionals have sought to deliver their content to the public, they have been aware that their audience would be varied. Therefore, many museum designers have used the techniques of universal design to increase the accessibility of their exhibits (Adaptive Environments, 2003; Majewski, n.d.; Tokar, 2003b). In the Content Section of its Exhibit Development Resources, the Boston Museum of Science contended that using universal design was an effective way to achieve intellectual access by providing multi-sensory approaches (2001c).

Mace (1997) has defined universal design as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (¶ 1). The lack of accessibility to people with disabilities was deemed a form of discrimination by the United States government with the enactment of the Rehabilitation Act in 1973. This law prohibited discrimination in any agency that received federal funding, including federal grants such as the National Endowment for the Arts and the National Science Foundation. Section 504 of this Act specified accessibility to programs (Association of Science Technology Centers, 2004). The federal laws were strengthened with the passage of the Americans with Disabilities Act in 1990 (United States Department of Justice, 2005) which prohibited discrimination on the basis of disability in businesses and other agencies that served the public and included private agencies. This law prohibited exclusion of people with disabilities from everyday activities, including leisure activities (Association of Science Technology Centers, 2004). Designers have sought to increase access through innovations such as curb cuts in sidewalks and electric door openers. Although originally designed to provide access to people with disabilities, these design elements have been frequently used by those without disabilities. A person riding a bicycle could have avoided a curb by crossing the street at a curb cut, or a patron may have chosen the electric door opener on

a building even though that person may have been physically able to manually open the door. These design elements have represented universal design at its best by enhancing accessibility for everyone.

The Center for Universal Design outlined the principles of universal design to be (a) equitable use, (b) flexible use, (c) simple and intuitive use, (d) perceptible information, (e) tolerance for error, (f) low physical effort, and (g) adequate size and space for approach and use (The Center for Universal Design, 1997). These principals have most often been applied to the design of products, and buildings. Universal design has also been applied to museums in regard to the design of exhibits, particularly through the use of hands-on exhibits (Boston Museum of Science, 2001b; Tokar, 2003b). Science museums and children's museums typically have been concerned with bringing content to visitors in multi-sensory ways. These types of museums have adopted the principles of universal design (Association of Science Technology Centers, 2004). However, there has been little movement toward accessibility in historical museums (Kudlick, 2005).

Tokar (2003a) discussed the advantages of the addition of universal design elements such as the use of audio tours and interactive elements. For example, the Boston Science Museum reinstalled its New England Lifezone Hall which consisted of a series of dioramas. The dioramas were left untouched but the exhibit was enhanced through the addition of audio, tactile and interpretive elements, smell boxes, and high-contrast, large type labels to make the hall more accessible to patrons with vision, hearing, mobility and other impairments. Evaluation data demonstrated that while the enhancements improved accessibility for that target group the changes benefited the general public as well. Patrons spent more time in the hall, interacted more with the exhibits, learned more of the content, and enjoyed them more (p. 31). This example

demonstrated that increased access to the content through the use of multi-sensory elements enhanced the experience.

The extension of the use of universal design from buildings, to exhibits, to curriculum has been a logical one. If design principals have been proven effective at removing barriers in the physical world one could reason that the same principles would be applicable in the cognitive area. When learners were provided with strategically developed supplemental materials to encourage thinking about a concept, the learner's understanding of the concept was improved. These supplemental materials have removed barriers so learners could access content in ways that were meaningful to them despite developmental, cognitive or physical limitations (Edyburn, 2005). The theory of universal design has also been studied by educators who have applied its principles to the classroom (Center for Applied Special Technology, 2006).

With the passage of the No Child Left Behind Act in 2002, educators were made accountable for teaching a rigorous curriculum to all students (United States Department of Education, 2003a). With this charge came a realization that more attention and effort were required to make that curriculum accessible. Two theories have emerged in response to this need. Differentiated instruction, a method of expanding curricular scope in order to anticipate and respond to students' learning differences, has been gaining attention (Tomlinson, 1999, p. 9). Additionally, leaders in the use of assistive technology have pioneered another theory. Universal design for learning has been primarily used by special education teachers as a way of bringing curriculum to students with disabilities by using technology (Edyburn, 2005; Orkwis, 1999). Both of these theories have proven to be relevant to the discussion of increased accessibility to learning materials.

Universal design for learning has been a theoretical framework that has guided the development of curriculum to meet the needs of all students. This work has represented

4

an expansion of the concepts of universal design beyond the design of physical objects to include materials and tools that facilitate cognition (Center for Applied Special Technology, 2006).

Van Garderen and Whittaker (2006) described the central goal of universal design for learning as providing the learner (or patron) with a wider variety of options to access, use, and engage with materials (p. 13). To accomplish this goal the design of curriculum materials has had to be flexible. This has been accomplished with careful planning during the development process to ensure that options were available. The use of multi-media formats and digital materials have been effective methods to provide these options. Additionally, universal design for learning has encouraged consideration of usability during the initial design phase of materials. This process has been exemplified when scaffold materials that supported portions of the cognitive task were created alongside the traditional materials in order to expand access and opportunities for engagement (Edyburn, 2005).

A similar theory in education has been differentiated instruction. Initially used to expand and enhance learning opportunities for students who have been identified as being gifted or talented, differentiated instruction has promoted the concept that instruction should use the individual strengths and preferences of the student to maximize learning (Tomlinson, 1999). This important initiative was articulated in 1997 with the re-authorization of the Individuals with Disabilities Education Act (IDEA). With this re-authorization, Congress also emphasized the need for students with disabilities to have "meaningful access to the general education curriculum" (United States Department of Education, 2005b, Section 614). Subsequently, differentiated instruction has been applied to the instruction of students with disabilities and not surprisingly, has been found to enhance the learning of all students. Like universal design for learning, the emphasis

of differentiated instruction has been to plan for diversity and design instructional

materials and methods that utilize the individual nature of the learner to further the

educator's goal (Tomlinson, 1999). The principles of differentiated instruction have

included the manipulation of (a) the content to be learned, (b) the process by which

information is presented and by which the learner engages with that information, and (c)

the product or manner in which the learner uses the information. These three components

could be modified according to the learner's (a) readiness level, (b) learning style, or (c)

interest (Orkwis, 1999; Tomlinson, 1999; Tomlinson & McTighe, 2006). Educators who

have successfully applied these principles work with the diversity presented by the

learner to create momentum towards the learning objective.

Although differentiated instruction and universal design had not been discussed

previously in an integrated manner, they could have been viewed as supportive theories

with multiple converging concepts (Van Garderen and Whittaker, 2006). Each theory

promoted modifications in the manner in which information is taken in by the learner,

varied means of interacting with the information, and alternatives for demonstrating that

the information has been received by the learner. The theories used similar

methodologies to accomplish this flexibility but the most critical characteristic the

theories shared was the fundamental acknowledgement that all learners were different,

and brought differences to the experience. Those differences could be used to further the

experience itself. The information in Figure 1 illustrates the allied nature of these two

theories.

Figure 1. Comparison of Differentiated Instruction and Universal Design for Learning.

Differentiated Instruction

Universal Design for Learning

Both theories stress the importance of:

Modification of:
1. Content
2. Process
3. Product
according to:
  a. readiness level
  b. interest
  c. learning style
    using:
    flexible grouping, tiering,
    scaffolds, and/or supports.

1. Recognizing the diverse needs of learners/patrons.

2. Planning for accommodations for that diversity.

3. Capitalizing on the increased engagement with the content that those accommodations bring when made available to all learners/patrons.

Creation of flexible and multiple methods of:
1. Presentation
2. Options for engagement
3. Apprenticeship and expression
by:
  a. clarifying goals
  b. providing choices
    using:
    digitized content,
    technology tools,
    multi-media tools,
    scaffolds, and/or supports.

The parallel nature of the move toward greater accessibility in both museums and education is demonstrated below. As universal design has increased access to the physical aspects of the museum, universal design for learning and differentiated instruction have increased the accessibility of curriculum in the classroom.

Figure 2 illustrates the parallel use of these two sets of sets of principles in each respective environment.

Figure 2. The use of accessibility theories in museums and schools.

There was room fo[...]ered to create curriculum materials.
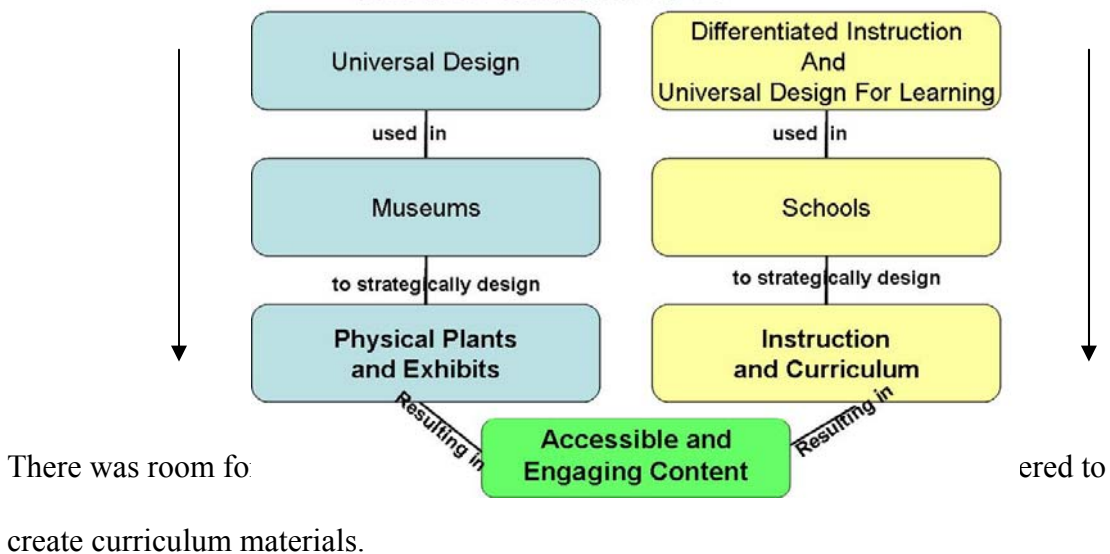
Statement of the Problem

In 1990, the United States government passed the Americans with Disabilities Act that mandated equal access to businesses and services that serve the public. Additionally, Title III of that Act laid the groundwork for increased attention to the issue of accessibility because the law required reasonable modifications to practices that denied equal access (United States Department of Justice, 2003). There have been parallel movements in museums and in schools to increase the accessibility of programs for a diverse population of patrons. There have also been an increased number of partnerships between museums and schools. These partnerships have provided a fertile environment for the parallel theories of universal design and differentiated instruction to be used together in the development of accessible curriculum.

The problem was that when museum professionals and educators partner, there were few resources available to guide the process of developing curriculum that was accessible to diverse groups of learner and patrons. Much has been written about each of these principles, but there has been no guidance on methods that integrate the concepts within the environment of museum curriculum. A handbook was needed to provide a structure for educators and museum professionals that combined the relevant components of differentiated instruction and universal design, and guided the application of those components to the design of curriculum materials.

Purpose of the Study

The purpose of the study was to research, develop, test and validate a handbook for museum professionals and educators on the use of the principles of universal design and differentiated instruction for the curriculum materials that are created when museums and schools partner. The proposed handbook was to provide guidance, materials, and resources that allowed professionals from both disciplines to develop rich and varied

opportunities to engage with museum content for people with disabilities, people with varied needs, and ultimately, all people.

Target Audience

The handbook provided guidance in the development of accessible museum curriculum for museum curators, museum educators and public school educators. The techniques and examples included in the handbook appealed to professionals who were working to bring more patrons through the doors of museums, particularly museums with a focus on historical collections. When museums partnered with education to create lesson plans around museum content, they benefited from an additional step; the design of supportive materials to increase the accessibility of those lessons. This handbook also appealed to educators who were struggling with the implementation of differentiated instructional techniques as they planned lessons for their diverse classrooms. Since the handbook contained examples and step-by-step instructions on the design of the supports, teachers would be able to apply these techniques to their practice.

Significance of the Study

This study had significance to museum professionals because the handbook outlined the application of tools used in the educational arena for use in the development of curriculum that pertained to museum content. As museums have been mandated to provide barrier free access to their buildings, they have also been obligated to deliver their content to patrons with diverse needs. Educators would have an important role to play in this process as some have been trained in the techniques of differentiated instruction. These skill sets would be an important contribution to the partnership. The study provided a foundation for the development of these diverse materials. The handbook outlined specific strategies and applications. Instructions and examples were

included in the use of the principles of both universal design and differentiated instruction in the arena of museum curriculum.

Scope and Limitations

Since the Americans with Disabilities Act was passed in 1990, public agencies and business have worked to remove barriers for people with disabilities. The handbook expanded this movement to allow both museum professionals and educators to design curriculum, materials to reach users with diverse needs.

The handbook did not address exhibit planning or design because there has been significant research in this area that would benefit museum exhibit designers. Additionally, the handbook did not deal with the physical aspects of the museum building because accessibility in this area has been outlined in the Americans with Disabilities Act. There was no attempt made in the study to clarify the relationship between the theories of universal design, universal design for learning, and differentiated instruction in respect to chronological development, application, or context.

Educational Research

In order to determine what would be included in the handbook several research questions were identified:

1. How could the themes of universal design and differentiated instruction be applied to the development of accessible museum curriculum materials?

2. Can examples be created using the techniques of universal design and differentiated instruction to demonstrate increased accessibility in the cognitive domain?

These objectives guided the researcher in the development of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. The research

objectives were (a) examine the literature to determine currently existing practices in developing accessible curriculum materials in museums, (b) determine how the principles of universal design could be applied to the design of curriculum materials, (c) determine how the principles of differentiated instruction could be applied to the design of museum curriculum materials, (d) develop examples and tools that museum professionals and teachers could use to apply the principles of universal design and differentiated instruction to the materials they design.

Organization of the Study

The dissertation followed the structure of the research and design model of Borg and Gall (1989). The study was organized into five chapters.

Chapter One: Introduction. Chapter one included an introduction, statement of the problem, purpose of the study, target audience, research questions, significance of the study, scope and limitations, educational research and methodology, organization of the study, and a definition of terms.

Chapter Two: Review of the Literature. Chapter two consisted of a review of literature relating to the principles of universal design and differentiated instruction. The application of these principles to curriculum was studied. Examples of curriculum produced by museum professionals and educators in partnership were sought.

Chapter Three: Methodology. Chapter three was a description of the processes used to create and validate *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*.

Chapter Four: Validated Product. Chapter four contained a revised version of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*.

Chapter Five: Findings, Conclusions, and Implications. Chapter five summarized findings, conclusions, implications, and recommendations from the study.

Definition of Terms

Access - The right to obtain, make use of, or take advantage of something, (WordReference, 2005).

Accessibility - The ability of a product to have the user actively engage and use that product (Orkwiss, 1999). Capable of being reached (WordReference, 2005).

Accessible Museum Curriculum - Print and electronic education materials, classroom activities, and interdisciplinary materials (Institute of Museum and Library Services (IMLS), 2002) that are designed to allow patrons with diverse learning needs to take advantage of the materials to the greatest extent possible.

Adaptation - The process of changing parts of a curricular material to meet the needs of an individual with a disability (Tomlinson, 2000a).

Assistive Technology - The use of a device, item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability. (Library of Congress, n.d.).

Americans with Disabilities Act - Public Law 33, 1990. Federal legislation that prohibits discrimination and ensures equal opportunity for persons with disabilities in

employment, state and local government services, public accommodations, commercial facilities, and transportation (United States Department of Justice, 2005b).

Barrier - Any condition that makes it difficult to make progress or to achieve an objective (WordNet 2.1, 2004).

Cognition - High level functions carried out by the human brain including comprehension and use of speech, visual perception and construction, calculation ability, attention (information processing), memory, and executive functions such as planning, problem-solving, and self-monitoring (National Multiple Sclerosis Society, 2004).

Collection - Several things grouped together or considered as a whole (WordReference, 2005).

Content - That which conveys information, for example, text, data, symbols, numerals, images, sound, and vision (Australian Government: National Archives of Australia, n.d).

Curator - Someone who is in charge of collecting, conserving, and interpreting objects for exhibit at a museum, zoo, or other place of exhibition (Brooklyn Expedition, n.d.).

Curb Cut - The slope from a sidewalk to a street. Curb cuts are primarily intended to accommodate people in wheelchairs. Curb cuts also benefit people with situational limitations that make it difficult to get over a curb (Lawton-Henry, 2002).

Curriculum - The planned interaction of pupils with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives (Indiana Department of Education, 2005).

Design - The process of planning and producing a product or environment (Roe et al., 1997).

Differentiated Curriculum - Adapting the curriculum to meet the unique needs of learners by making modifications in complexity, depth, or pacing. Adaptations may include selecting rather than covering all elements of a curriculum, depending on the individual needs of students (Sayler, 1993).

Differentiated Instruction - A method of teaching that requires teachers to begin where students are rather than at the front of a curriculum guide, and to accept and build upon the premise that learners differ in important ways (Tomlinson, 1999).

Digital - Referring to the electronic storage and presentation of information (Center for Applied Special Technology, 2006).

Diorama - A picture or series of pictures representing a continuous scene (WordReference, 2005).

Disabilities - Certain kinds of impairment affecting a person's capabilities to perform socially defined roles and functions within specific environments (Ward and Baker, 2005).

Diversity - Individuals and communities that are vary with regard to their national origin, gender, race, culture, economic status, religion, sexual orientation, physical or cognitive ability, age, and/or family structure (American Association of Museums, 2002).

Developmental Disabilities - Experiencing developmental delays, as defined by the state and as measured by appropriate diagnostic instruments and procedures in one or more of the following areas: physical development, cognitive development, communication development, social or emotional development, or adaptive development (United States Department of Education 2005b).

Educator - One trained in teaching; a teacher; a specialist in the theory and practice of teaching; a person whose occupation is to educate (System for Adult Basic Education Support, n.d.).

Engagement - The act of sharing in the activities of a group, as in participation (WordNet 2.1, 2005).

Exhibit - Something shown to the public (WordNet 2.1, 2005).

General Curriculum - The set of curricular standards established by the state that represents the expected level of proficiency to be attained by students who have not been identified as having a disability (United States Department of Education, 2005b).

Gifted and Talented - Exceptional children who are determined to be within the gifted category of exceptionality as such category is defined by the state board (Kansas Education Statutes, 2004).

Handbook - A concise reference book providing specific information about a subject or location (WordNet 2.1, 2005).

Impairment - Any loss or abnormality of psychological, physiological, or anatomical structure or function (National Multiple Sclerosis Society, 2004).

Individuals with Disabilities Education Act (IDEA) - HR1350, Federal legislation re-authorized in 1997, then again in 2004. The title was changed to the Individuals with Disabilities Education Improvement Act (IDEIA) with the 2004 re-authorization. (United States Department of Education, 2005a).

Interactive - An electronic environment that is designed to allow the audience to interact with it. Often referred to as "multi-media," these environment may take the form of a web site or computer program (Massachusetts Institute of Technology, n.d.).

Learner - Someone who takes up knowledge or beliefs (WordReference, 2005).

Museum - An institution which performs all or most of the following functions: collecting, preserving, exhibiting and interpreting the natural and cultural objects of our environment (American Association of Museums, 2002).

Museum Curriculum - Print and electronic education materials, thematic programs, classroom activities, and interdisciplinary materials, (Institute of Museum and Library Services (IMLS), 2002).

Multi-Media - Presenting data in more than one medium such as combining text, graphics, and sound (Micro2000, 2004).

Negro Leagues Baseball Museum (NLBM) - A privately funded, non-profit organization dedicated to preserving the rich history of African American Baseball (NLBM, n.d.).

No Child Left Behind - H.R. 1, The No Child Left Behind Act is a reform of the Elementary and Secondary Education Act (ESEA), enacted in 1965. It redefines the federal role in kindergarten through twelfth grade education to help improve the academic achievement of all American students. It has four major components (a) accountability for results, (b) flexibility at the state and local level, (c) expanded options for parents, and (d) emphasis on research-base teaching methods (U.S. Department of Education, 2003a).

Patron – Frequenter; a regular customer (WordNet 2.1, 2005).

Professional - Engaged in a job as a means of livelihood (WordReference, 2005).

Scaffolding - An instructional technique in which the teacher breaks a complex task into smaller tasks, models the desired learning strategy or task, provides support as students

learn to do the task, and then gradually shifts responsibility to the students. In this manner a teacher enables students to accomplish as much of a task as possible without adult assistance (North Central Regional Educational Laboratory (NCREL), 2004).

Smell Box - A constructed box as part of a museum exhibit that contains a chemical which mimics the smell of the item on display (Association of Science Technology Centers, 2004).

Special Education - Specially designed instruction, at no cost to parents, to meet the unique needs of a child with a disability (United States Department of Education, 2005b).

Standards Based Curriculum - Teaching directed toward student mastery of defined standards. Now that nearly all states have adopted curriculum standards, teachers are expected to teach in such a way that students achieve the standards (Association for Supervision and Curriculum Development, 2006).

Universal Design - The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (Mace, 1997).

Universal Design for Learning - A blueprint for creating flexible goals, methods, materials, and assessments that accommodate learner differences (Center for Applied Special Technology, 2006).

Usability - A characteristic, that is present to a greater or lesser degree, which describes how effectively a user can interact with a product. It can also be thought of as how easy a product is to learn and how easy it is to use (Axup, 2002).

Summary

The purpose of the study was to research, develop, and validate a handbook to guide museum professionals and educators to develop accessible curriculum materials. The problem was that most curriculum materials created by museum and school partnerships did not meet the needs of diverse learners, and were not accessible to a variety of patrons. The dissertation culminated in a completed handbook that offered museums and school professionals the information they needed to design curriculum materials that were accessible to people with disabilities such as physical and cognitive limitations.

CHAPTER II: Review of the Literature

Introduction

A review of the literature began in January of 2006 and continued through the summer of 2006. Additional resources were reviewed during field testing of the guide to ensure that new information was included.

Chapter II established the definition of museum and school partnerships and summarized the research findings in three areas. Part one explored the history and principles of the architectural movement of universal design, its application in museums, and its expansion to the classroom via the field of assistive technology. Part two focused on the educational practice of differentiated instruction and the use of these strategies to design curriculum that expanded accessibility to diverse learners. The final section established the need for a handbook to guide museum educators and school personnel when they partnered to design curriculum that was accessible to diverse groups of users.

The concept of a partnership between a museum and a school with the purpose of designing curriculum was central to this study. Therefore it was important to define the terms museum, school and partnership as they related to the study.

The federal government in the Museum and Library Services Act defined a museum as:

> A public or private nonprofit agency or institution organized on a permanent basis for essentially educational or aesthetic purposes, which, utilizing a professional staff, owns or utilizes tangible objects, cares for them, and exhibits them to the public on a regular basis (American Association of Museums (AAM), n.d.,¶ 5).

It was important to note that one of the purposes of a museum has been that of education. Through their collections and programs, museums have offered encounters that stimulate curiosity, give pleasure, and increase knowledge (AAM, 2002). This discovery process has involved investigating, recording and interpreting the world around us, and our part in that world.

The U.S. Department of Education defined a school as, "A division of the school system consisting of students in one or more grades or other identifiable groups and organized to give instruction of a defined type" (¶ 6, 2004a). The definition provided by Princeton University (WordNet, n.d., ¶ 1,) included the purpose of a school as an educational institution.

The terms partnership and collaboration have been commonly used synonymously. This was also the case in this study. The Institute of Museum and Library Services defined partnership as:

A relationship between individuals or groups that is characterized by mutual cooperation and responsibility, as for the achievement of a specified goal (see collaboration). In this usage partnership describes a spectrum of relationships between two or more organizations ranging from relatively informal cooperation through formal, legal agreement (2004, p. 25).

Using these definitions, a partnership between a school and a museum was defined as a collaborative relationship created to accomplish a specific goal. In the context of this study, that goal was to create curriculum materials that brought the learning experience to learners with diverse needs. The fact that museums have embraced educational goals made partnerships between museums and schools logical. The number of such partnerships has increased. In a study released in 2002, the Institute of Museum and Library Services reported that over a billion dollars annually were spent

21

by museums to support kindergarten through twelfth grade education (p. 1). Results from this survey revealed an increase in the number of students, teachers, and schools served by museums since 1991 (p. 2).

One of the outcomes of partnerships between museums and schools has been the creation of meaningful and diverse sets of curriculum materials (Institute of Museum and Library Services, 2002). Kansas State University and the Negro Leagues Baseball Museum have had a partnership since 1998. In 2005, graduate students began using Negro Leagues history to create standards-based curriculum for teaching secondary social studies. This process was enhanced when lesson plans were augmented with supportive materials that were designed using the principles of universal design for learning and differentiated instruction.

Part One: Universal Design

Universal design (UD) emerged initially as an architectural concept (Mace, 1997) and the principals of UD were applied to the design of physical buildings, space, and objects. This process served as a foundation for a further application; using universal design principals to support learning.

Universal Design in the Physical Environment

Robert Mace (1997) defined universal design as, "the design of products and environments to be usable by all people to the greatest extent possible without the need for adaptation or specialized design" (¶ 1). The intent of universal design has been to, "simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost" (Center for Universal Design [CUD], 2006a, ¶ 2). The development of UD was rooted in the Civil Rights Movement of the 1960s and subsequent legislation on behalf of people with disabilities in the 1970s, 1980s, and 1990s. Several social factors contributed to the

increased awareness of the need for accessibility. First, there was an increase in the number of elderly citizens as a result of increased life span and better health care. The average lifespan was 47 years in the early 20th century but has increased to an average of 76 years today (CUD, 2006a, ¶ 3). Additionally, after World War II, there was an increase in the number of disabled veterans living in the United States (CUD, 2006a, ¶ 4). In 1997, the United States Census Bureau reported that one in five Americans had some form of disability and that this trend would continue to grow as the population aged (McNeil, 1997).

These changes in the population presented new challenges to businesses and governmental agencies because many physical facilities were unusable by people with physical limitations. The lack of accessibility to people with disabilities was deemed a form of discrimination by the United States government with the enactment of the Rehabilitation Act in 1973. This law prohibited discrimination in any agency that received federal funding. Federal laws were strengthened with the passage of the Americans with Disabilities Act (ADA) in 1990 (United States Department of Justice, 2005) which prohibited discrimination on the basis of disability in businesses, places of employment, services, programs, public transportation, public accommodation, and telecommunications. The ADA raised public awareness to physical barriers that impede access and represented a uniform nationwide mandate that ensured accessibility regardless of local attitudes. The Architectural and Transportation Barriers Compliance Board (Access Board) issued Accessibility Guidelines for accessible design in 1991. These guidelines were adopted with modifications by the U.S. Department of Justice and became the enforceable ADA Standards for Accessible Design (CUD, 2006a, ¶ 15).

As architects began to implement these new standards they discovered that specially designed elements for people with disabilities were expensive and aesthetically

distracting. The realization emerged that design elements could be incorporated that would meet accessibility standards, be commonly provided, and thus be less expensive, unlabeled, attractive, and even marketable and could also benefit all users. The idea of universal design was born (CUD, 2006a).

The Center for Universal Design (CUD) has outlined the principles of universal design to be (a) equitable use, (b) flexibility in use, (c) simple and intuitive use, (d) perceptible information, (e) tolerance for error, (f) low physical effort, and (g) size and space for approach and use (1997). Universal design features have usually been standard practices that have been placed differently, selected carefully, or omitted (CUD, 2006b). Using the principles of UD, architects and designers have sought to increase access to buildings, spaces, and objects by creating design elements such as curb cuts in sidewalks and electric door openers. Although originally designed to provide access to people with disabilities, these design elements have been frequently used by those without disabilities. A person riding a bicycle could avoid a curb by crossing the street at a curb cut or a patron may have chosen the electric door opener on a building even though that person may have been physically able to manually open the door. These design elements represented universal design at its best by enhancing accessibility for everyone.

Universal Design in Museums

When museum professionals have sought to deliver their content to the public, they have been aware that their audience would be varied. Therefore, many museum designers have used the techniques of universal design to increase the accessibility of their exhibits (Adaptive Environments, 2003; Majewski, n.d.; Tokar, 2003b). In the Content Section of its Exhibit Development Resources, the Boston Museum of Science contended that using universal design was an effective way to achieve intellectual access by providing multi-sensory approaches (2001c). The Office of the Provost at the

Smithsonian Institute has recognized the diversity within their audience and realized that, "exhibitions must teach to different learning styles, respond to issues of cultural and gender equity, and offer multiple levels of information" (Majewski, n.d., ¶ 1). In the Smithsonian Guidelines for Accessible Exhibition Design, Majewski stated, "Accessibility begins as a mandate to serve people who have been discriminated against for centuries; it prevails as a tool that serves diverse audiences for a lifetime" (¶ 2). This document has served as a resource for exhibition designers, curators,, collections managers, designers, editors, developers, educators, and other exhibition team members and has represented the Smithsonian's method for meeting the requirements of accessibility laws. It has presented a general set of guidelines for exhibit content, presentation, and physical access emphasizing that care was to be given to ensure that display cases were easily accessed from either a sitting or standing position, labels and exhibit explanations were provided through more than one sensory channel, and specific instructions were detailed regarding the use of audio and visual materials to provide equal access to individuals with sensory impairments. This set of guidelines provided the most comprehensive resource from the literature review.

Science museums and children's museums typically have been concerned with bringing content to visitors in multi-sensory ways. These types of museums have adopted the principles of universal design (Association of Science Technology Centers, 2004; Boston Museum of Science, 2001b). This application also involved the expanded use of technology with the addition of interactive computer-enhanced presentation that delivered material to the visitors visually, auditory, and tactilely. The use of technology represented an attempt to augment the cognitive experience of the visitor regardless of whether he or she was a person with a disability. Multi-sensory representation increased

learning (Berninger, Abbott, Abbot, Graham, & Richards, 2002;.Howard, Ellis, & Rasmussen, 2004; Jatala & Seevers, 2006; Prestia, 2004).

Tokar (2003a) discussed the advantages of adding universal design elements such as the use of audio tours and interactive elements. For example, the Boston Science Museum redesigned its New England Lifezone Hall which consisted of a series of dioramas. The dioramas were left untouched, but the exhibit was enhanced by the addition of audio, tactile, and interpretive elements, smell boxes, and high-contrast, large type labels to make the hall more accessible to patrons with vision, hearing, mobility, and other impairments. Evaluation data demonstrated that while the enhancements improved accessibility for that target group, the changes benefited the general public as well. Patrons spent more time in the hall, interacted more with the exhibits, learned more of the content, and enjoyed them more (p. 31). This example demonstrated that increased access to the content through the use of multi-sensory elements enhanced the experience.

Waite, Kirlkey, Pendleton, and Turner (2005) conducted a study that used handheld and tablet computers to improve the access to information in three museums and a zoo for individuals with low vision, hearing, and mobility. They also included parents with small children in their focus groups. Groups reported difficulty with text labels, artifact exhibits, placement, and lighting in the environments but also reported that hardware and software enhancements were effective in ameliorating the effects of their limitations. These enhancements included high contrast images of artifacts, adjustable font, audio descriptions, and the use of closed captioning. It was interesting to note that parents accompanied by children also reported that their experience and the experience of their children was improved by the addition of the technology solutions. In this study it was observed that children tended to move quickly around an exhibit interacting with anything that caught their attention. Parents spent the majority of their time explaining

the exhibition to their children and not much time interacting with the material themselves (p.78). Technology additions held children's attention for longer periods of time. Due to their short stature they shared some of the same limitations that were experienced by people with mobility limitations who were confined to wheelchairs. Adaptations increased the physical accessibility to children as well.

However, there has been little movement toward accessibility in historical museums (Kudlick, 2005). The literature was limited in this area.

Universal Design and Assistive Technology

These principles were quite similar to another growing field in the area of increased accessibility; that of assistive technology. The goal of this group of designers has been to use technology software and hardware to compensate for loss of functionality as a result of a physical, sensory, or cognitive disability. These devises have increased an individual's ability to interact with his or her environment. Although the aim of leaders in assistive technology has been a goal for an individual person, and the purpose of universal design has been more mainstream, the underlying premise has been the same. This paradigm has closely resembled the current movement in education toward access to the general education curriculum.

The parallel nature of these two fields has been discovered and explored by product designers such as those at Oxo International. This company's "Good Grips" line of kitchen utensils with thick grips was designed for usability by persons limited by arthritis. The products resembled others sold by assistive technology suppliers but were more aesthetically pleasing. Because these utensils used principles from both fields, "Good Grips" have found a niche in the marketplace that has included individuals with disabilities and users who were not disabled (CUD, 2006a). This product represented a crossover from UD to assistive technology. An example of movement in the opposite

direction (assistive technology to universal design) has been the increased use of voice recognition software. Created to augment the communication skills of people who were physically unable to produce written material, this innovation has proven to be very useful for many people. For example, the busy executive who used to dictate letters to a secretary could now speak to the computer or into a digital recorder and did not even have to be in his or her office.

The Use of Universal Design in the Cognitive Domain

The extension of the use of universal design from buildings, to exhibits, to curriculum was logical. If design principals have been proven effective at removing barriers in the physical world, one could reason that the same principles would be applicable in the cognitive area. Educational leaders in the use of assistive technology have expanded universal design by employing its principles in the classroom. This work has moved beyond the design of physical objects to include materials and tools that facilitate cognition (Center for Applied Special Technology (CAST), 2006). Access has been improved through the provision of strategically developed supplemental materials to facilitate thinking about a concept or subject in order to improve the learner's understanding. These supplemental materials removed barriers so learners could interact with content despite developmental, cognitive, or physical limitations (Edyburn, 2003a).

The theory of universal design has been expanded to the classroom as universal design for learning (UDL) (CAST, 2006). In the learning environment, these principles have primarily been used by special education teachers who have used technology to deliver content to students with disabilities (Edyburn, 2005; Orkwis, 1999). But in doing so, UDL increased the accessibility to learning materials for non-disabled students as well (Rose & Meyer, 2002). With the passage of the No Child Left Behind Act in 2002, educators have become legally accountable for teaching a rigorous curriculum to all

students (United States Department of Education, 2003a). With this change came a realization that more attention and effort were required to make curriculum accessible. Through this process, universally designed curriculum has had the potential to move into the arena of general education and to support general education teachers in their mandate to teach every learner and leave no child behind.

Van Garderen and Whittaker (2006) described the central goal of universal design for learning as providing the learner with a wider variety of options to access, use, and engage with materials (p. 13). This was accomplished when the considerations of usability were prioritized during the *initial* design phase with careful planning that expanded the flexibility of the curriculum material. This process was exemplified when scaffold materials that supported portions of the cognitive task were created alongside the traditional materials in order to expand access and opportunities for engagement (Edyburn, 2003b). The Center for Applied Special Technology (CAST) pioneered this work in the early 1990s. Rose and Meyer described preliminary research findings of Russian psychologist Lev Vygotsky who theorized that three conditions were essential for learning to occur:

The learner must (a) recognize patterns in sensory data, (b) have one or more strategies for operating on the perceived patterns, and (c) be engaged both by the strategies and the sensory data to which he or she is applying them. If any of these three conditions is missing, learning will be suboptimal at best (2002, ch. 2).

Positron Emission Topography (PET) scan images have allowed researchers to generate maps detailing the brain areas that were activated as an individual performed particular mental tasks. According to Meyer and Rose (1998), the patterns of activity suggested the presence of three cortical systems each functionally and anatomically

distinct. These systems corresponded to Vygotsky's three conditions for learning: (a) the recognition system, (b) the strategic system, and (c) the engagement system.

When curriculum developers understood these networks in the brain they were able to achieve a solid match between the network they were attempting to support and the curriculum supports they designed. The results were supportive curriculum that enhanced learning.

Universal Design for Learning in the Classroom

Barriers have existed for professionals who sought to incorporate UDL into their curriculum development. These have included limited awareness on the part of educators and a reliance on the integrated use of technology. As with other educational reform agenda, adoption has moved at a very slow pace (Fullan, 2001). Awareness has been limited because UDL was relatively new in the field of education. This has been due in part to the fact that it relied heavily upon the application of assistive technology and was inter-twined with those strategies. Special educators used technology most frequently with students with severe disabilities. These teachers have been utilizing switches, alternative keyboards, and computer monitors for quite some time (Edyburn, 2000) but it was not until the 1997 re-authorization of the Individual with Disabilities Education Act that the possible use of assistive technology was mandated as a consideration for any student with a disability (United States Department of Education, 2005a).

Also, the integration of technology into the every day learning experiences of typical learners has been a relatively recent practice (Punya & Koehler, 2006). Teachers have been slow to integrate the use of technology into their instruction (Williams & Kingham, 2003). The United States Department of Education surveyed public school teachers in 1999 and reported that the availability of technology had grown. In this survey, 99% of teachers reported that they had computers and Internet connections

available in their schools and 84% reported having at least one computer in their classroom (p. 4). But only half of the teachers reported that they used computers for instruction (p. 5). Teachers who reported feeling better prepared were more likely to use these technologies than their less prepared colleagues. Approximately one-third of teachers reported feeling well prepared or very well prepared to use computers and the Internet for classroom instruction with less experienced teachers indicating they felt better prepared to use technology than their more experienced colleagues (Smerdon, Cronen, Lanahan, Anderson, Iannottie, & Angeles, 2000, p. 6). However, in a 2006 review of 68 refereed journal articles with a focus on introducing technology to pre-service teachers, Kay concluded that pre-service teachers had not been successfully prepared (p, 395). This review summarized obstacles that prevented the successful use of computers. These included: (a) lack of time, (b) teaching philosophy of mentors and school administration with respect to technology, (c) technological skill of faculty, (d) fear of technological problems, (e) lack of clear understanding about how to integrate technology into teaching, and (f) insufficient access to technology (p. 383).

Clearly there has been a gap between the potential that universal design for learning holds and current practice, however there was also promise. The emergence of Professional Learning Communities in many schools has increased collaboration between special and general educators and provided for the development of a shared vision that leaders in educational reform have written about as being essential (DuFour, 2005; Fullan, 2001).

Part Two: Differentiated Instruction

Differentiated instruction has been a philosophy about teaching and learning that has provided a method of expanding curricular scope in order to "anticipate and respond to students' learning differences" (Tomlinson, 1999, p. 9). Initially used to expand and

enhance learning opportunities for students who were identified as being gifted or talented, differentiated instruction has promoted the concept that instruction should use the individual strengths and preferences of the student to maximize learning. Subsequently, differentiated instruction has been applied to the instruction of entire classrooms and not surprisingly, has been found to enhance the learning of all students. Like universal design for learning, the emphasis of differentiated instruction has been to plan for diversity and design instructional materials and methods that utilize the individual nature of the learner to create momentum towards the learning objective (Tomlinson, 1999).

> In an appropriately differentiated classroom, all learners focus much of their time and attention on the key concepts, principles, and skills identified by the teacher as essential to growth and development in the subject -- but at varying degrees of abstractness, complexity, open-endedness, problem clarity, and structure (Kierman & Tomlinson, 1997, p. 6).

> The principles of differentiated instruction have included a series of decisions made by teachers regarding the manipulation of:

> (a) the content to be learned/input, (b) the process by which information is presented and by which the learner engages with that information/sense-making, and (c) the product or manner in which the learner uses the information/output (Peirce and Adams, 2004, p. 59).

These three components could be modified according to the learner's: (a) readiness level, (b) learning style, or (c) interest (Orkwis, 1999; Tomlinson, 1999; Tomlinson & McTighe, 2006).

> Decision making has been crucial to this process and has been based upon learner diversity. Planning for differentiation included a two-step decision making process. Step

one included a decision regarding which part of a lesson was to be differentiated. This was done by predicting potential barriers that might have impeded the learning process within the group, and then planning which aspect of the lesson could be adjusted to compensate for those barriers. Step two utilized a finer level of sorting; resulting in the decision about the manner in which the differentiation was to be implemented. There were nine possible combinations. The information in Figure 3 illustrates the relationship of these decision points.

Figure 3. The decision making process in differentiated instruction.
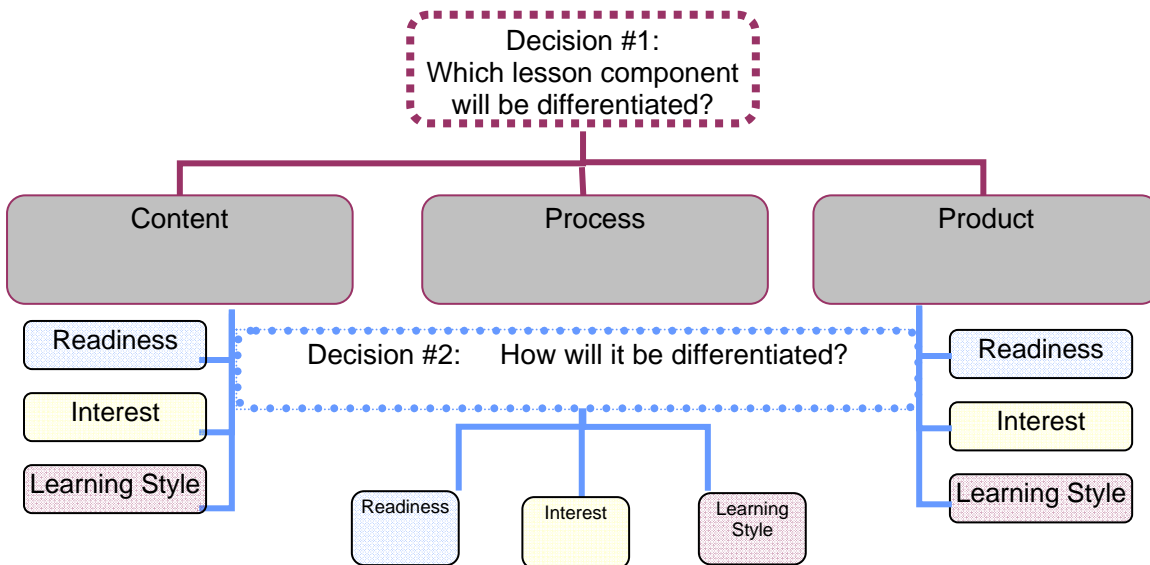
VanSciver (2005) shared these two examples of differentiation. Among elementary students learning how to multiply, one group of students may have been able to memorize their multiplication tables and understand the connection between addition and multiplication through conversation with the teacher. A different set of students may have needed to see how that process worked through the use of manipulatives such as groups of checkers.

Some middle school geography students may have been able to see easily how they could use maps to help understand the world. Other students may have needed a

guiding hand to physically take them to that natural world to see how the map represented its different features.

Tomlinson wrote that educators who subscribed to the philosophy of differentiated instruction held some common beliefs.

Students who are the same age differ in their readiness to learn, their interests, their styles of learning, their experiences, and their life circumstances, and, the differences in students are significant enough to make a major impact on what students need to learn, the pace at which they need to learn it, and the support they need from teachers and others to learn it well (Tomlinson, 2000b, p. 6).

VanSciver promoted differentiated instruction as the answer to educators' quandary regarding the No Child Left Behind mandate; to the point that he proclaimed that, differentiation should be, "as American as motherhood, apple pie and baseball" (2005, p. 534).

Key Concepts in Differentiation

The use of flexible groups was emphasized as a vehicle for delivering a differentiated lesson. Groupings that changed with the content and the learning activities accommodated a variety of teacher objectives (Peirce & Adams, 2004). This approach capitalized on the high expectations that teachers had for high-performing groups of students and provided opportunities for teachers to scaffold supports for those who struggled. The emphasis in this method was on flexibility. Flexibility was the element that distinguished this use of groups from previously used methods of ability grouping and tracking procedures. The literature was clear that ability grouping produced benefit only for groups of high achieving students and created a cycle of low expectations that

hindered the growth of students for whom learning was slow and difficult (Tomlinson, 2006c).

Educators who subscribed to the philosophy of differentiated instruction have re-framed their thinking about a student's academic functioning skills as "readiness" (Tomlinson, 1999). Readiness was assessed by determining a student's current knowledge, understanding, and skill as it related to what was being studied. Readiness varied from student to student and within an individual student; according to content area, daily attitude, and state of health. This flexible way to look at skill sets facilitated more flexible planning because readiness was not captured in a static score such as on an intelligence test (Tomlinson, 1999; Van Garderen & Whittaker, 2006).

One method of differentiating has been to use tiered lessons. In this type of lesson planning the teacher decided which part of the lesson was to be differentiated (content, process, or product) and by what method it would be tiered (readiness, interest, or learning style). Students were assigned different learning objectives and different learning activities. However, the activities in which they engaged reflected a consistent learning path towards those objectives.

The use of a planning pyramid was a helpful tool for teachers when they designed tiered lessons. The pyramid represented a model for increasing the depth and breadth of planning in a particular content area. Different groups of students were held accountable for different content, process, or product. For the purposes of explanation, the example of the pyramid has been described as a lesson for which the decision was been made to differentiate the content by readiness level. The middle section of the pyramid was the largest, and included the learning objectives for lessons that were typically planned by teachers for students who functioned at their academic grade level. This level may have contained multiple learning objectives but did not represent any adjustment and would

have represented most traditional lesson plans. Differentiation occurred when the teacher

expanded the plan in both directions. The bottom level of the pyramid characterized the

most basic level of knowledge that was acceptable mastery for this content. In this

example in which the decision was made to differentiate the content of the lesson by

readiness level, this tier may have been appropriate for students with moderate or severe

disabilities or any student whose performance was below grade level in this particular

area. The learning objectives were less complex and represented a grasp of the main

points of the lesson. In contrast, the top level of the pyramid described the learning

objectives that were above and beyond the norm. These objectives were extensions of

the standards and were appropriate for students who achieved at very high levels. The

planning pyramid was not limited to three levels. Educators may have found it necessary

to plan instruction on several levels depending on the diversity among their learners. The

information in Figure 4 illustrates a three-level planning pyramid to assist in the

development of tiered lesson objectives to differentiate content by readiness level.

Figure 4. A three-tiered planning pyramid.

What a few learners will know and be able to do.

What most learners will know and be able to do.

What all learners will know and be able to do.
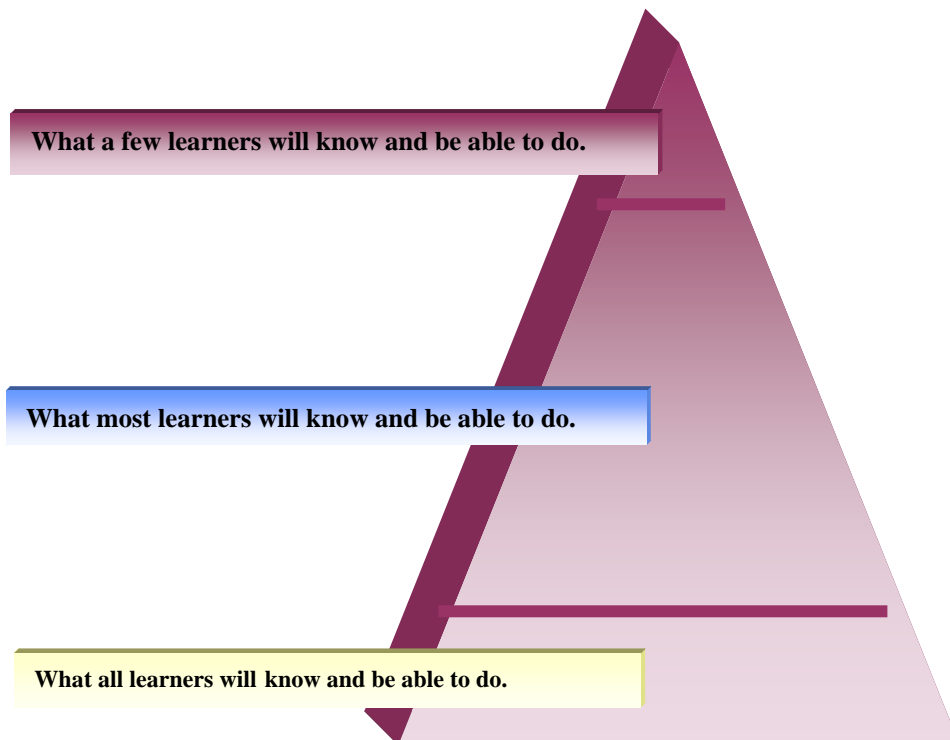
There were many ways to differentiate instruction. As was illustrated in Figure 3, there were nine combinations of lesson elements to modify in order to plan learning that matched the diverse needs of the learner(s). Wormeli stated, "Half of differentiation is the teacher's mind-set: "Am I teaching so students best learn?" The rest of it is expertise in course content, cognitive theory, the developmental level of the students, and differentiated practices" (2005, p. 30).

Universal design for Learning and Differentiated Instruction

Although differentiated instruction and universal design had not been discussed previously in an integrated manner, they were viewed as supportive theories with multiple converging concepts (Van Garderen & Whittaker, 2006). Each theory promoted modifications in the manner in which information was taken in by the learner, varied means of interacting with the information, and alternatives for demonstrating that the information had been received by the learner. The theories used similar methodologies to accomplish this flexibility but the most critical characteristic the theories shared was the fundamental acknowledgement that all learners were different and brought differences to the experience. Those differences could be used to further the experience itself and were best accommodated <u>during</u> the planning process, not after the fact. The information in Figure 5 illustrates the allied nature of these two theories.

Figure 5. Comparison of Differentiated Instruction and Universal Design for Learning.

Differentiated Instruction

Modification of:
1. Content
2. Process
3. Product
according to:
  a. readiness level
  b. interest
  c. learning style
    using:
    flexible grouping, tiering, scaffolds, and/or supports.

Both theories stress the importance of:
4. Recognizing the diverse needs of learners/patrons.
5. Planning for accommodations for that diversity.
6. Capitalizing on the increased engagement with the content that those accommodations bring when made available to all learners/patrons.

Universal Design for Learning

Creation of flexible and multiple methods of:
1. Presentation
2. Options for engagement
3. Apprenticeship and expression
by:
  a. clarifying goals
  b. providing choices
    using:
    digitized content,
    technology tools,
    multi-media tools,
    scaffolds, and/or supports.

Part Three: The Need for a Handbook

The review of the literature confirmed that both museums and schools were concerned with greater accessibility to their products. In museums this priority was seen primarily in the physical environment but was also visible to a lesser degree in exhibit design. In schools the push toward reaching every learner created a momentum towards differentiated materials and instruction.

The parallel nature of the move toward greater accessibility in both museums and education is demonstrated below. As universal design has increased access to the physical aspects of the museum, universal design for learning and differentiated instruction have increased the accessibility of curriculum in the classroom. The information in Figure 6 illustrates the parallel use of these two sets of sets of principles in each respective environment.

Figure 6. The use of accessibility theories in museums and schools.

Universal Design

used in

Museums

to strategically design

Physical Plants
and Exhibits

Resulting in

Differentiated Instruction
And
Universal Design For Learning

used in

Schools

to strategically design

Instruction
and Curriculum

Resulting in

Accessible and
Engaging Content
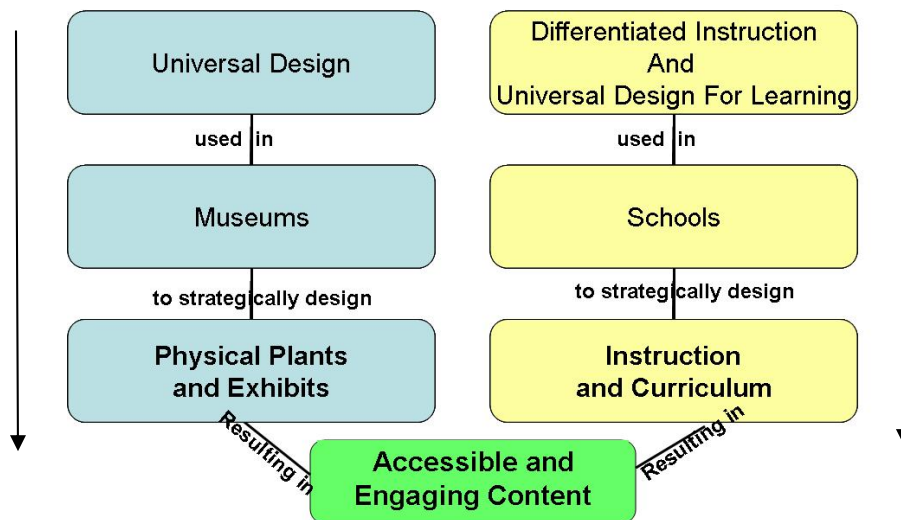
The literature review confirmed that museums and schools were both institutions concerned with teaching and learning (AAM, n.d.). Many museums held educational activities as essential functions and employed museum educators to facilitate meaningful

educational experiences for patrons (AAM, 1998, p. 111). While there were references to accessible educational programs in museums, these references were few. The American Association of Museums, the Institute of Museum Services, and the National Endowment for the Arts collaborated to publish The Accessible Museum in 1992. In the preface, author Dianne Pilgrim wrote that the belief that museums were for everyone has been central to most museums mission statements and that the concern for accessibility were, "not just about physical access, but it is about creating exhibitions and educational programs that are inclusive for people with visual, and hearing impairments as well as learning disabilities" (p. 8). The book showcased museums that have made their collections accessible in a variety of ways. The museums ranged from zoos with after-school programs for students with disabilities to museums of art that included hands-on exhibits to a children's museum with an interactive exhibit that allowed children to experience what it was like to be visually, physically, or hearing impaired. There were brief references to specialized print materials for patrons with visual differences but there was no mention of curriculum materials that have been designed to enhance accessibility in any of the highlighted museums (Pilgrim, 1992).

The American Association of Museums published a resource manual for museums which provided guidance in the Americans with Disabilities Act. The book titled *Everyone Is Welcome*, used the principles of universal design in the physical environment and in exhibit design. There was a chapter dealing with the accessibility of content communication which included specific techniques regarding text, audio, lighting, and placement. This section also referenced large print museum maps, sign language interpreter-led tours, and captioned orientation videos (1998, p. 112). The manual did not deal with curriculum.

The Smithsonian Institute had an Accessibility Program in the Office of the Provost. The program posted *Guidelines for Accessible Exhibit Design* on the Internet (Majewski, n.d.). This resource was very specific in regards to text labels, artifact placement, and lighting and included a section on printed materials which outlined text guidelines, language use, and alternative presentation such as braille and audio. However, it did not include specifics on the content of printed materials or guidelines for making content accessible.

The curriculum products of most partnerships between schools and museums have consisted primarily of a teacher's guide to the museum field trip (Boston Museum of Science, 2001a; Negro Leagues Baseball Museum, n.d.) or lesson plans (Smithsonian Center for Education and Museum Studies, 2006). These products, while potentially useful for teachers, did not include accommodations or modifications for students with diverse learning needs (Art Institute of Chicago, 2004; J. Paul Getty Museum, n.d.; Smithsonian Center for Education and Museum Studies, 2006). As museums and schools have been increasingly challenged to become more accessible these curricular materials should also apply to a broader audience.

The review of the literature revealed a need for a handbook to guide school and museum educators in the processes of universal design for learning and differentiated instruction. These techniques could be applied to the lesson plans and curriculum materials that museums schools create. No such resource existed.

Summary

In summary, museums have been mandated to increase the accessibility of their facilities through a series of federal laws and regulations. This legislation has spurred the development of new principals in architectural design called universal design. These design elements have increased the accessibility of physical plants and museum exhibits

for patrons with disabilities but have also enhanced their function for all patrons. Likewise, leaders in the field of assistive technology have pioneered another set of techniques known as universal design for learning. This important move involved the use of technology to deliver content to diverse learners. This too,has had the potential to expand the delivery of learning materials to all students, not just those with disabilities.

The use of differentiated instruction has been another way educators improved their ability to reach learners with different readiness levels, interests, and learning styles. This theory has supported the concept that all students vary in these characteristics from subject to subject and day to day. There have been many methods of differentiating curriculum and they have held potential for educators and museum professionals who wished to design curriculum that was accessible.

There were few resources to guide professionals in this endeavor. While there were a few helpful guides on physical accessibility, and while these guides addressed the need for accessible educational programs and even print materials, they did not include specific suggestions or techniques to accomplish the task. Therefore, the review established a need for a handbook that school and museum educators could use to design curriculum that was as accessible as the physical museum environment and the exhibits.

CHAPTER III: Research Methodology

Introduction

The research design followed the educational research and development (R&D) model described by Borg and Gall (1989). The R&D process produced a validated product through a series of tests and refinements. The study began with the review of the literature that was relevant to the proposed product, and the product was developed based on that research. A series of field tests of the product provided feedback, and this feedback was used to revise the product. Attention to the requirements of each of the steps yielded a usable product. The research and development model was a feasible process for the development of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators.*

This study was limited to steps one through seven of the R&D process, and included: (1) research analysis and proof of concept, (2) product planning and design, (3) product development, (4) preliminary field testing, (5) product revision, (6) main field testing, and (7) operational product revision. Steps eight through ten were not included in this study. Those steps included (8) operational field testing, (9) final product revision, and (10) dissemination and implementation. Time and budget constraints were prohibitive factors inherent to graduate study, and made these steps infeasible; however the study produced a complete and validated product. As Figure 7 illustrates, the research and development model could be either a linear or circular process. The researcher planned for the steps to follow one another in a sequential manner (denoted with the red line on Figure 7), however the possibility existed that the results of either the preliminary field test or the main field test might have required a return to earlier steps

(indicated by the dotted lines in figure 7). In this situation, subsequent steps would have been followed in order, until the final product was validated.

Figure 7. Model for the seven steps of the R&D process.
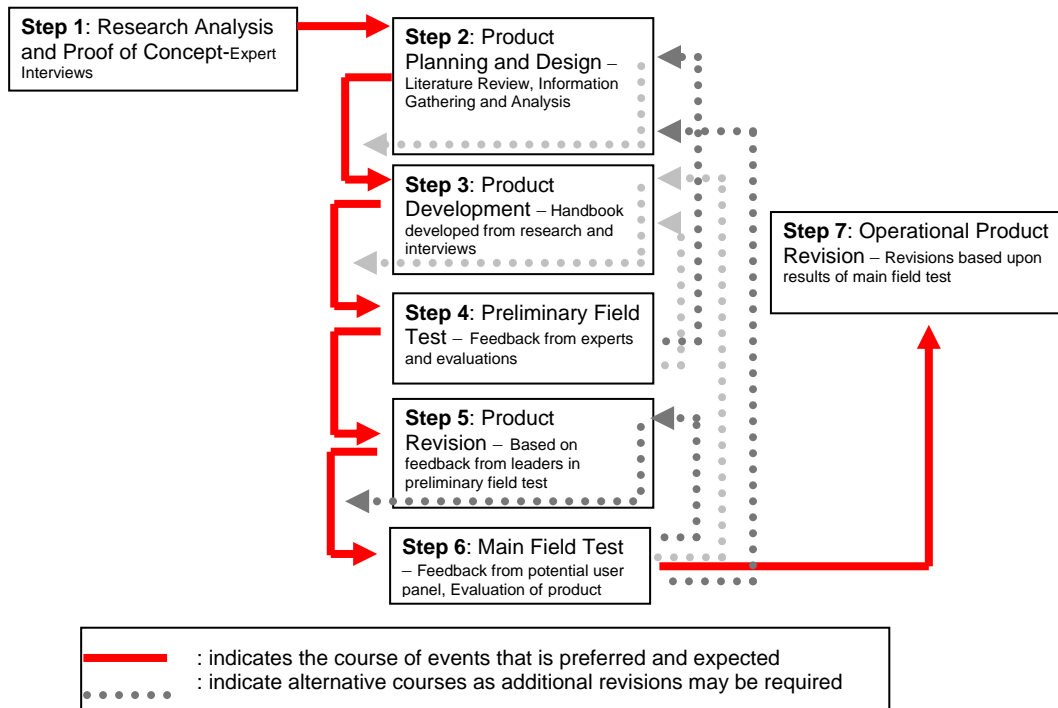
Step 1: Research Analysis and Proof of Concept-Expert Interviews

Step 2: Product Planning and Design – Literature Review, Information Gathering and Analysis

Step 3: Product Development – Handbook developed from research and interviews

Step 4: Preliminary Field Test – Feedback from experts and evaluations

Step 5: Product Revision – Based on feedback from leaders in preliminary field test

Step 6: Main Field Test – Feedback from potential user panel, Evaluation of product

Step 7: Operational Product Revision – Revisions based upon results of main field test

: indicates the course of events that is preferred and expected
: indicate alternative courses as additional revisions may be required

In order to determine what would be included in the handbook several research questions were identified:

1. How could the themes of universal design and differentiated instruction be applied to the development of accessible museum curriculum materials?

2. Can examples be created using the techniques of universal design and differentiated instruction to demonstrate increased accessibility in the cognitive domain?

Specific research objectives guided the researcher in the development of the handbook *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. The research objectives were to:

43

1. Examine the literature to determine currently existing practices in developing accessible curriculum materials in museums.

2. Determine how the principles of universal design could be applied to the design of curriculum materials.

3. Determine how the principles of differentiated instruction could be applied to the design of museum curriculum materials.

4. Develop examples and tools that museum professionals and teachers could use to apply the principles of universal design and differentiated instruction to the materials they design.

The timeline for completion of the research is illustrated in Table 1.

Table 1. Major events and timeline.

Event/Step	Timeline
Proposal approved by committee	April 24, 2006
Proof of concept	May, 2006 – June 2006
Review of the literature	January, 2006 – August, 2006
Development of the handbook	September, 2006 – December, 2006
Preliminary field test	January, 2007
Revision of the product	January, 2007 – February, 2007
Main field test	February, 2007
Revision of the product	March, 2007
Research presented to committee	April 17, 2007

Research Analysis and Proof of Concept

The proof of concept included: research, interview analysis, and a review of the literature in: (a) universal design, (b) differentiated instruction, (c) museum accessibility, and (d) partnerships between museums and education. Interviews were conducted to determine the need for the handbook, and potential content to be included in the handbook. Three national experts were identified in the fields of museum education, universal design for learning, exhibit design, curriculum design, differentiated instruction, and diverse learners. Experts were selected and meet at least two of the following three criteria:

1. Have had five to ten years of experience working in a museum or in an educational setting using universal design, differentiated instruction and/or curriculum design.

2. Have been a staff member of a nationally accredited museum by the American Museum Association (AMA) or ILMS or an educational professional association such as the Council on Exceptional Children (CEC) or the Association for Supervision and Curriculum Development (ASCD).

3. Have published a book, or peer reviewed articles, or conducted national workshops on museum education, universal design for learning, accessibility, curriculum design, differentiated instruction, or diverse learners.

Proof of concept experts included Dr. Dave Edyburn, Ms. Ann Fortescue and Ms. Janice Majewske. Table 2 contains information regarding the qualifications of the proof of concept experts.

Table 2. Proof of concept experts.

Name	Qualifications
David Edyburn	1. Associate Professor of Exceptional Education at the University of Wisconsin. 2. Member of the Board of Directors of the International Society of Technology in Education (ISTE), 2003 to 2004. 3. President of the Special Education Technology Special Interest Group (SETSIG), 2001 to 2002. 4. President of the Technology and Media (TAM) Division of the Council for Exceptional Children, 1995 to1997. 5. Nationally renowned speaker and trainer on the topic of universal design for learning, and author of many peer-reviewed articles and book chapters on the subject.
Ann Fortescue	1. Chairperson of the Council of Standing Professional Committees for the American Association of Museums (AAM). 2. Chairperson of the Committee on Education for the American Association of Museums (AAM). 3. Director of Education and Visitor Services for the Senator John Heinz Pittsburgh Regional history Center, in association with the Smithsonian Institution.
Janice Majewski	1. Coordinator of the Smithsonian Accessibility Program for the Smithsonian Institute. 2. Author of the *Smithsonian Guidelines for Accessible Exhibition Design*.

The proof of concept experts were given an opportunity to suggest candidates for participation in the preliminary field test. The nomination form appears as Appendix A. Nominated candidates were considered to see if they met the qualifications for preliminary field testing participants listed below under step four. During interviews with the researcher, both   Ms. Fortescue and Dr. Edyburn expressed a desire to be included in the main field test.

The proof of concept returned the following information: a) there was an important need for a resource for educators in museums and schools seeking to enhance the accessibility of curriculum materials; b) the current level of research in the field was adequate to support the creation of a quality resource; and (c) the proposed handbook

would increase the likelihood that educators would develop curricular materials that were accessible to diverse learners.

Product Planning and Design

The product planning and design process incorporated information gleaned from the literature review and information received from experts in the proof of concept. Electronic and print materials were included in the review of the literature. During this process the target audience was specified to be educators from both museums and schools. The handbook's objective was defined to be a resource for educators who wished to enhance the accessibility of curriculum materials they develop. The handbook was to include specific instructions and examples of the techniques of differentiated instruction and universal design for learning and discuss the application of these techniques as a means to deliver cognitive content to diverse learners. A specific plan for the evaluation of the handbook was determined, as questionnaires were finalized.

Product Development

A draft of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* was developed. The handbook was based on the literature review and the expert interviews. The handbook also included examples of curriculum designs that provided increased accessibility to lesson plans that were created for the Negro Leagues Baseball Museum as part of the partnership with Kansas State University. The handbook was developed in three chapters. Chapter one included a discussion of the statutory and research foundations for accessibility. Chapter two consisted of a detailed exploration of the application of universal design for learning and differentiated instruction to the design of curriculum materials. Specifically, the chapter was organized according to the chronological progression of the learning process. In order to acquire

new knowledge, learners must first have the content presented to them. Then, learners must engage with that content in some manner, and finally, a result of that engagement is produced. To follow this progression, the handbook was designed to deal with: a) presentation, b) process; and c) product. Chapter Three included a discussion of self assessment and a tool for educators to use to determine the level of accessibility of materials they create.

Internet websites that contained useful software or curriculum design information were included in the handbook. These Internet resources were set apart from the text of the handbook in boxes and marked with an icon for easy reference. Likewise, print resources such as books and manuals were also included in the same manner, using an icon of a book. Additionally in an effort to model one of the techniques of universal design for learning, the researcher periodically included a box that included the main points and important ideas of a particular section of the handbook. These too were designated with an icon; this time a picture of a light bulb was used. Finally, the researcher included several warnings to the reader that were highlighted with the icon of a traffic cone.

The handbook contained several appendices that were used to include larger examples of lesson plans and curriculum materials. A glossary was also included and terms were presented in bold text in the body of the handbook as a way to alert the readers.

Preliminary Field Test

The handbook was examined through a preliminary field test designed to obtain information about the quality and relevancy of the handbook. Leaders in the areas of museum education, universal design for learning, differentiated instruction, or universal design were used in the field test. Nominations made by the proof of concept experts

were considered as well. The five preliminary field test leaders were selected who met at least three of the following five criteria:

1. Have published peer reviewed articles or conducted workshops on universal design, differentiated instruction, accessibility, curriculum design, or diverse learners.

2. Have written books or websites designed to guide museum professionals in the process of universal design or educators in the process of curriculum design for diverse learners.

3. Have had current or previous employment pertaining to curriculum design, accessibility, universal design or differentiated instruction.

4. Have held local, state, or national memberships in professional organizations dealing with museum education, education, curriculum design, diverse learning needs, or related organizations (e.g., The Council for Exceptional Children, The National Association of Special Education Administrators, United School Administrators, Association for Supervision and Curriculum Development, American Association of Museums, Institute of Museum and Library Services).

5. Held an advanced degree from an accredited college or university in the area of special education, curriculum design, museum education, museum studies or education.

Preliminary field test leaders included Dr. Dave Edyburn, Ms. Ann Fortescue, Dr. Sean Smith, Mr. Tom Coleman and Ms. Mary Madden. Table 3 contains information regarding the qualifications of the preliminary field test leaders.

Table 3. Preliminary field test leaders.

Name	Qualifications
David Edyburn	1. Associate Professor of Exceptional Education at the University of Wisconsin. 2. Member of the Board of Directors of the International Society of Technology in Education (ISTE), 2003 to 2004. 3. President of the Special Education Technology Special Interest Group (SETSIG), 2001 to 2002. 4. President of the Technology and Media (TAM) Division of the Council for Exceptional Children, 1995 to1997. 5. Nationally renowned speaker and trainer on the topic of universal design for learning, and author of many peer-reviewed articles and book chapters on the subject.
Ann Fortescue	1. Chairperson of the Council of Standing Professional Committees for the American Association of Museums (AAM). 2. Chairperson of the Committee on Education for the American Association of Museums (AAM). 3. Director of Education and Visitor Services for the Senator John Heinz Pittsburgh Regional history Center, in association with the Smithsonian Institution.
Dr. Sean Smith	1. Assistant Professor, Special Education Department, School of Education; University of Kansas. 2. Executive Board Member Kansas Parent Advocacy, Families Together 3. Member at Large, Technology and Media Division, Council for Exceptional Children 4. Down Syndrome Guild Education Committee 5. Associate Editor-Journal of Special Education Technology 6. Author of many peer reviewed and non peer reviewed articles, book chapters, websites and trainings.
Mr. Tom Coleman	1. Accessibility Specialist (Retired), National Park Service, United States Department of the Interior. 2. Trainer on accessibility and disability rights for the National Park Service. 3. Author of handbooks and guidelines on accessibility and disability rights for the National Park Service.
Mary Madden	1. Education and Outreach Division, Kansas State Historical Society. 2. Professional Developer for educators in the area of curriculum design and educational museum materials. 3. Member Museum Educators Roundtable

Leaders were provided a sample of the handbook, a letter of instruction (see Appendix B) and a questionnaire that served as the preliminary evaluation tool (see Appendix C). The questionnaire consisted of a series of 15 questions, six of which were designed to solicit narrative comments and nine of which were rated on a five point Likert scale.

The questionnaire contained opportunities to provide three types of feedback. First, there were six questions that dealt with the format of the guide, which included readability, organization and appearance, and assessed the usability of the handbook. Second, the evaluation included nine questions that dealt with the content including the relevance and usefulness of the content. These questions evaluated whether the handbook provided the necessary information for the development of accessible curriculum. Finally, questions provided the leaders with the opportunity to make specific comments on the draft and solicited the addition of specific information from the leaders.

The narrative feedback provided substantive information. Areas of consensus among leaders and consistency between Likert scale responses and narrative feedback was examined. Trends were sought. Leader responses that were unclear to the researcher were clarified through follow up methods such as email and telephone calls. These data were used to determine the strengths and weaknesses of the handbook.

Specific comments for each format specific item were listed verbatim in Table 4. Additionally, any action taken based on the preliminary field test leader comment is also described in the *Research Actions* column of the table. The research actions were categorized with three identifiers: *Agreed*, the researcher agreed with the suggested change by the leader and made a corresponding change to the handbook; *Disagreed,* the researcher disagreed with a suggested change by the leader and indicated the reasoning for not making a change to the handbook; and *Acknowledged*, the researcher

acknowledged a comment or suggestion, any changes to the handbook based on this

comment or suggestions were specifically described in the table.

Table 4. Preliminary field test format-specific responses.

Leader Comment	*Research Action*
1. The organization makes information easy to find.	
● I commend the information's organization and that it is able to be used in pieces. This allows for educators to utilize the information most pertinent to their teaching situations without feeling as if the have compromised their intended results.	Acknowledged
2. The text is readable.	
● Yes, there are a few charts and graphs that should be reformatted.	Agreed. All charts and graphs were reviewed and re-created when possible. Font size and style was considered.
3. The grammar and writing are appropriate.	
● There is some repetition (i.e. dealing with pyramids) but that isn't necessarily bad since this is/will be new to most museum educators. Better to say it twice than not all! (You're dealing with a very tiered audience!)	Agreed. The format of the book was designed to be usable in sections; therefore some repetition was required to ensure information that pertained to multiple sections was included.
4. The models, figures and tables are useful.	
● The text uses a good combination of standard education, museum education and diversity education models, thereby offering different aspects to each user and expanding the knowledge of users in each discipline.	Acknowledged.
● The examples are very useful but I struggled with the format. As a result, I would like to suggest that you create figures or sidebars that offer a make-over. This could involve image 1, to illustrate the existing display. Then, a discussion of its value/purpose along with an analysis of its accessibility traits and inherent barriers. Finally, image 2 would illustrate a revised	Disagreed. The theory/practice gap was not noted by museum educators in their feedback. The

display along with a discussion of the accessibility design principles that were implemented. I believe this change is essential in for helping bridge the theory and practice gap relative to this topic. Inserting examples in this format throughout your discussion will help readers understand principles and practices.	suggested formatting changes were not feasible given the current word processing software and the researcher's design skills. However, discussion was added to examples to highlight accessibility traits and barriers as suggested.
5. What suggestions do you have to improve the readability of the handbook?	
● Figure 1, the type size or font is too small. I feel the font should be at least 14 or 15 point.	Agreed. The figure was re-designed to enlarge font size as much as possible.
● In the museum world, we use the terms "pre" and "post-visit" materials for curriculum that enhances the museum visit. I know that some of your curriculum ideas can be incorporated in the exhibit but some can't. For example, I can't see any visitor willingly completing a Venn Diagram. Adding the terms "pre-visit" and "post-visit" may help some museum educators with knowing how to use these ideas.	Agreed. The terms "pre-visit" and "post-visit" were added to some examples.
6. What suggestions do you have to improve the organization and usability of the handbook?	
● Excellent organization!	Acknowledged.
● In chapter 2, I wondered why you didn't start with "Text" (p. 34) since that is the main medium in museums.	Disagreed. Text was presented last precisely for that reason. Alternatives to text-dependant materials were presented first as a means to highlight the accessibility speech and images provide.

● Add an introductory section about what is known about the design of interactive museum exhibits.	Disagreed. This study was designed to examine curriculum materials. Exhibits are beyond the scope of the study.
● The handbook in my opinion was well organized and very thorough.	Acknowledged.

Overall, leaders provided positive feedback through their narrative comments regarding the format of the handbook. The researcher observed a trend in leader suggestions that pertained to the readability and size of font used in some of the tables and examples. Care was taken to rework these figures to improve the clarity.

The handbook's format strengths and weaknesses were analyzed based on the mean score of each question of the quantitative sections of the questionnaire. A mean score was determined from the leaders' responses to the Likert scale questions. Scores for format-specific items were listed in Table 5.

Table 5. Mean score rating from preliminary field test format-specific responses.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Questionnaire Item	Mean Score
1. The organization makes information easy to find.	1.25
2. The text is readable.	1.50
3. The grammar and writing are appropriate.	1.25
4. The models, figures and tables are useful.	1.75

Overall the Preliminary Field Test leaders provided positive feedback on the

format. The mean scores ranged from 1.25 to 1.75.

Leaders provided feedback on the content of the handbook through nine

questionnaire items. Specific comments for each content specific item were listed

verbatim in Table 6. Additionally, any action taken based on the preliminary field test

leader comment is also described in the *Research Actions* column of the table.

Table 6. Preliminary field test content-specific responses.

Leader Comment	*Research Action*
7. The content represents an accurate interpretation of the research and literature on the subjects of accessibility, universal design and differentiated instruction.	
● Having just come from a symposium on accessibility, it was wonderful to read a publication that considered these concepts, which are usually architecture elements applied to education.	Acknowledged.
8. The content is useful to museum professionals and educators who design museum curriculum that is accessible to diverse groups of patrons.	
● As a museum professional, I found this book helpful in refreshing previous concepts as well as the potential application of new tactics.	Acknowledged.
9. The handbook is a comprehensive representation of the content area	
● It definably is in the education area but might need a few more examples of creative museum exhibits that practice this philosophy. For example, some of your examples would make great computer games in the gallery. On page 25, the note-taking tool could be computerized it with multiple choice answers and points assigned to each question. Kids love to compete. We have this same type of activity as a Jeopardy board in our children's' area. Kids of all ages play it. It could also be a manipulative where kids have to connect the questions to the answer block (interlocking, color coded, etc.).	Disagreed. Exhibit design is not within the scope of this study.
10. The glossary, references, models, figures and tables contain information that supplements the concepts being presented.	
● No comments	
11. The examples demonstrate the content in a manner that is helpful.	
● This is picky but I don't know what you want me to do with pages 95 and 96. Also you call the "The Scrapbook of Negro…" on page 91 The Quest Page. I am very literal and I found that confusing.	Agreed. This lesson plan was revised to be more consistent.
12. Are there specific content areas in which the handbook needs revision (universal design, universal design for learning, differentiated instruction, accessibility, museum education, etc.)?	
● These are all important components. New emphasis on museum education is suggested.	Agreed. A section on museum

	education was added.
● This is probably picky too, but I would move the 3 steps of learning farther down in the page. I like the sentence that begins, "This chapter will describe..." as the opening sentence to the first paragraph (with a little re-working). It seems stronger to me than opening with a list.	Agreed. This section was revised.

13. What information should be added to the handbook?	
● I don't know if you have looked at the Journal of Museum Education for background on the state of museum education. The summer 2006 issue (Vol. 31, No. 2) is devoted to the topic, "Expanding Conversations: How Curriculum Theory Can Inform Education Practice". Also in 2006 the Museum Education Roundtable published "Excellence and Equity: Education and The Public Dimension of Museums." It really elevated the status and demand for quality education programs in the museum Field. Sam Wineberg wrote a great book titled, "Historical Thinking and Other Unnatural Acts" which is highly acclaimed in the field. His basic premise is that "we" have to provide the context/content of history in a clear, usable fashion in order for kids to "connect the dots" in the right order and draw logical conclusions for the mass of information. As personal example is a 2nd grader student I had on tour. In front of our log cabin I asked the group, "What is the second thing pioneers needed to do after building a shelter?" I was looking for the answers, "farm" or "start a business". Instead I got "landscape". She was from Johnson County and that was her reality. Long story to say I really like your emphasis on tiered systems and thought Wineberg might help.	Agreed. These resources were located and this content supported the addition of the section on museum education suggested by leaders.
● I believe the initial introductory sections should focus on museum education. As is, I do not see enough acknowledgement about what museum officials already known about designing for diverse audiences. As a result, this oversight may limit the utility of the work by the targeted stakeholders. Adding a section as I propose may facilitate access to the existing knowledge base within the field of museum education for readers that are not familiar with it and will give you more credibility as you outline your UDL ideas and suggestions. In particular, I hope you can provide a museum education framework. That is, what does this professional already know about the design of interactive displays, (e.g. visual display, text, interactive design, teacher materials, etc.)	Agreed. A section on museum education was added to the handbook.

14. What are the strengths of the handbook?	
● This is an "excellent cookbook." How will it be distributed to potential users?	Acknowledged.
● Technology integration, concepts reinforced with supporting and organizational tips, very well organized, techniques can be applied by	Acknowledged.

any educator to enhance their teaching. ● Innovative topic brings together diverse fields to a specialized application.	Acknowledged.
● <u>Many.</u> I am going to have my whole staff read it. I learned a lot about a number of tools (computer) that I didn't know about before.	Acknowledged.
15. What are the weaknesses of the handbook?	
● Specific example of current design and a UDL design should be presented side by side along with resources interested readers can access.	Acknowledged. This format change might have enhanced the readers' experience but it was beyond of the capability of the software application and the researcher's design skills.
● I would try to emphasize reading and math activities with history because of NCLB. Teachers need cross discipline tools and museums should be providing them.	Disagreed. The addition of math and reading examples are outside the scope of this study.

Overall, leaders found the content of the handbook to be comprehensive except that two of the five suggested the addition of material on the topic of museum education. This section was added using the reference materials suggested by the leaders.

The handbook's content strengths and weaknesses were analyzed based on the mean score of each question of the quantitative sections of the questionnaire. A mean score was determined from the leaders' responses to the Likert scale questions. Scores for format-specific items were listed in Table 7.

Table 7. Mean score rating from preliminary field test content-specific responses.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

7. The content represents an accurate interpretation of the research and literature on the subjects of accessibility, universal design and differentiated instruction.	1.25
8. The content is useful to museum professionals and educators who design museum curriculum that is accessible to diverse groups of patrons.	1.75
9. The handbook is a comprehensive representation of the content area	1.50
10. The glossary, references, models, figures and tables contain information that supplements the concepts being presented.	1.25
11. The examples demonstrate the content in a manner that is helpful.	1.75

Overall the Preliminary Field Test leaders provided positive feedback on the content. The mean scores ranged from 1.25 to 1.75.

Leaders were asked to give specific feedback on the handbook, and relate their suggestions to a particular page of the book. Comments from this specific questionnaire item were recorded in Table 8.

Table 8. Preliminary field test specific feedback responses.

Please use this section to make specific comments on particular pages or sections of the handbook.	
● First, let me say that this is wonderful! It gives me more ammunition for being an integral part of all exhibit development – not an afterthought as has been the case for so many years. You have done a tremendous service to the profession. Thank you for letting me read it and I <u>sincerely</u> apologize for being so late.	Acknowledged.
● Innovative ideas presented to utilize the web for education. The structured, open ended and Venn diagram research tools serve as a positive extension of the web as a teaching tool.	Acknowledged.
● The breakdown of the section on speech text, images and the example lesson plan demonstrate how to use each tool and aid in a novice educator's ability to stretch.	Acknowledged.
● The ability to extract a section for use without having to apply it in its entirety makes this handbook more user friendly. Educators are able to select the building locks that will work best for their particular educational situation.	Acknowledged.
● The handbook pays excellent attention to varied audiences with purpose of reaching all learners.	Acknowledged.

● NOTE TAKING is an important skill to master to ensure future academic success. The handbook considered learning styles and presented solutions for educators to better prepare their students for continued success by acknowledging, using and developing their own strengths.	Acknowledged.
● Good "cutting edge" information. Could have used this 20 years ago at the National Park Service.	Acknowledged.

Leaders were also be given a nomination form, to use to suggest potential main field test participants (see Appendix A). Nominees were contacted to explore their willingness to participate in the main field test.

Product Revision

The handbook was revised using the feedback provided by the leaders who participated in the preliminary field test. Revisions consisted of changes to both format and content. Format changes included design, layout and readability while content changes consisted of modifications to the substance of the handbook. Revisions made to the handbook as a result of the criticism of these leaders added validity to the handbook and the opinions expressed by the leaders were seriously regarded and carried sufficient weight so as to be incorporated into the revision. In the event that the researcher received feedback that she may have be inclined to reject, the research objectives were used to determine whether or not an opinion would the catalyst for a particular revision. This process included a comparison of that opinion to the results of the literature review, and the evidence found as a result of the research objectives. This set of research data served as a yardstick by which the leader feedback was analyzed and then either overridden or incorporated.

Main Field Test

A main field test was completed using the revised version of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. The purpose of the main field test was to obtain additional information on the usability and usefulness of the handbook. The field test was conducted with educators from schools and museums who had an understanding of curriculum development and a desire to increase the accessibility of the curriculum materials they created. Seven potential users of the handbook made up the main field test participants. These potential users met at least two of the following three criteria:

1. Have been a practicing museum or school educator, museum curator, or museum curriculum professional, in the United States.

2. Have had the potential for using the handbook in their museum, school district, school, or classroom.

3. Have had a willingness to partner with a museum or school to increase the accessibility of curriculum materials offered by a museum.

Main field test potential users included Mr. David Bakke, Ms. Sherry Reed, Mrs. Kendra Simmer, Mrs. Paula Swartzman-Waters, Dr. Vicki Smith, Mrs. Linda Rosenblum, and Mr. Dan Carey-Whalen. Table 9 contains information regarding the qualifications of the main field test potential users

Table 9. Main field test potential users.

Name	Qualifications
David Bakke	1. Naturalist and Education Liaison. Muscatine Nature Center, Muscatine County Park Service. 2. Museum educator, curriculum consultant to the Muscatine Public Schools. 3. Nominated by a preliminary field test leader.
Sherry Reed	1. Professional Developer, Greenbush Service Center. 2. Author in the area of curriculum design. 3. Nominated by a preliminary field test leader.

Kendra Simmer	1. Special education practitioner specializing in the use of curriculum modifications for students with mild and moderate disabilities for the Auburn Washburn USD 437, in Topeka, Kansas
	2. Curriculum design partner to district educators regarding modifications and accommodations.
Paula Swartzman-Waters	1. Professional developer in the area of Assistive technology and universal design for learning for the Topeka Public Schools, USD 501, in Topeka, Kansas.
	2. Practicing special educator.
	3. Nominated by a preliminary field test leader.
Dr. Vicki Smith	1. Special Education Director, Holton Special Education Cooperative, Holton, Kansas.
	4. Professional developer in the area of assistive technology to enhance curriculum accessibility.
Linda Rosenblum	1. Training/Education Specialist. Brown vs. Board of Education National Historic Site, Topeka, Kansas.
	2. Potential partner in the design of curriculum for museums.
Dan Carey-Whalen	1. Education Coordinator/State History Day Coordinator. Kansas Historical Society.
	2. Current partner in museum curriculum design.
	3. Nominated by a preliminary field test leader.

Potential users who participated in the main field test were provided a sample of the handbook, a letter of instruction (see Appendix D), and a questionnaire that served as the main evaluation tool (see Appendix E). The questionnaire consisted of a series of 13 questions, six of which were designed to solicit narrative comments and seven of which were rated on a five point Likert scale. The questionnaire contained opportunities to provide three types of feedback. First, there were four questions that dealt with the format of the guide which included readability, organization and appearance, and assessed the usability of the handbook. Second, the evaluation included nine questions that dealt with the content including the relevance and usefulness of the content. These questions evaluated whether the handbook provided the necessary information for the development of accessible curriculum. Finally, questions provided the users with the

opportunity to make specific comments on the draft, and solicited the addition of specific information from the users.

Once returned, the narrative feedback from the questionnaires provided substantive information. Areas of consensus among users and consistency between Likert scale responses and narrative feedback was examined. Trends were sought. User responses that were unclear to the researcher were clarified through follow up methods such as email and telephone calls. The information gathered through this evaluation determined the usability of the handbook for the targeted audience.

Specific comments for each format specific item were listed verbatim in Table 10. Additionally, any action taken based on the main field test user comment is also described in the *Research Actions* column of the table. The research actions were categorized with three identifiers: *Agreed*, the researcher agreed with the suggested change by the user and had made a corresponding changed to the handbook; *Disagreed,* the researcher disagreed with a suggested change by the user and indicated the reasoning for not making a change to the handbook; and *Acknowledged*, the researcher acknowledged a comment or suggestion, any changes to the handbook based on this comment or suggestions were specifically described in the table.

Table 10. **Main field test format-specific responses.**

User Comment	*Research Action*
1. The organization makes information easy to find.	
● This is excellent, just a bit "busy" at times and could use some more white space.	Agreed. White space was added.
● The layout seems clear. A designer or curriculum writer can easily use the Table of Contents to find sections most pertinent to their needs.	Acknowledged.
● I understood the organization better after reading it and reviewing the Table of Contents again. This is because I understood the terminology at that point.	Acknowledged.
● The graphic on page 4 really works for those of use who are visual learners.	Acknowledged.
2. The text is readable.	

● <u>Very</u> readable.	Acknowledged.
● Much of the background information in chapter one was new to me. Users like myself will appreciate the effort put into this section.	Acknowledged.
● Liked the icons too.	Acknowledged.
3. The models, figures and tables are useful.	
● FANTASTIC. Super examples for immediate and accessible application.	Acknowledged.
● My learning style searches these out. For the most part I found them engaging, relevant and very interesting. Well done! I have a few specific comments in part 3.	Acknowledged.
● Very – they tied it all together.	Acknowledged.
● Icons highly effective to direct reader; web resources and descriptions about the content of various tools very helpful.	Acknowledged.
● The mouse icon doesn't look to me like a mouse. I had to go back to page 4 to find out what the picture was when I came across it later in the text. The highway model on page 3 I felt was a bit overdone. I think the concept could have been more illustrated more concisely. I found the illustrations of the screen shots, for example, page 11 or page 28 were the most helpful for my understanding of the text.	Acknowledged. The legend on page 4 was helpful. Disagreed. Previous experiences with the highway model led the researcher to break down the description to increase its effectiveness. Acknowledged.
4. What suggestions do you have to make the handbook more usable?	
● Maybe just a bit more white space. Tabs could be helpful, but not necessary. ● More space between examples would make them easier to read and follow. Right now they often run into each other.	Agreed. White space and tabs were added to increase the usability.
● From an educator's standpoint, it's very usable already. ● It might be helpful to have a partial Table of Contents at the front of each chapter as a chapter outline "big pic"; "set out" the headings to make them stand out more to the reader; and/or tab the handbook for ease of finding specific content more quickly (i.e., Process-Scaffolds, Process-Cognitive Prostheses, etc.) Or, each part (of the three parts) of the book could be different colored paper. ●Student engagement concept is very critical-perhaps define/bold the concept.	Acknowledged. Agreed. A partial Table of Contents was added to each chapter to increase usability. Color-coded tabs were also added. Agreed. Engagement was added to the glossary.

●Include the NLBM website more prominently in the book.	Agreed. A screen shot of the NLBM eMuseum was added to the section that describes the partnership.

Overall, users provided positive feedback through their narrative comments. Specific suggestions regarding format changes were seriously regarded and incorporated into the handbook.

Likert scores for the format questions were examined for consistency with the narrative feedback. A mean score was determined from the users' responses to the Likert scale questions. Scores for format-specific items ranged from 2.0 to 1.40 and were listed in Table 11.

Table 11. Mean score rating from main field test format-specific responses.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Questionnaire Item	Mean Score
1. The organization makes information easy to find.	1.80
2. The text is readable.	1.50
3. The models, figures and tables are useful.	1.50

Overall the Main Field Test uses provided positive feedback on the format. The mean scores ranged from 1.40 to 2.00. Two of the seven users suggested the additions of color coding and tabs. The researcher agreed that these additions would improve the usability of the handbook. The use of color and tabs was added to allow users to locate specific sections with ease.

Users provided feedback on the content of the handbook through nine questionnaire items. Specific comments for each content specific item were listed verbatim in Table 13. Additionally, any action taken based on the main field test user comment is also described in the *Research Actions* column of the table.

Table 12. Main field test content-specific responses.

User Comment	Research Action
5. The content is useful to museum professionals and educators who design museum curriculum that is accessible to diverse groups of patrons.	
● The handbook provides good practical and basic suggestions, but also offers more in depth and technical options for users with the time and equipment (technology) to implement them.	Acknowledged.
● Excellent!	Acknowledged.
● As an education specialist in a federal historical site, we are mandated to provide accessibility in programming to all visitors. However, the focus of universal design and access from the federal government has been on physical access such as visual and hearing impairment supports. The bulk of the content of the handbook focuses on cognitive supports – which to this date, I have not spent much time or consideration on.	Acknowledged.
● Especially useful to educators.	Acknowledged.
6. The handbook is a comprehensive representation of the content area.	
● The handbook does seem to be very thorough, however I may not be qualified to answer how comprehensive it is.	Acknowledged.
● My training in cognitive development was as an undergraduate 15-20 years ago. I have not been current in new pedagogies or philosophies of teaching limited ability students for quite some time. I found many new concepts and ideas in the handbook that I will probably incorporate into my curriculum to some extent. I would not be an expert on knowing how comprehensive the content is in the current field of study however.	Acknowledged.
● Comprehensive <u>AND</u> usable.	Acknowledged.
7. The glossary, references, models, figures, and tables contain information that supplements the concepts being presented.	
● These were well done and very helpful showing a progression of change to the same text for different learners. A helpful technique.	Acknowledged.
● Excellent!	Acknowledged.
8. The examples demonstrate the content in a manner that is helpful.	

● I would think the variety of examples would address the needs and interests of most museum curriculum designers. Though my nature center is smaller and limited in access to some technologies mentioned, the ideas are sound and helpful.	Acknowledged.
● I found the information on the Auto-Summary feature of Microsoft Word interesting. I was unaware of the feature on an application I use every day. I think I may try it out on future documents and curriculum content essays. I also found the suggestion for using graphic organizers instead of standard textual worksheets helpful. I plan to incorporate that idea into a current WebQuest project I am working on.	Acknowledged.
● Great examples!	Acknowledged.
● Excellent!	Acknowledged.

9. What parts of the content of the handbook would be most useful to museum professionals and educators who wish to design accessible curriculum materials?	
● I found the resource listing like software programs available to be the most helpful. Also, examples of museum education programs used in other agencies are always helpful in generating new ideas for material presentation as well.	Acknowledged.
● Museum professionals – the strategies for increasing access to more museum patrons. The attention to sensory details is VERY helpful.	Acknowledged.
● Educators – This is a wonderful guide to help educators to begin to make their work more accessible to all students.	Acknowledged.
● Chapter One, section 2 and Chapter Two, section 1 were especially helpful for those who may not have a strong education background. The information on universal design and differentiated learning were particularly helpful. This, with the section on presentation, provides a nice lead-in to the discussion of process.	Acknowledged.
● Examples, charts, graphs, terms, and glossary, completed examples.	Acknowledged.
● The most useful parts would be your specific examples of techniques that could be applied easily to any topic (content).	Acknowledged.
● The process and product sections. Museums need to focus on new means of engaging students and allowing for multiple means of expressing what they have learned.	Acknowledged.

10. What parts of the content of the handbook would be least useful?	
● For individuals conversant in the language and theories of the education field Chapter one and parts of two, section one may not be necessary. Suggestions for use of technology would be less useful for persons limited in their access to computers, software, or software upgrades.	Acknowledged. The researcher was aware that educators who had limited access to hardware and software would be at a disadvantage. Effort was taken to fully describe the rationale behind the use of the

	technology tools, so that modifications could be made by hand that would accomplish the same accessibility goal. Acknowledged.
● Museum professionals – probably the technical aspects of differentiated instruction. Educators – the section specific to museum education.	
11. What are the strengths of the handbook?	
● Icons – WONDERFUL.	Acknowledged.
● Bold vocabulary and glossary. So many excellent, excellent descriptions on universal design.	Acknowledged.
● Beautiful graphics.	Acknowledged.
● Smooth transition from the technical format to narrative – back and forth.	Acknowledged.
● The very existence of the handbook will be helpful to museum professionals because so little emphasis has been placed on providing accessible programming to all visitors. The fact that the handbook sheds some light on the issue and presents some possible remedies for accessibility issues is probably its greatest strength.	Acknowledged.
● Strengths of the handbook would include the background information and the variety and depth of examples.	Acknowledged.
● Layout that is easy to use; icons to direct attention; color examples/multiple examples; appendices; synthesis of the UDL and AT concepts using a real world example (museum content).	Acknowledged.
● The variety of techniques presented for each phase (presentation, process, product) to met individual needs.	Acknowledged.
● The examples and the practical nature of the handbook.	Acknowledged.
12. What are the weaknesses of the handbook?	
● The handbook focuses too heavily on cognitive disability and does not address physical access in depth. While cognitive supports are issues to be considered, our visitation includes more persons with physical disabilities which our facilities and programs need to address.	Disagreed. The researcher would argue that there are many patrons with cognitive limitations that may not be observable to a museum educator. The scope of the study was on curriculum and the learning process, not museum visits. The suggestion to include more information on

	physical accessibility is a recommendation for further research.
● Perhaps an interactive CD or digital book option with training podcasts would be good addition when you publish.	Agreed. The suggestion to create a digital version is an implication to the study.
● The title may limit the reader's interest – perhaps taking Museum out of the first line of the book title might broaden audience.	Disagreed. Although the use of the word Museum in the title may narrow the audience, the target audience specifically included museum educators, and the problem statement specifically noted a lack of resources in the area of museum curriculum.
● There are places where the language is heavy. The section from page 9-14 on universal design and differentiated instruction took serious reading (for me). I "got" the concepts, but the information seemed tough to read. Some of that was the quotes from other researchers that were technical in nature.	Agreed. This section was revised to make it more reader friendly.
13. What information should be added to the handbook?	
● Maybe some "If you do nothing else, strive for this…" suggestions. For example, I have limited time and resources so we greatly simplify text on our exhibits. We also add interactive tactile or audio elements to engage visitors. We know most of our audience consists of elementary age students, teachers and their parents. So simple scavenger hunts direct them to read text, do quizzes, try activities to find the answers.	Agreed. This section was added to the handbook in Chapter Three.
● If digital version with templates came with the book-educators could use the version with templates and video guidance; it would help them create units/lessons in an accessible fashion by just opening the hot links for some examples, and selecting from the many examples to insert content.	Acknowledged. The re-formatting of the handbook into a website would overcome the limitations of two dimensional

	print. This suggestion is an implication of the study.
● A self-assessment for museum professionals and educators.	Agreed. This section was added to the handbook in Chapter Three.

Overall, users found the content of the handbook to be comprehensive. One reviewer reported that the format of the handbook examples supported his understanding of how curriculum barriers could be reduced using the techniques. This was important to the researcher because it reflected the effectiveness of the format in bridging the gap between theory and practice that was raised by one of the preliminary field test leaders. The most exciting of the content section comments were those made by a museum educator who appreciated several of the technology resources but more importantly reported that she planned to use them in upcoming projects. This feedback represented significant relevance to potential users and demonstrated that the scope and depth of the handbook were sufficient to generate new skill sets in users. Additionally, user comments that the figures were clear and helpful reflected improved usability from the preliminary field test and indicated that handbook revisions had been valid and successful. One trend that was noted was the repeated feedback that was specific to the two target audience groups. Museum professionals tended to express interest in information more specific to their field and education professionals to theirs. The suggestions to add self-assessment tools and prioritized sets of strategies were seriously regarded and those items were added to the handbook as an entirely new chapter.

Users provided feedback on the content of the handbook through nine questionnaire items. Five of the content specific items were scored with a five-point

scale. The response code of these questions was 1) Strongly Agree, 2) Agree, 3) Neutral, 4) Disagree, and 5) Strongly Disagree. Scores for content specific items were reported on Table 13.

Table 13. Mean score rating from main field test content-specific responses.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

5. The content is useful to museum professionals and educators who design museum curriculum that is accessible to diverse groups of patrons.	1.50
6. The handbook is a comprehensive representation of the content area.	1.80
7. The glossary, references, models, figures and tables contain information that supplements the concepts being presented.	1.63
8. The examples demonstrate the content in a manner that is helpful.	1.33

Overall the Main Field Test users provided positive feedback on the content. The mean scores ranged from 1.33 to 1.80.

Users were asked to give specific feedback on the handbook, and relate their suggestions to a particular page of the book. Comments from this specific questionnaire item were recorded in table 14.

Table 14. Main field test specific feedback responses.

Please use this section to make specific comments on particular pages or sections of the handbook.	
● Highway analogy is <u>WONDERFUL!</u>	Acknowledged.
● Description of UD and DI – easily used as a short reading in professional development settings.	Acknowledged.
● Readability /Auto Summary – AWESOME!	Acknowledged.
● Structured graphic organizers. Great idea, and so easy to do with a computer.	Acknowledged.
● All the strategies are wonderful and make sure this book is <u>USED!</u>	Acknowledged.
● The appendix is excellent for springboard ideas.	Acknowledged.

Operational Product Revision

This revision of the handbook was made upon receipt and analysis of data collected during the main field test. Revisions made to the handbook as a result of the participant criticism were seriously regarded, and were incorporated into the revision. In the event that the handbook received feedback that the researcher may have been inclined to reject, the research objectives were used to determine whether or not an opinion would be the catalyst for a particular revision. This process included a comparison of that opinion to the results of the literature review, and the evidence found as a result of the research objectives. This set of research data served as a yardstick by which feedback of main field test participants was analyzed and then either overridden or incorporated.

In summary, this research and design approach provided a process to develop, test and revise a handbook for developing accessible museum curriculum.

Dissemination of Results

The results of the study, including Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators and the dissertation will be used to disseminate information about the study. A copy of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* will be provided to each of the proof of concept experts, the preliminary field test leaders and the main field test users.

CHAPTER IV: Validated Product

Accessible Museum Curriculum:

A Handbook for Museum Professionals and Educators

By

Ann Elliott

List of Figures

Introduction

This handbook is written to support professionals who wish to increase the scope and reach of curriculum materials they develop. The handbook contains practical, research-based strategies and applications. When applied during the initial design phase of the curriculum development process, these techniques will enhance the **accessibility** of curriculum, and therefore enhance the delivery of content to learners and patrons with varied learning needs. These tools are also effective when used to retrofit already existing curricular materials, however, they may be more difficult and time consuming to implement once materials have already been developed. Therefore, the reader is encouraged to reflect upon the many diverse learners and patrons that may benefit from a wider range of options and make a strategic decision to incorporate supports for those diverse groups as the development process unfolds. This decision will ultimately benefit many potential learners and patrons.

Who should use this book?

This book will benefit museum professionals, including curators, exhibit designers, and educators who are interested in expanding the principals of architectural accessibility to the world of the mind. Museum patrons who are not engaged with the museum's collection do not benefit from their museum experiences. The process of cognition varies greatly among patrons, both those with and those without disabilities. Physical differences such as mobility and sensory diversity have a profound impact on a patron's cognitive experience. Therefore, enhancing the accessibility of the mental process a museum visitor engages in has the potential to deliver a museum's content to a wider audience. The methods in this handbook utilize the principles of universal design; a set of design strategies that are already in use in the physical environment of many museums.

Educational professionals, including teachers, administrators, and curriculum developers will also benefit from this handbook. It goes without saying that the educational system is greatly concerned with the process of cognition. Curriculum design has typically been the task of school educators and the methods and tools presented in this handbook are based on educational research and practice. Teachers will find these techniques useful in the lesson planning process as well.

When museum professionals decide to enhance the cognitive experiences of their patrons, they take on an educational role. Obviously, the school professional's role is also educational. Therefore, for the purposes of clarity, the handbook will refer to both groups in the target audience as "**educators**". This term focuses the reader on the mental process of cognition; that of learning. The handbook deals with methods to enhance the learning process. These strategies will be effective whether employed in a school or museum setting, as well as within a partnership between museums and schools.

Why should readers use this book?

Educators have as their primary goal the transfer of knowledge from one party to another. The learning process is a complex series of cognitive activities and research has revealed much about how the human brain functions. This knowledge has improved teaching methods in general; however, several other factors impact the learning process in a myriad of ways including the characteristics of individual learner preferences along with their interests and abilities. These factors, in turn, also determine the effectiveness of

these teaching materials. Therefore, educators must be concerned with the variety of learners they will encounter and are wise to plan accordingly.

The diversity represented by any group of potential learners can be an important part of the learning equation. Learners' capacities are not inherent; capacities are defined by the interplay between learners' abilities and the tools they use. Curriculum that is designed to reach only a portion of this group will have a diluted effect on the group as a whole. Museums and schools are both institutions concerned with reaching a wide variety of patrons. Museums depend on patrons and donors to maintain their very existence and schools have been given the charge of teaching every learner. Information regarding accessibilty laws can be found in Chapter One of the handbook, but suffice it to say that educators from both museums and schools should be planning learning activities, (whether in the gallery or the classroom), that reach as many diverse learners as possible.

Consider this example.

> Teachers who have access to only a few tools and methods for teaching and assessing learners' progress naturally tend to define goals that are closely tied to methods. Consider this goal, set by Patrick's teacher, Mr. Hernandez, as part of a class research project: "Students will collect information from a variety of books as part of their research." In a traditional classroom, with only traditional fixed media available, Mr. Hernandez might logically conclude that Patrick couldn't work toward the same goal as his classmates because of his slow reading and tendency to be easily discouraged.

> What if, in addition to books, the resources available to Mr. Hernandez's students included digital text with reading support, a variety of image-rich sources, videos, and scaffolds to help Patrick stay focused and organize his information? In this classroom, it would be clearer that the goal's true purpose-learning to collect and synthesize information-does not depend upon the use of printed text. Mr. Hernandez might restate the goal more generally: "Students will collect information from a variety of sources." This rewording separates the goal from the methods for attaining it, broadening the options for the entire class. Patrick, instead of having to lower his sights because of difficulty accessing a particular medium, could rely on scaffolds and supports to achieve the same goal as his peers (Rose and Meyer, 2002, chap.5).

When educators design additional supportive tools for learners to use, diverse groups of learners can reach the same learning goal, but can use different paths to achieve it. In schools, this process is imperative as educators are challenged to "leave no child behind", and in museums the potential diversity represented by prospective patrons is unlimited.

Consider the teaching and learning process as a highway. Typically, educators have designed instruction "right down the middle", a phrase that is familiar to many in the field. The phrase refers to the process of planning and delivering learning activities designed for the "typical" learner and essentially leaving behind those learners whose skill levels or interest fall on either side of that one highway. Now consider the alternative; educators who consider the needs of a wider range of learners can incorporate curricular elements for those groups in the initial design process, much like architects

design accessibility features in new buildings. When this is done, the learning highway contains many lanes or paths that can be used by diverse learners. Additionally, this highway can include multiple ways of entering and exiting the highway, so that diverse learners can access the learning in multiple ways, and demonstrate their learning in multiple ways. This multiple lane highway accommodates both a greater volume of traffic, and a greater diversity of travelers. Figure 1 illustrates this process.

Figure 8. A model of accessible curriculum.

1. Instruction resembles the construction of a one-way highway for learners. (A) The learning journey begins with the selection of the content to be learned. (B) The journey continues down the highway as learners engage with that content. (C) The end of the learning journey is reached when learners demonstrate mastery of the content by producing a product.

2. (B) By adding lanes to the highway, the highway offers learners more options to engage with the content. Additional lanes are not restricted, but available to any traveler.

3. (B) The more lanes there are, the more options travelers have. When travelers have the freedom to move from lane to lane, they can make the journey in a flexible way - one that meets their needs from moment to moment.

4. Adding additional lanes to the highway on which learners can enter the process, and exit the process truly increases accessibility. (A) The entry lanes allow learners to have different sets of content objectives if necessary. (C) The exit lanes allow learners to demonstrate their mastery of the content in multiple ways. This includes different types of end products.

How should readers use this book?

The handbook is organized into three major chapters with each chapter containing several specific sections.   Each section can stand alone or the sections may be used in conjunction with each other. Therefore, readers have the flexibility to use the contents in a manner that best fits their immediate needs. This method of organization also allows the content to be presented in a very simple, pragmatic way. Readers are encouraged to skip around and refer to sections in any order. For this reason, the reader may notice some overlap in content. Many strategies can be applied in more than one section. In order to include as many practical tools as possible, some repetition is present. Definitions of words that appear in **bold** font can be found in the glossary.

Readers will notice icons and illustrations scattered throughout the handbook. This content consists of the following material:

1. The mouse icon indicates helpful resources on the Internet.

2 The book icon indicates helpful resources in print.

3. The light bulb icon indicates the "Big Idea" or main point of a section.

4. The cone icon indicates a warning or potential difficulty.

Given that technology will play a large role in the development of accessible curriculum, a word about current technology applications is necessary. This handbook was written in a particular time in history and uses technologies known to the author through research and training. In some examples, it is helpful to describe a particular technology rather than name a software or hardware title. However, in other situations, listing a specific tool will help the educator understand the application of that tool. Therefore, while care has been taken not to "date" the handbook with technologies present in 2007, there are times when the reader will need to generalize the application to a more recently developed technology.

Many of the examples in the handbook were developed as a part of a school/museum partnership between Kansas State University (KSU) in Manhattan, Kansas and the Negro Leagues Baseball Museum (NLBM) in Kansas City, Missouri. Curriculum materials created by the KSU/NLBM partnership are posted on the Internet. This internet site will be refered to as the NLB eMueum. The home page for the NLB eMuseum is shown in Figure 2, along with the url address to access the materials on the Internet. Lesson plans were developed by educators from both environments and **scaffold** materials were included in the initial planning to enhance the cognitive accessibility of the materials for diverse learners. The reader will recognize social studies content delivered from the platform of the Negro Leagues Baseball history in these examples, and will identify the intended audience as learners fifteen years of age and older. However, these examples will serve educators as models for the development of accessible curricular materials for

multiple age groups. Additionally, the handbook contains examples that are not dependant upon a particular content area or age group.

Figure 9. Negro Leagues Baseball eMuseum home page and url address.

The handbook includes:

Chapter One	**Chapter Three**
Statutory foundations for accessibility	Self-Assessment
Research foundations	Priorities
1. Universal Design for Learning	
2. Differentiated Instruction	
Chapter Two	**Appendices**
Presentation	Examples
Process	Glossary
Product	Bibliography

Figure 10. Model for the design of accessible curriculum.

Research Foundations of Accessibility

Differentiated Instruction

Universal Design for Learning

Presentation

Process

Product

Statutory Foundations for Accessibility

ADA

504

IDEIA

Title III
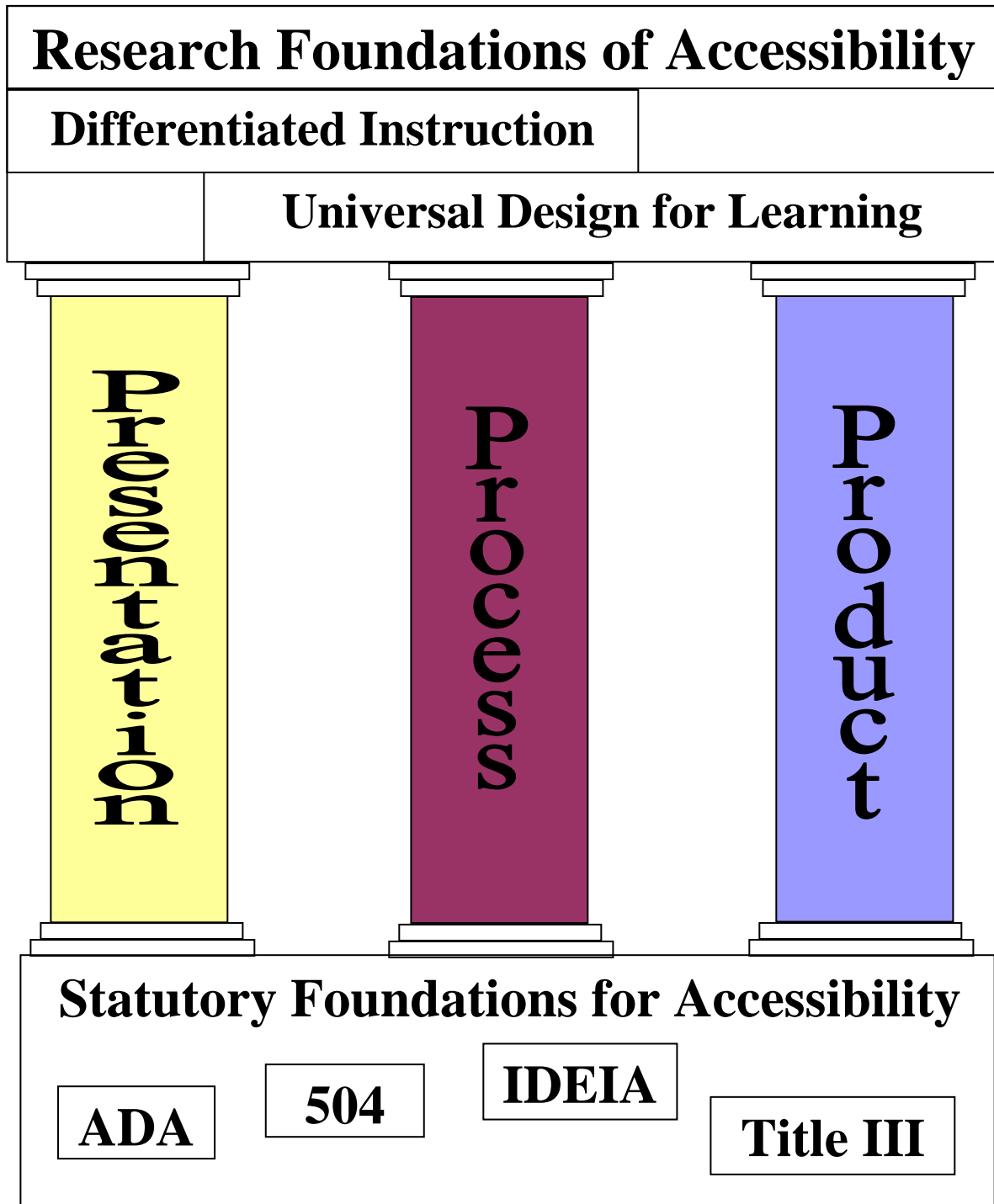
Chapter One

Introduction

As educators strive to deliver a rigorous curriculum to every learner, they use methods and strategies that increase the reach of the content, so that learners with diverse needs are provided meaningful access.   These methods are applications of several sets of principals; universal design and differentiated instruction. This handbook explores each concept as it relates to curriculum and discusses the application of each to the design of accessible curriculum that may be developed for museums. The handbook contains a brief introduction to universal design and differentiated instruction, techniques for using each, and examples from curricular materials that have been developed for museums.

Museum education

Museums have included education as a primary goal for a long time. Educational values were included the charters of some of America's earliest museums. More recently, the Tax Reform Act of 1969 encouraged the adoption of educational goals by providing a tax benefit to non-profit organizations, such as museums (Kess, 1970).

Today, the American Association of Museum's accreditation program standards emphasize that museums assert their public service role and, "place education at the center of that role (2005, ¶ 1). Museums report that the number of students, teachers, and schools they serve has continued to grow. Museums of all types and sizes offer educational programs and work with schools.

Many employ museum educators whose job it is to deliver the museum's collection to patrons via the learning process. Although traditionally, the focus on these educational efforts may have been tied to a visit to the museum by school children, increasingly, the role of the museum educator has expanded to include adult learning, virtual learning and partnerships with educators in elementary, secondary and post-secondary schools. The increased availability of the Internet has allowed museums to reach patrons who may never physical visit the gallery, but will benefit from interacting with the collection on line. Many museum websites incorporate educational materials that include field trip guides, interactive exhibits, resource libraries, and lesson plans.

Section One: Statutory foundations for accessibility

- Legislation that mandates accessibility
- Section 504
- Americans with Disabilities Act
- Title III
- Individuals with Disabilities Education Improvement Act

Legislation that mandates accessibility
The Civil Rights Movement of the 1960's gave rise to the Disability Rights Movement. While minorities and women were protected by civil rights legislation passed by the United States Congress during the 1960's, the rights of people with disabilities were not protected by federal legislation until much later. However, several social factors contributed to the increased awareness of the need for accessibility. First, there was an increase in the number of elderly citizens as a result of increased life span and better health care.   The average lifespan was 47 years in the early 20th century, but increased to an average of 76 years by the later part of the century (Center for Universal Design [CUD], 2006a, ¶ 3). Additionally, after World War II, there was an increase in the number of disabled veterans living in the United States (CUD, 2006a, ¶ 4).

Section 504
These changes in the population presented new challenges to businesses and governmental agencies because many physical facilities were unusable to people with physical limitations. The lack of accessibility to people with disabilities was not addressed until Section 504 of the Rehabilitation Act was enacted in 1973. This law prohibited discrimination on the basis of a disability towards otherwise qualified people by recipients of federal financial assistance.

Americans with Disabilities Act
The federal laws were strengthened with the passage of the Americans with Disabilities Act (ADA) in 1990 (United States Department of Justice, 2005) which prohibited discrimination on the basis of disability in businesses, places of employment, services, programs, public transportation, public accommodation and telecommunications.

Title III
Title III of the ADA went further to prohibit discrimination on the basis of disability by public accommodations and required places of public accommodation and commercial facilities to be designed, constructed, and altered in compliance with the accessibility standards established by the ADA . The ADA has raised public awareness to physical barriers that impede access and has represented a uniform nationwide mandate that ensures accessibility regardless of local attitudes.

Individuals with Disabilities Education Improvement Act
The Individuals with Disabilities Education Improvement Act (IDEIA) was reauthorized in 2004. This law was formerly the Education for All Handicapped Children Act, passed in 1975, and required that all children with disabilities receive a free, appropriate public education in the least restrictive environment. Public schools have obligations to students with disabilities under IDEIA, and as local government agencies, schools are also bound by the stipulations of Section 504 and the ADA.

These important pieces of federal legislation have impacted the disability community in terms of accessibility and will continue to play an important role. In 1997, the United States Census Bureau reported that one in five Americans had some form of disability and that this trend would continue to grow as the population aged (McNeil, 1997). People with disabilities represent a significant segment of society; visiting businesses, governmental agencies and schools.

Section Two: Research foundations for accessibility

- Universal Design
    - · Universal design in the physical environment
    - · Universal design in museums
    - · Universal design in the cognitive environment
- Differentiated Instruction
- Universal design for learning and differentiated instruction

Universal Design
As architects began to implement these new standards, they discovered that specially designed elements for people with disabilities were expensive and aesthetically distracting. The realization emerged that design elements could be incorporated that would meet accessibility standards, be commonly provided and thus be less expensive, unlabeled, attractive, and even marketable, which could benefit all users. The idea of **universal design** was born (CUD, 2006a).

<u>Universal design in the physical environment</u>
Robert Mace, of the Center for Universal Design defines universal design as "the design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialized design" (1997, ¶ 1). The intent of universal design is to "simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost" (CUD, 2006a, ¶ 2).

The Center for Universal design outlines the seven principles of universal design:
1. Equitable use.
2. Flexible use.
3. Simple and intuitive use.
4. Perceptible information.
5. Tolerance for error.
6. Low physical effort.
7. Size and space for approach and use (1997).

Universal design features are usually standard practices that are placed differently, selected carefully, or omitted (CUD, 2006b). This is an important concept to our later

discussion because the "mundane" nature of UD shapes our use of UD in the learning environment.

> What makes UD so effective and efficient is not the addition of innovative features, but rather the innovative use of elements that are readily available.

Two classic examples of UD are curb cuts in sidewalks and electric door openers. Although originally designed to provide access to people with disabilities, these design elements are frequently used by those without disabilities. A person riding a bicycle can avoid a curb by crossing the street at a curb cut or a patron may choose the electric door opener on a building, even though that person may be physically able to manually open the door. These design elements represent universal design at its best by employing simple technologies that enhance accessibility for everyone.

Universal design in museums

In order to reach a wide spectrum of patrons with diverse needs, museum designers use the techniques of universal design to increase the accessibility of their exhibits (Adaptive Environments, 2003; Majewski, n.d.; Tokar, 2003). Leaders in exhibit development at the Boston Museum of Science (2001c) and the Smithsonian contend that UD provides intellectual access to patrons through the use of multi-sensory presentations and that "exhibitions must teach to different learning styles, respond to issues of cultural and gender equity, and offer multiple levels of information" (Majewski, n.d., ¶ 1). These concepts will also translate to our discussion of curriculum design.

> *The Smithsonian Guidelines for Accessible Exhibition Design* (Majewski, n.d.) serves as a resource for exhibition designers, curators, registrars, conservators, collections managers, designers, editors, developers, and educators. The guidelines present specific instructions regarding exhibit content, presentation, and physical access, and emphasize that care be given to ensure that display cases are easily accessed from either a sitting or standing position. Directions are included to ensure that labels and exhibit explanations are provided through more than one sensory channel, and advise the use of audio and visual materials to provide equal access to individuals with sensory impairments.

Science museums and children's museums typically are concerned with bringing content to visitors in multi-sensory ways and the principals of universal design are useful to accomplish this goal (Association of Science Technology Centers, 2004; Boston Museum of Science, 2001b). Through the expanded use of technology, interactive and computer-enhanced presentations deliver material to the visitors that appeal to them visually, auditory and tactilely. By delivering museum content through several sensory channels, the cognitive experiences of visitors are enhanced, regardless of whether or not they have a disability. The effective use of multi-sensory representation as a method to increase learning has been reported in many research articles (Berninger, Abbott, Abbot, Graham, & Richards, 2002; Howard, Ellis, & Rasmussen, 2004; Jatala & Seevers, 2006; Prestia, 2004).

In summary, the practice of universal design includes several valuable concepts that extend beyond physical access, into the realm of thinking and understanding.

1. Universal design relies upon the strategic and innovative use of typical design elements to increase access.
2. Multi-sensory presentation results in multi-layered access.
3. Products that are universally designed are useful for people with and without disabilities. When made available to everyone, everyone can potentially benefit from their use.
4. Universal design is most effective when included in the initial design phase, rather than as a retrofit.

Universal design in the cognitive environment

The theory of universal design has been expanded to the classroom as **universal design for learning (UDL)**. The Center of Applied Special Technology (CAST) in Wakefield Massachusetts and founded in 1984 developed UDL as a means to expand learning opportunities for people with disabilities. CAST promotes multiple means of representation, expression and **engagement** (2006) as critical elements of UDL and uses technology to accomplish this. The theoretical underpinnings of UDL are described by Rose and Meyer (1998, 2002). These researchers use Positron Emission Topography (PET) scan images that allow researchers to generate maps that detail specific brain areas that are activated as an individual performs particular mental tasks. According to Meyer and Rose (1998), the patterns of activity suggest the presence of three cortical systems, each functionally and anatomically distinct. This three-system theory acts as a foundation for CAST's call for the use of multiple methods to increase accessibility. The theory also coincides with preliminary research findings of Russian psychologist Lev Vygotsky (Rose & Meyer, 2002). Figure 4 illustrates the similarity between these sets of brain functions and systems.

Figure 11. Comparison of brain systems that are essential to learning.

Researcher	Brain functions/systems essential to learning		
CAST	Representation	Engagement	Expression
Rose & Meyer	Recognition	Strategic	Affective
Vygotsky	Recognition	Strategic	Engagement

In order to design supportive curriculum that enhances learning, curriculum developers must understand these networks in the brain and achieve a solid match between the network they are attempting to support and the curriculum they design. This match

provides curricular flexibility (in the manner in which learners approach content, work with the content and acquire new learning) to provide appropriate support and challenge for a typically diverse spectrum of learners.

Another leader in the field, Dr. Dave Edyburn has written and presented extensively in the area of universal design for learning, particularly regarding the provision of strategically developed supplemental materials to facilitate thinking about a concept or subject in order to improve the learner's understanding. Dr. Edyburn also uses technology to create supplemental materials and remove barriers, allowing learners to interact with content despite developmental, cognitive or physical limitations (Edyburn, 2003a, 2005).

These techniques are currently used primarily by special education teachers, with students with disabilities, via an individualized plan as mandated by the Individuals with Disabilities Education and Improvement Act (IDEIA, 2004). However, as students with disabilities are educated in the general education classroom, resources that increase accessibility are coming with them. In turn, general educators are finding that many students benefit and are taking notice. With the passage of the **No Child Left Behind Act** in 2002, educators are now legally accountable for teaching a rigorous curriculum to all students (United States Department of Education, 2003). With this change has come a realization that more attention and effort are required to make curriculum accessible. Through the process of seeking curriculum materials with a wider scope, educators are only recently beginning to use universally designed materials in their mandate to teach every learner and leave no child behind.

In summary, Universal Design for Learning provides curricular flexibility (in activities, in the ways that information is presented, in the ways that students respond or demonstrate knowledge, and in the ways in which students are engaged) to provide appropriate support and challenge for a typically diverse spectrum of learners. The goal of UDL is accomplished when the consideration of usability is prioritized during the *initial* design phase; with careful planning that expands the flexibility of the curriculum material. Early consideration is exemplified when scaffold materials that support portions of the cognitive task are created alongside the traditional materials in order to expand access and opportunities for engagement (Edyburn, 2003a).

Differentiated Instruction
Differentiated instruction is a philosophy about teaching and learning that provides a method of expanding curricular scope in order to "anticipate and respond to students' learning differences" (Tomlinson, 1999, p. 9). Differentiated instruction promotes the concept that instruction should use the individual strengths and preferences of learners to maximize learning. Like universal design for learning, the emphasis of differentiated instruction is to plan for diversity and design instructional materials and methods that utilize the individual nature of the learner to create momentum towards the learning objective (Tomlinson, 1999). These materials are varied in the degree of abstractness, complexity, open-endedness, problem clarity, and structure they represent. (Kierman & Tomlinson, 1997, p. 6).

The principles of differentiated instruction include a series of decisions, made by educators regarding the manipulation of:

1. The content to be learned/input.
2. The process by which information is presented and by which the learner engages with that information/sense-making
3. The product or manner in which the learner uses the information/output (Peirce and Adams, 2004, p. 59).

These three components could be modified according to the learner's:
1. Readiness level.
2. Learning style.
3. Interest (Orkwis, 1999; Tomlinson, 1999; Tomlinson & McTighe, 2006).

Decision making is crucial to this process and is based upon learner diversity. Planning for differentiation includes a two-step decision-making process. Step one includes a decision regarding which part of a lesson is to be differentiated. This is done by predicting potential barriers that might impede the learning process within the group and then planning which aspect of the lesson can be adjusted to compensate for those barriers. Step two utilizes a finer level of sorting; resulting in the decision about the manner in which the differentiation is to be implemented. There are nine possible combinations. Figure 5 illustrates the relationship of these decision points.

Figure 12. The decision making process in differentiated instruction.
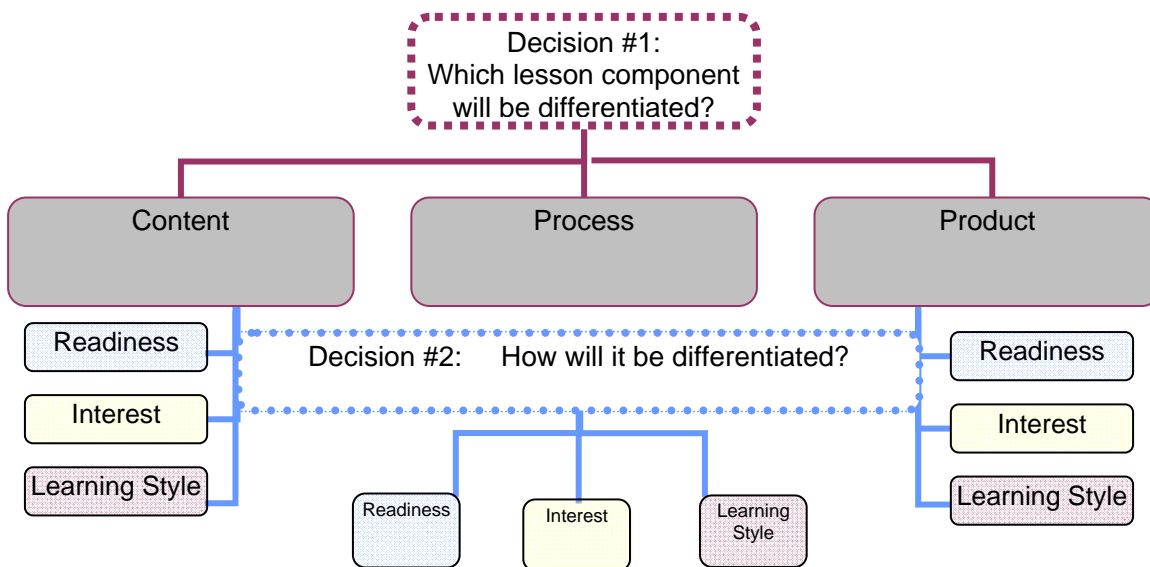
VanSciver (2005) shared this example of differentiation, among elementary students learning how to multiply. One group of students may be able to memorize their multiplication tables and understand the connection between addition and multiplication through conversation with the teacher. A different set of students may need to see how that process works through the use of manipulatives such as groups of checkers that they can physically move around to replicate the process of multiplication.

Tomlinson writes that educators who subscribe to the philosophy of differentiated instruction hold some common beliefs.

> Students who are the same age differ in their readiness to learn, their interests, their styles of learning, their experiences, and their life circumstances, and, the differences in students are significant enough to make a major impact on what students need to learn, the pace at which they need to learn it, and the support they need from teachers and others to learn it well (Tomlinson, 2000, p. 6).

The use of flexible groups is one method for delivering a differentiated learning activity. When grouping is flexible, groups change with the content and the learning activities accommodate a variety of teacher objectives (Peirce & Adams, 2004). This approach capitalizes on the high expectations that educators have for high-performing groups of learners and provides opportunities for educators to scaffold supports for those who struggle. The emphasis in this method is on the word *flexible*. This is the element that distinguishes this use of groups from previously used methods of ability grouping and tracking procedures.

Educators who subscribe to the philosophy of differentiated instruction re-frame their thinking about a learner's academic functioning skills as "**readiness**" (Tomlinson, 1999). Readiness is assessed by determining a learner's current knowledge, understanding, and skill as it relates to what is being studied. It varies from learner to learner and within an individual learner; either according to content area, daily attitude, state of health, etc. This flexible way to look at skill sets facilitates more flexible planning because readiness cannot be captured in a static score on an intelligence test (Tomlinson, 1999; Van Garderen & Whittaker, 2006).

One method of differentiating is to use **tiered lessons**. In this type of lesson planning, the educator decides which part of the learning activity will be differentiated (content, process or product) and by what method it will be tiered (readiness, interest of learning style). Learners may be assigned different learning objectives and activities. However, the activities in which they engage reflect a consistent learning path towards those objectives.

The use of a planning pyramid (Schumm, Vaughn and Harris, 1997) can be a helpful tool for educators when they design tiered lessons. The pyramid represents a model for increasing the depth and breadth of planning in a particular content area. Different groups of learners will be held accountable for different content, process or product. For the purposes of explanation, this example of the pyramid will be described as an activity for which the decision has been made to differentiate the content by readiness level. The middle section of the pyramid is the largest and usually includes the learning objectives for lessons that are typically planned for learners whose readiness level can be predicted. This level may contain multiple learning objectives, but does not represent any adjustment. It can be compared to a lesson blueprint and would typically be representative of most traditional lesson plans. Differentiation occurs when the teacher expands this blueprint in both directions. The bottom level of the pyramid characterizes the most basic level of knowledge that is acceptable mastery for this content. In this example in which the decision has been made to differentiate the content of the lesson by readiness level, this tier may be appropriate for learners with cognitive limitations. These learning objectives are less complex and represent a grasp of the main points of the

activity. In contrast, the top level of the pyramid describes the learning objectives that are above and beyond the predictable norm. It should be noted that the planning pyramid is not limited to three levels. Educators may find it necessary to plan instruction on several levels depending on the diversity among their learners. Figure 6 illustrates a three-level planning pyramid.

Figure 13. A three-tiered planning pyramid

What a few learners will know and be able to do.

What most learners will know and be able to do.

What all learners will know and be able to do.
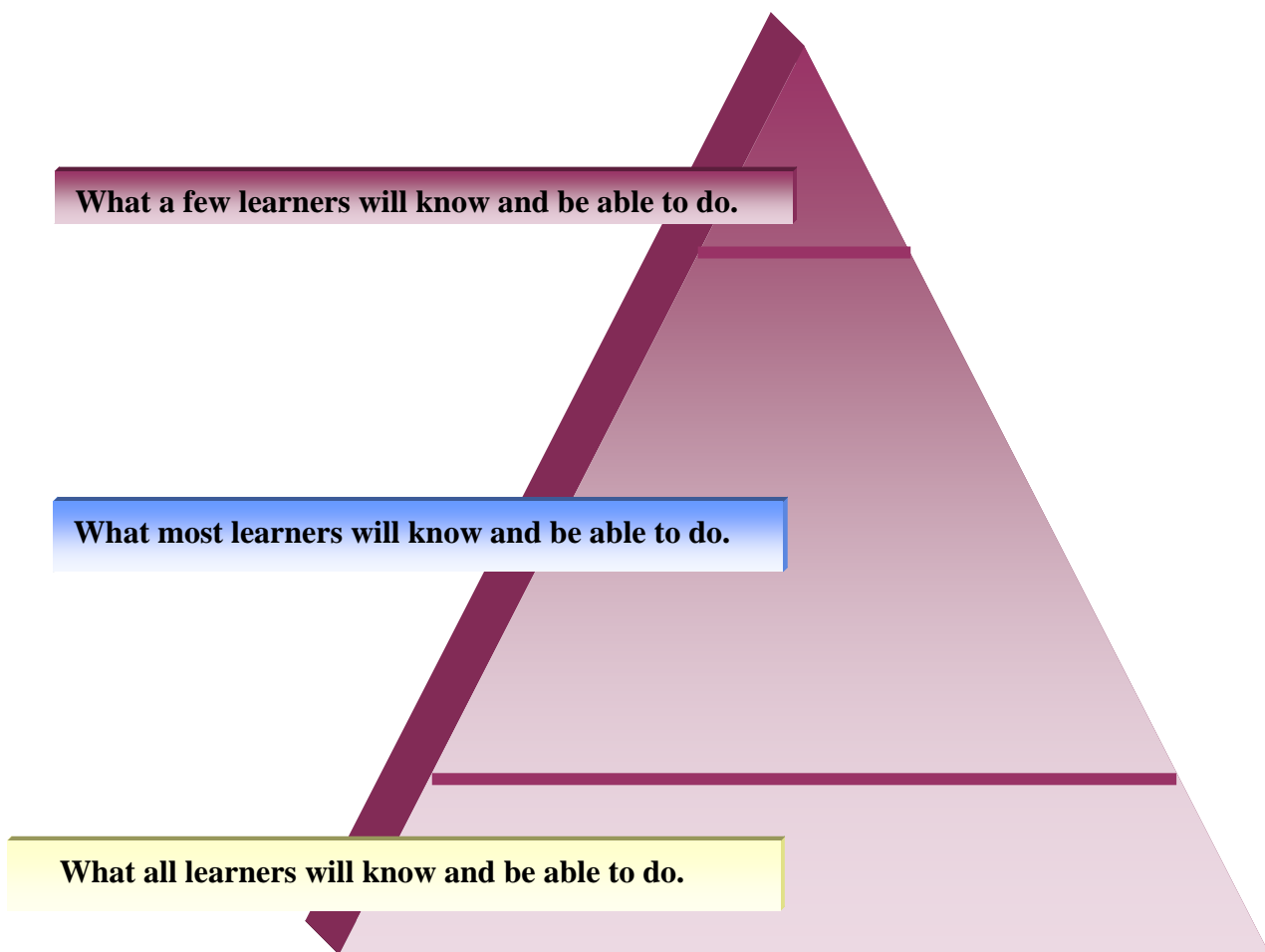
There are many ways to differentiate instruction. As illustrated in Figure 5, there are nine combinations of lesson elements to modify in order to plan learning that match the diverse needs of the learner(s).

Universal design for learning and differentiated instruction

Although differentiated instruction and universal design have not been discussed previously in an integrated manner, they can be viewed as supportive theories with multiple converging concepts (Van Garderen & Whittaker, 2006). Each theory promotes modifications in the manner in which information is taken in by the learner, varied means of interacting with the information, and alternatives for demonstrating that the information has been received by the learner. The theories use similar methodologies to accomplish this flexibility but the most critical characteristic the theories share is the fundamental acknowledgement that all learners are different and bring differences to the experience. Those differences can be used to further the experience itself and are best accommodated during the planning process not after the fact.

The information in Figure 7 illustrates the allied nature of these two theories

Figure 14. Comparison of Differentiated Instruction and Universal Design for Learning.

Differentiated Instruction

Modification of:
1. Content
2. Process
3. Product
according to:
  a. readiness level
  b. interest
  c. learning style
    using:
    flexible grouping, tiering, scaffolds, and/or supports.

Both theories stress the importance of:

7. Recognizing the diverse needs of learners/patrons.

8. Planning for accommodations for that diversity.

9. Capitalizing on the increased engagement with the content that those accommodations bring when made available to all learners/patrons.

Universal Design for Learning

Creation of flexible and multiple methods of:
1. Presentation
2. Options for engagement
3. Apprenticeship and expression
by:
  a. clarifying goals
  b. providing choices
    using:
    digitized content, technology tools, multi-media tools, scaffolds, and/or supports.

In differentiated instruction and in universal design for learning, the unique interests, skills and background knowledge a learner brings to the experience are critical elements in the planning process.

Chapter Two

Introduction
This chapter will describe specific techniques that will increase the accessibility of learning materials. Essentially, the learning process becomes more accessible as the learner is given more options. These options can be delivered at various stages in the process of learning. In order to examine these alternatives, it is helpful to describe the process of learning as consisting of three basic steps:

1. The learner <u>recognizes</u> the content through some means of <u>presentation.</u>
2. The learner <u>engages</u> with the content to connect it to prior knowledge, commits it to memory and makes new connections to it; in other words, <u>processes</u> it.
3. The learner <u>expresses</u> the newly learned content to demonstrate mastery, usually through a <u>product</u>.

To design curriculum that is more accessible, educators can modify and design supports for any of these steps. Designing options in each of these areas allows learners to use the options that maximize their experience.

	1.	To support recognition, increase the accessibility of <u>presentation</u>.
	2.	To support engagement, increase the accessibility of <u>process</u>.
	3.	To support expression, increase the accessibility of <u>product</u>.

This chapter will describe methods for designing supports for each of these stages. The chapter is organized according to these stages and educators may find it helpful to approach stages in a linear fashion.

Presentation → Process → Product

Conversely, because each section can stand alone as a complete set of strategies, educators may explore sections in the order that corresponds with their current needs. Readers may find one section more pertinent to their present experiences and therefore may wish to concentrate on only those sections that hold promise to a situation at hand.

Figure 15. Model of the three curricular components to be addressed in the handbook.
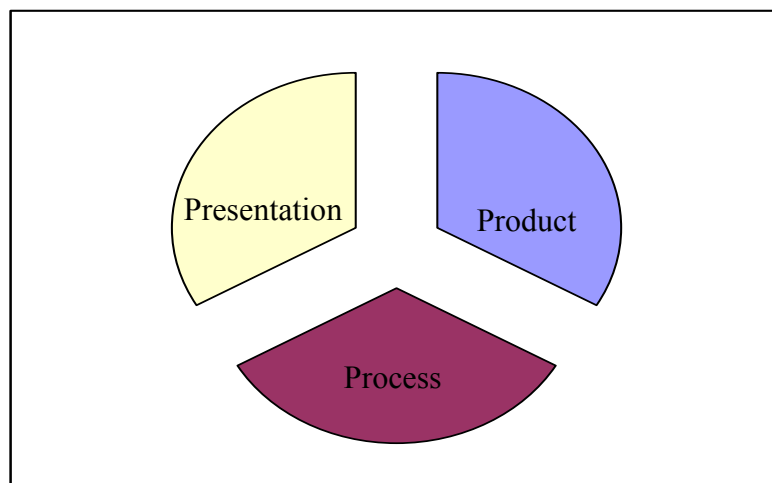
Section One – Presentation

Multiple means of representation give learners various ways of acquiring information and knowledge (Center for Applied Special Technology, [CAST], 2006).

- Speech
  - · Advantages of speech
  - · Disadvantages of speech
  - · Increasing the flexibility of speech
- Images
  - · Advantages of images
  - · Disadvantages of images
  - · Increasing the flexibility of images
- Text
  - · Advantages of text
  - · Disadvantages of text
  - · Increasing the flexibility of text
- Combining speech, images and text

In order to learn any new content, the learner must be able to recognize the material. This recognition usually occurs in a teaching environment through the use of traditional media such as speech, text and images. The decision as to which media an educator chooses is often influenced by availability and the personal preference of that educator. Seldom are the inherent communicative strengths and weakness of these media considered in relation to their instructional purpose. Furthermore, educators seldom consider learner characteristics in this decision process. By doing so, educators can take advantage of learner preferences and strengths as well as support learner weaknesses.

Traditional instructional media and materials are rather inflexible, thus not well suited for differentiation, and educators who wish to provide alternatives are required to search out and/or create supplemental materials. However, computer-assisted media offer a wider range of presentation methods and make multiple means possible. Also, by planning for multiple means of presentation at the onset of the curriculum development process, several media versions of the content can be developed early on (Rose and Meyer, 2002).

Content that is presented in multiple media expands its accessibility to individual learners. Traditional media (speech, text and images), all offer both advantages and disadvantages as means of presentation. Used alone, the learner is subject to the limitations of each. However, used together the learner has choice. This choice translates into increased methods for acquiring the content, and represents a powerful method of differentiating content by readiness level, learning style and/or interest.

 Many learners will benefit from combinations of presentation methods and others will choose the media that best fits their learning style, preference, or that compensates for their limitations.

Speech

Consider the use of speech, live or recorded, as a means to deliver content. While many learners find listening to content a satisfying experience, others may have difficulty gaining meaning from listening. An examination of the advantage and disadvantages of speech will indicate options to enhance the accessibility of content delivered through speech.

Advantages of speech

The intonation, pace, volume and pitch of the human voice allow educators to express meaning beyond what words can convey. Live speech holds an additional advantage; that of nonverbal expression and gesture that enhances the communicative power of the words. Many learners who find text difficult for one reason or another will benefit from hearing content.

Disadvantages of speech

Speech is time and memory dependant. The physical mechanism of hearing sound and the neurological process of making meaning from that sound is limited by the presence of the stimulation. As sound waves are produced, they must be detected and processed in order and within a set timeframe before the next set of sounds is produced. The listener must remember meaning as it is decoded and string multiple meaning strands together in order to understand sentences, then concepts. This means that the delivery and the listener must be matched in speed, volume, pitch, clarity and cognitive level.

Consider the alignment of these factors that are necessary for learning to occur and the loss of access if just one element is mismatched. A simple example is the volume with which a lecture is delivered. Individuals vary greatly in their ability to detect sound at various volumes. This variability may be the result of developmental, neurological or age factors. If the speaker does not produce enough volume, listeners may have difficulty hearing and therefore, will be unable to access the content. Likewise, the level of sophistication in vocabulary choice between the speaker and the listener may not match. If unknown words are used, the cognitive process of making meaning from sound will be hampered, thus impacting the learner's cognition. Typically, this match is achieved through a series of assumptions, any of which can be the wrong assumption. The result is a mismatch between speaker and learner (Rose and Meyer, 2002).

Increasing the flexibility of speech

Educators would be well served to plan ahead and to build in flexible means of using speech. The more flexible the presentation, the more matches possible. The following list represents techniques for building in flexibility, and thereby increasing accessibility:

1.   Use digital speech that can be manipulated for rate, pitch and volume.
2.   Use digital translators that can present material in different languages.
3.   Use recordings that offer the listener the option to replay content.
4.   Pair speech with text, images and touch.
5.   Add vocabulary supports.
6.   Add cognitive supports and scaffolds to provide frameworks on which the listener can recognize prior knowledge and build meaning for new learning.

Putting these techniques to work

Text to speech readers translate digital text to spoken language. Text must be available in digital form in order for it to be recognized. In general, if text on the computer can be highlighted on the screen, it is digital text. Much information on the Internet is presented in **Portable Document Format (PDF)** that must be read with the Adobe Acrobat computer software. This text is not digital, but rather is an image of text, much like a scanned picture of a printed page. In order to use this type of text it must be converted to digital media. There are software tools available to accomplish this conversion.

Digital speech is available from a variety of sources on the Internet. Several software companies offer free downloads. Explore the following sites to experiment with various tools or conduct an Internet keyword search for "speech to text" or "text readers".

PDF Text Reader 1.1 from CTdeveloping at *www.ctdeveloping.com*. This free download allows you to open a PDF file in the reader window. This process converts the text to a digital image that can be edited, manipulated and/or moved to another word processing application or to a text reader. The free download is subject to personal use only. An educator and professional version are available for purchase.

NaturalReader at *www.naturalreaders.com* allows a computer to convert text to audio files such as MP3 or WAV (to be played on a CD player or iPod) from text files, MS Word files, MS Internet Explorer webpages, Adobe PDF files and email. The user can adjust speed, voice, quality, volume, zoom size, font and background color. The reader is available in male and female voices in 5 languages. The website offers a free download, or the opportunity to purchase a package for as little as $39.99.

ReadPlease at *www.readplease.com* opens a window on the desktop into which text is copied and pasted. Users can customize font and background color, use the low vision color option, and adjust voice choice and speed. The control buttons are easy to use so this tool works well when readers need to start and stop frequently (as in listening to test questions and choosing an answer or in listening to the reader read a printed worksheet). The reader also reads email **emotiocons** such as ☺ or ☹. The reader includes seven languages and highlights text as it is read. It requires digital text so PDF files are not readable**.** The free download is a 30 day trial.

Examples of materials with modified speech components

This set of examples supplements a high school social studies lesson plan on the Buffalo Soldiers written for the NLB eMuseum. The original lesson plan contained a lecture to be given by the teacher, followed by several comprehension activities. The lecture was converted to an article by typing it into a word processing program. The original 877 word lecture was written at a twelfth grade reading level (Chandler, 2006a). Readability statistics were provided using Microsoft Word.

Figure 16. Original lecture and the readability statistics

<div style="border:1px solid">

Brief History of Buffalo Soldiers and Baseball

Excerpt for Original Lecture (877 words, 12.0 Grade Reading Level)
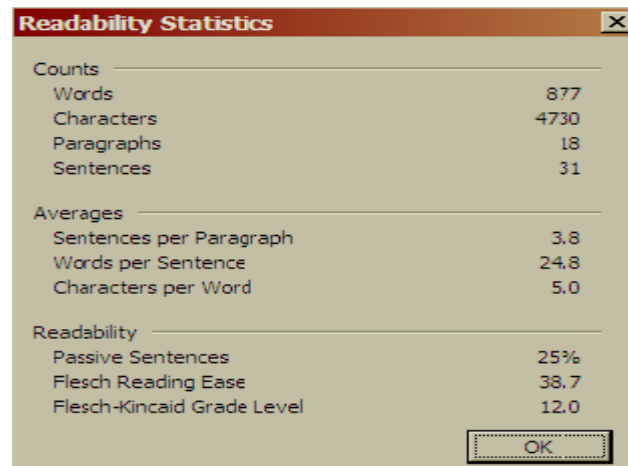
The History of the 9th and 10th Cavalry in the 24th and 25th Infantry Division and how these units came to be: "In 1866, Congress passed the legislation establishing two all-black cavalry and four all-black infantry regiments, each consisting of about 1,000 men. –

The Cavalry units commanded by white officers were moved out west of the Mississippi River, mostly to fight renegade Indians. Because of their skills and reputation, the black soldiers consistently received some of the most dangerous and difficult assignments the Army had to offer.

"According to legend, the Cheyenne and Comanche tribes called the troops Buffalo Soldiers because their fighting spirit reminded them of the Buffalo."

These Buffalo soldiers would be involved in many fights and receive much credit for their valor in action against the Indian tribes of the west and fight in the Philippines and Cuba for Teddy Roosevelt in the Spanish-American War. They would see action and be stationed throughout Colorado, Utah, New Mexico, Texas, Oklahoma, Arizona, Hawaii, Philippines and Cuba. The 25th Infantry Regiment was stationed away from the action for a time in Washington State.

Using the readability statistics feature of Microsoft Word, the digital text can be analyzed for reading difficulty. The feature provides word count, sentence length and grade level. It should be noted that the highest difficulty level represented by the Flesch-Kincaid Grade scale is 12.0 or twelfth grade. Passages that are written at a higher difficulty level will also be displayed at a 12.0 readability level. Figure 8 displays a screen shot of the readability level for the original lecture used in the Buffalo Soldier lesson plan.

</div>

The article was then re-written to a lower reading level. This allowed multi-media presentation by producing digital text that could be read by a computer or a person. Additional punctuation was added to facilitate the smooth presentation by a text reading software program. The learner could access the information prior to the lecture, thereby activating prior knowledge and building a framework on which to anchor new learning. The reading difficulty level of the modified version and the summarized modified version are shown below in Figures 9 and 10.

> **Warning:** Text readers do not breathe, therefore the software will not pause between words. To add some inflection and natural pauses, type in commas and extra periods. This is especially important after headings.

Example #1: Digital text, lower reading level, and vocabulary supports
In this example, the lecture was converted to a digital text version by typing it into a word processing program. The lecture was re-written at the 8th grade reading level. Additionally, added vocabulary supports have been inserted in the text. These are displayed in underlined font. The vocabulary words are displayed in bold and the definitions in italic font. These cues alert the learner that this text is meant to support certain vocabulary words in the article. Additional commas have been inserted between the vocabulary words to act as a signal to the text reader software. Text to speech software will read these cues with a slight pause before and after the words, thus slightly setting them apart. Readability statistics have been provided using Microsoft Word. Notice that the number of words in the text has been reduced to 405 words and that the length of both the paragraphs and the sentences is considerably reduced.

The article could be used in any of the following ways to support diverse learners:
1. Read prior to the lecture to provide background information.
2. Used during the lecture to provide a visual map for the learner while the lecture is being delivered using speech.
3. Used with a colored highlighting marker as a note taking tool during the lecture.
4. Read after the lecture as a review or "firm up" activity to provide additional repetitions.
5. Used as a pre-visit article prior to a field trip.

Figure 17. Lecture re-written at a lower readability level.

> **Brief History of Buffalo Soldiers and Baseball**
> **Full Article, Alternate Reading Level (621 words - 8.0 GE)**
>
> **Black soldiers.**
> In 1866, **Congress**, *the United States government*, passed the law creating **military regiments**, *or units*, made up of only Black soldiers. There were two units that fought on horseback. These units were called the cavalry units. There were another four that

fought on foot. They were called infantry regiments. Each of these fighting units had about 1,000 Black men in them.

The **cavalry units**, *or those who used horses*, were led by White officers. The army sent them west to fight the Indians. They were good fighters. Because of this, they were given the most difficult **assignments,** *or jobs*. The Indians called these troops Buffalo Soldiers because their fighting spirit reminded them of buffalo. These Buffalo Soldiers won many fights against the Indians. They were famous for their bravery.

Soldiers and baseball.
When these soldiers were not fighting there was time to play. Baseball was the choice during the summer months. Black soldiers played against White soldiers. Sometimes Black soldiers played against the White people who lived near their forts.
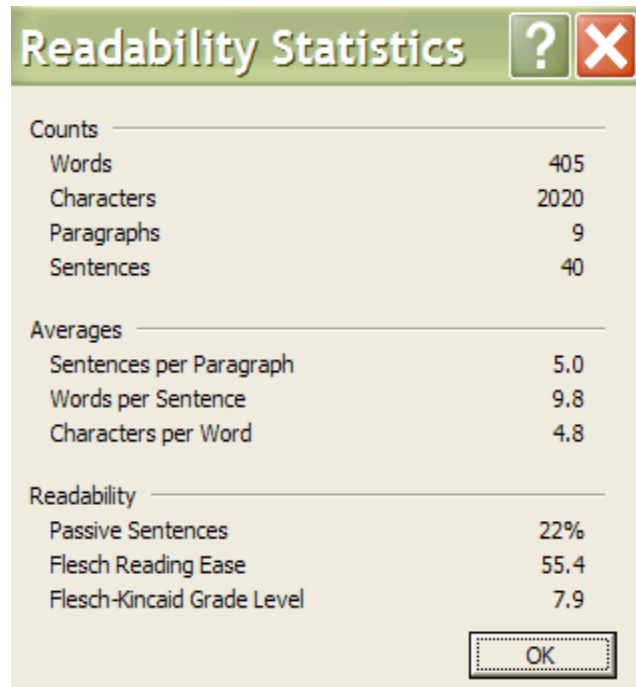
Many people came to watch the games at Fort Douglas, in **Utah**, *a state in the western United States.* This team was called the Colored Monarchs. Players became famous. James Flowers was one of the many Black soldiers that played baseball during their time in the military.

Buffalo Soldiers played baseball at Fort Ethan Allen in **Vermont**, *a state in the northeastern United States*. The games were played on Sunday. That is, until a minister from the town complained. He said the games created a bad environment for the town's young people. The Fort's **commander,** *or leader*, argued that this was not the case but the Army stopped the baseball games between soldiers and people who lived in town. This decision forced the Buffalo Soldier to play games only against other soldiers.

On October 5, 1909, 900 men of the U.S. Army's 25th Infantry Regiment were transferred to Fort Lawton in **Washington State,** *in the north western most part of the United States*. They were famous for their baseball team. They won the US Army championship and were rated the best **amateur**, team in the county, *meaning they were not paid to play*. In the Army, Black soldiers played against White soldiers. Some problems did happen. The Buffalo Soldiers won most of their games. They were also good boxers. Sometimes fights broke out between Black and White players over a bad call by the **umpires,** *or person whose job it is to make sure the game is played by the rules*. Sometimes boxing matches were arranged between units.

Conclusion: It is clear that Buffalo Soldiers made a big impact in the U.S. Army. They also gained favor in the world of baseball. Baseball was changing from a pastime into a major athletic event (Chandler, 2006a).

Example #1: Modified Text

Readability Statistics

Counts	
Words	405
Characters	2020
Paragraphs	9
Sentences	40

Averages	
Sentences per Paragraph	5.0
Words per Sentence	9.8
Characters per Word	4.8

Readability	
Passive Sentences	22%
Flesch Reading Ease	55.4
Flesch-Kincaid Grade Level	7.9

OK

Example #2: Executive summary, lower reading level, and vocabulary supports
Using the Microsoft Word AutoSummary tool, the same lecture article was also reduced to a shorter version. The software application creates an abstract of the article by sifting the content. The user can choose how much sifting the tool applies. One powerful, interactive feature of this software application is that it also includes a slider on the screen that can be manipulated by the learner as the document is displayed. This allows for exceptional accessibility because the learner can choose the depth and breadth of the content at the moment it is being presented. Educators can also create print copies in various versions to increase the options learners may choose from.

This example uses 50% of the material, and by doing so the software application boils down the critical elements for learners who may not have the cognitive ability to benefit from the full detail. Notice that the number of words in the text has been reduced to 205 words and that the length of both the paragraphs and the sentences is considerably reduced. The vocabulary supports follow the same concept as above; however, in this example the word and cue are highlighted in color.

Figure 18. Executive summary and readability statistics of simplified articles.

A Brief History of Buffalo Soldiers and Baseball
Executive Summary (50%)
Alternate Reading Level (209 words – 8.4 GE)
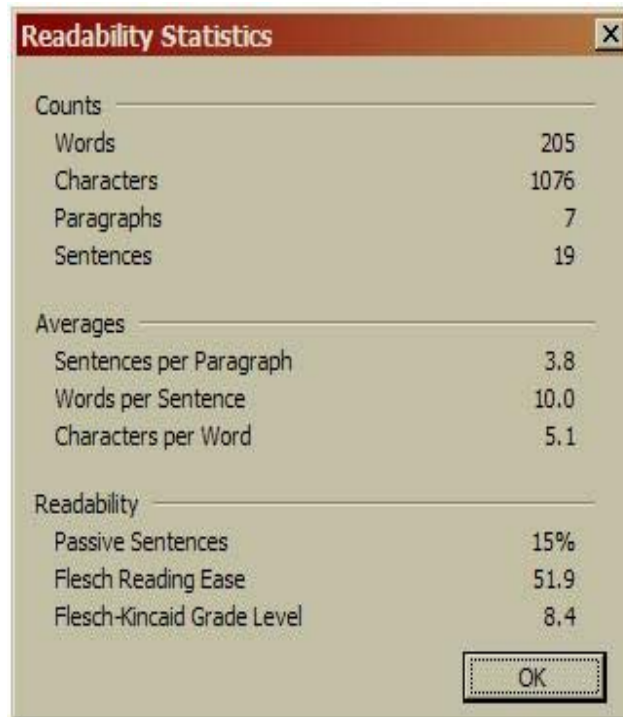
Black soldiers.
In 1866, Congress, the United States government, passed the law creating military regiments, or units, made up of only Black soldiers. There were two cavalry units, because they used horses. The army sent them west to fight the Indians. The Indians called these troops Buffalo Soldiers because their fighting spirit reminded them of buffalo. These Buffalo soldiers won many fights against the Indians.

When these soldiers were not fighting there was time to play. Black soldiers played against White soldiers. Sometimes Black soldiers played against the White people who lived near their forts.

One team was called the Colored Monarchs. Players became famous. Buffalo Soldiers played baseball at Fort Ethan Allen in Vermont, a northeastern state. The games were played on Sunday but a local minister complained. He said the games were a bad influence on the young people. The Fort's commander, or leader, argued that this was not the case. The Army stopped the baseball games between soldiers and people who lived in town anyway. This decision forced the Buffalo Soldier to play games only against other soldiers.

Example #2 Auto Summary
of Modified Text

Readability Statistics	☒
Counts	
Words	205
Characters	1076
Paragraphs	7
Sentences	19
Averages	
Sentences per Paragraph	3.8
Words per Sentence	10.0
Characters per Word	5.1
Readability	
Passive Sentences	15%
Flesch Reading Ease	51.9
Flesch-Kincaid Grade Level	8.4
	OK

> **Microsoft Word** contains a handy tool called AutoSummary. It can be found under the Tools menu. This feature condenses digital text into summaries or highlights key points. The feature also contains a toggle bar that allows the user to choose how much material is included. Once text is highlighted, the tool allows the user to display the entire document with highlights, just a summary of the highlighted text as a separate document, or a summary shown at the top of the original document.

Example #3: Vocabulary supports
In this excerpt from the lecture/article, vocabulary supports have been added using Microsoft Word. Using the markup menu, the educator can insert a written comment or a recorded sound comment. The comments can be made visible or invisible by selecting the view markup option. This technique allows some learners to read unimpeded, while others who need the additional supports can see and/or hear them. By clicking on the speaker icon in the 3rd comment, the learner can hear a recorded comment.

Figure 19. Screen shot of a lecture presented as a Micrsoft Word document.
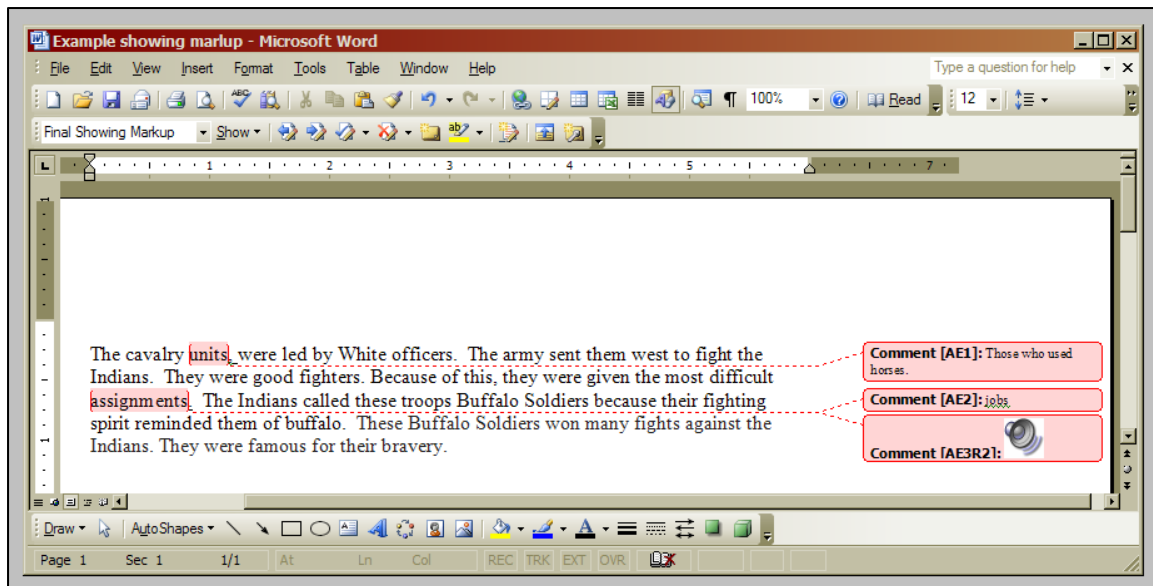
Example #4: Using ReadPlease
When copied and pasted into the ReadPlease window, the text appears as illustrated below. Learners have the ability to change the voice, the speed of the voice, and the font size using tools on the window. Words are highlighted in yellow as they are read. ReadPlease does not read parenthesis, so they could be used to set apart vocabulary supports when this software is being used. Other text to speech readers read the

parenthesis symbols, which may confuse learners. In that event, other methods described above would be more helpful.

Figure 20. Screen shot of a lecture presented in a text reader
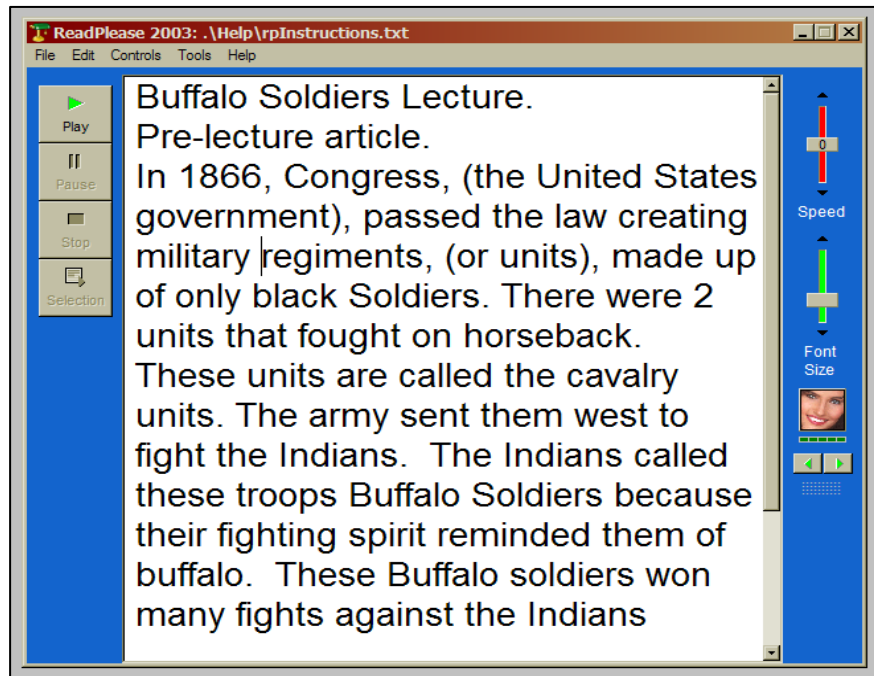
Example #5: Supported note-taking tool
A supported note-taking tool, created by an educator, can accompany the lecture on the Buffalo Soldiers. This handout supplies the learner with a scaffold in that it provides cues and supports to assist in organizing the material. It uses the task of physically recording information to encode what is being presented. Although a simple accommodation, this type of tool can make lecture format lessons more accessible to learners with **cognitive processing delays**, attention difficulties, memory limitations, cognitive disabilities, handwriting limitations, and deficits in organization and **executive functioning**. This type of tool is helpful as a post-visit supplement.

Figure 21. Supported note-taking tool for a lecture on Negro Leagues history.

A Brief History of Buffalo Soldiers and Baseball

Listen to the lecture and fill in the blanks.

<u>History</u>
1.   When did Congress pass laws that started black fighting groups?
         (year)_____.
2.   There were (how many) _____ cavalry units and (how many) _____ infantry
         groups?
3.   All together there were about (how many) _____ black soldiers in these
         groups.
4.   The officers in the cavalry units were (black/white)_____.
5.   They were sent to fight (Indians/the Spanish)_____ in the west.
6.   They (lost/won) _____ most of their fights.
7.   They were called Buffalo Soldiers by the (white officers/Indians) _____
         because they were so brave.

<u>Soldiers and baseball</u>
8.   Black soldiers played baseball against (white soldiers/Indians)_____.
9.   Sometimes they played against (people they fought against/people who lived near
         the forts)_____.
10.   The team's name from Fort Douglas, Utah was (The Cubs/The Colored
         Monarchs) _____.
11.   One of the famous players was James (Smith/Flowers)
         _____.
12.   In (what state?) _____, games were played on Sunday.
13.   The games were stopped because the local minister thought they were (too
         competitive/a bad influence) _____.
14.   After that, soldiers could only play baseball against (other soldiers/Indians)
         _____.
15.   In 1909, the best amateur baseball team was the Army's 25th Infantry Regiment
         from Fort (Carson/Lawton) _____ in Washington State.
16.   On this baseball team, black soldiers played against (white soldiers/townspeople)
         _____, and sometimes fights broke out.
17.   The Buffalo Soldiers (won/lost)_____most of their games.
18.   The Buffalo Soldiers influenced (the U.S. Army/the Spanish) _____
         and the game of _____.

Example #6: Graphic organizer
Graphic Organizers allow learners to build knowledge in a visual way. This supports the
auditory processing that occurs while listening and reduces some of the **cognitive load** to
sort material as it is initially encountered. There are many graphic organizers that vary
from simple to complex. Educators will choose a design that supports the sophistication

level of the framework they wish to provide for learners. This example represents a simplistic organizer. It could be used:
1.   As a note taking tool during the lecture.
2.   If completed by the educator prior to the lesson, as a pre-teaching tool.
3.   As a "firm up" review activity.

Figure 22. Graphic organizer for a lecture on Negro Leagues history.

A Brief History of Buffalo Soldiers and Baseball

HISTORY

Congress created Black regiments in (year)_____.

Calvary Units
Definition:_____
(#) _____ of men
_____ officers
Other notes:

Infantry Units
Definition: _____
(#) _____ of men
Other notes:

Who did they fight?

Did they win or lose?

Why were they called Buffalo Soldiers?
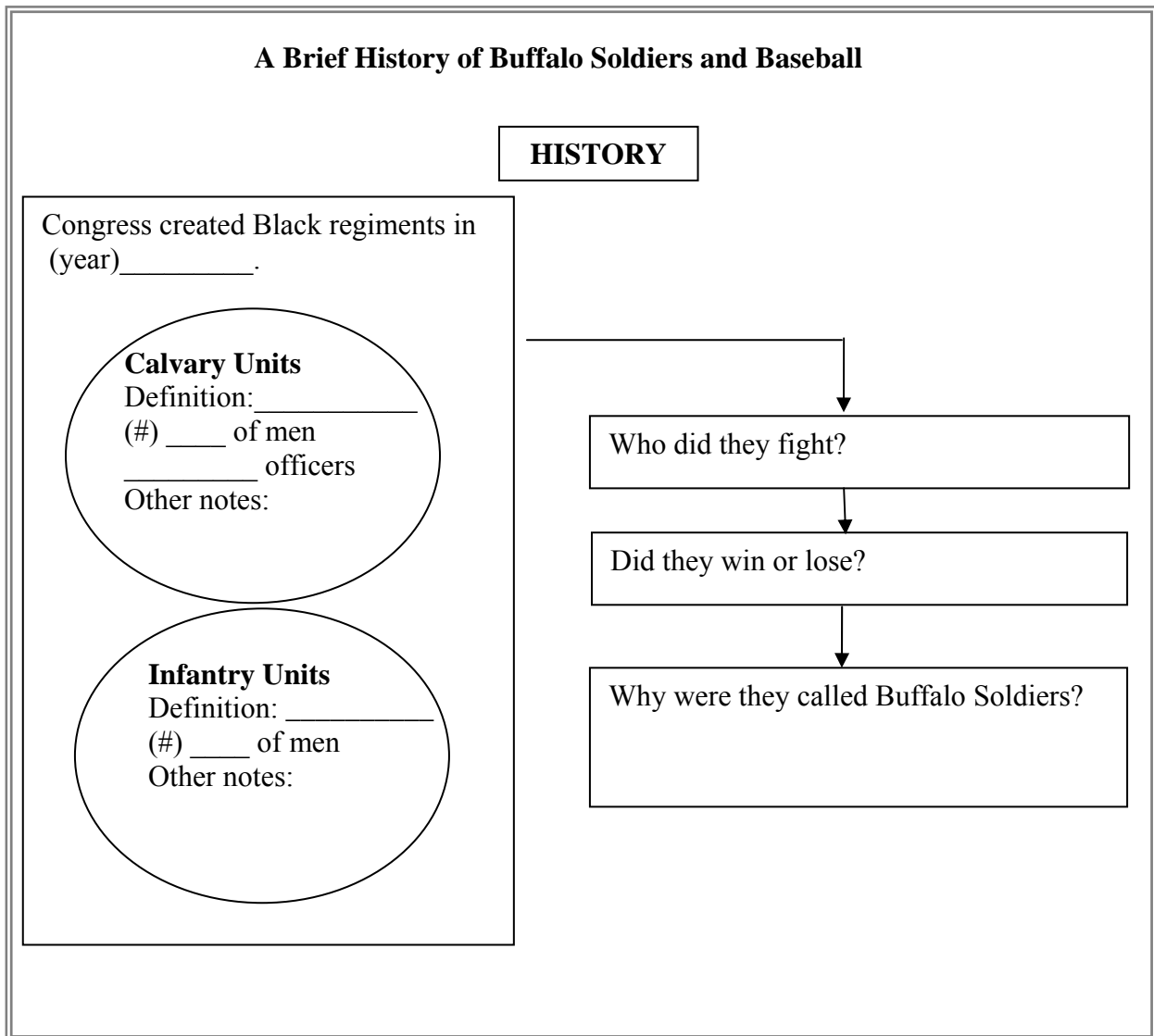
Images
Still images have long been staples in the presentation of content. Pictures, diagrams, charts and graphs all serve to convey meaning in highly engaging ways. However, the role of still images diminishes in the learning environment as learners grow from childhood to young adults. Picture books are prevalent means of transmitting knowledge for young learners, but the size and quantity of images are sacrificed for printed text in

educational curriculum designed for older learners. Although this phenomenon is true in educational materials, it is not the case in curriculum designed for more aesthetic purposes. Coffee table books of photography, recipe books filled with colorful pictures and other artistic images are plentiful in environments other than the classroom. Still images are regularly used in museum galleries and materials.

Media has produced the moving images of video, movies and computer graphics. These mediums offer a wider range of sensory material by combining sound and pictures, and thus are gaining importance in the learning environment.

Advantages of images
One advantage of still images is that they communicate all content at the same time. When the learner looks at a picture, there is no pre-set sequence that dictates order or pace as meaning is delivered. Additionally, no decoding is necessary because images convey information literally; therefore, images are not as dependant upon a cognitive match with the learner. Images also have the ability to convey emotion and feeling more directly than text. They can be used to simplify complex information such as a diagram or graph. Images also increase the likelihood that material will be remembered longer.

Disadvantages of images
Images can be difficult for some learners to interpret because they rely on practice and training. An example of this limitation is that learners must be educated on how to read a bar graph or a scatter gram in order to understand the information it represents. Images may be highly culturally dependant, and thus prone to misinterpretation by members of other cultures. Finally, images may not be able to convey information that is highly abstract or conceptual, but rather are better suited to surface level knowledge (Rose and Meyer, 2002).

Increasing the flexibility of images
The limitations and uses of images should be considered when designing learning materials. Educators who plan and choose images as integral methods of content delivery will enhance the richness of their curriculum. The following list represents techniques for building in flexibility and thereby increasing accessibility:

1. Design multiple images that convey information in different ways to provide learners with options that match their interpretative skill level.
2. Provide multiple images that convey the same content to deepen the meaning through repetition and multiple representations.
3. Use still images alongside and inside text to reinforce portions of the content.
4. Use moving images such as movies and video to demonstrate fluid concepts, convey abstract and emotional content.
5. Combine images with speech to transmit information through multiple sensory channels.

American Memory from the United States Library of Congress at *http://memory.loc.gov/ammem/index.htm.* This site houses photographs and songs in a searchable format. There are collections on topics from Washington to Houdini.

Putting these techniques to work

Example #7: Text alone vs. text with an image.
Consider the difference between a text paragraph describing an object and the additional information that is added when an image is included. Here is a simple example.

Figure 23. Example of text alone.

Text Alone
The Desktop is the screen background on the monitor on which windows, icons, and dialog boxes appear. A window will open on top of this background, somewhere on the desktop. The taskbar is a narrow strip of information at the bottom of the screen that contains icons representing any open applications or documents. The start menu will open from the bottom left corner of the screen and expand upwards to display application icons on a menu.

Figure 24. Example of text with an image.

Text With an Image
The Desktop is the screen background on the monitor and appears as blue on the diagram below. A window will open on top of this background. The window that is open below displays the contents of My Computer. The taskbar is visible at the bottom of the screen and contains icons representing software applications that are open at the moment. The start menu can be found in the bottom left and contains a menu of programs the user may open for use.
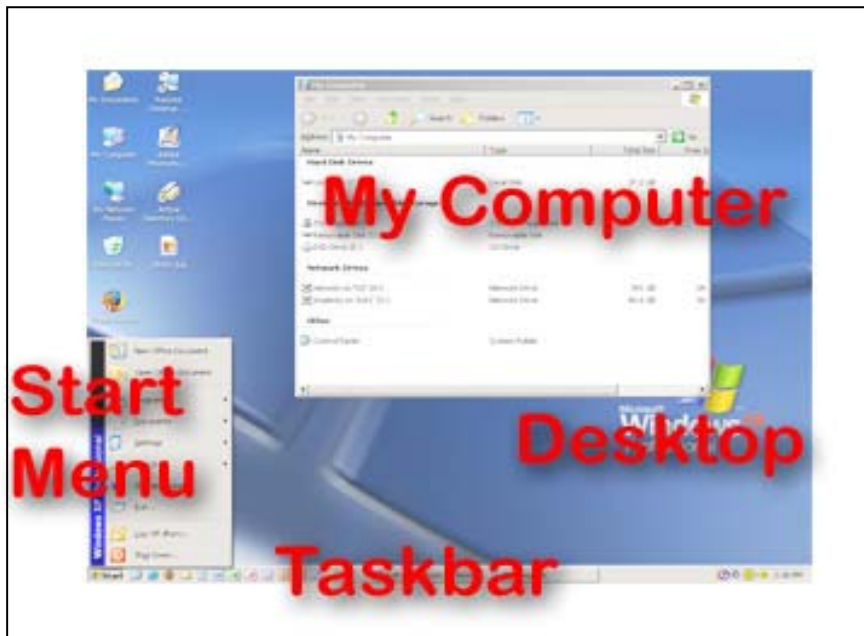
Text With a Movie Clip
Consider the following example of an interview with Negro Leagues player Harold Gould as he discusses the impact of segregation on players on the road. Although the reader can detect some of the emotion and nuances of his speech patterns by reading the text, the lesson becomes much richer with the addition of a short movie clip of the interview. This adds facial expression, intonation, speed and gestures to the presentation.

Figure 25. Screen shot of movie clip of Negro Leagues player Harold Gould

**Harold Gould talks about the impact of segregation
and the hardships of life on the road.**

In an interview at the Negro Leagues Baseball Museum, Harold recounts:

No, no, no hotel. You stop someplace, and Goose was great for that. He would say, "Well, two of you can go over Miss Mouldry's." and "Olla Brown's can put one of ya up." And there are shacks all around town, one house or another. And couldn't even use the bathrooms there. Couldn't wash up. You were dirty as a pig. I mean dirty. I mean dirty. Stinkin'. And that's the way it was. And most of the ball parks, the white ball parks in the South; you could not change no clothes in there. You can't change no, you just can't go in there. Don't go in there. One place down south we needed gas. Gas was very cheap then. We stopped and the boys wanted to relieve themselves, started going to the bathroom.
   "You guys can't go in there."
   "What do you mean don't go in there?"
   "You can't go in there."
    "Well, stop the gas. We ain't buying no more gas from ya."
   "Well, wait a minute, just one of you go at a time."
We kept on pumping the gas, but only one could go at a time. But he didn't want to lose that sale cause it were gonna pump maybe twenty thirty gallons. That's how they were down there.

106

But most places down there, like in Atlanta, where ya think we played with Atlanta Crackers Ballpark you couldn't use the bathroom, couldn't go in the shower, couldn't change in there. Had to go out in people's houses to change our clothes. This was all over. All over the South. I mean all over. And then the stands would have White Ladies, Colored Women, you hear me? White Ladies, colored women. Then they'd have white men, colored men.

Harold Gould talks about the impact of segregation and the hardships of life on the road
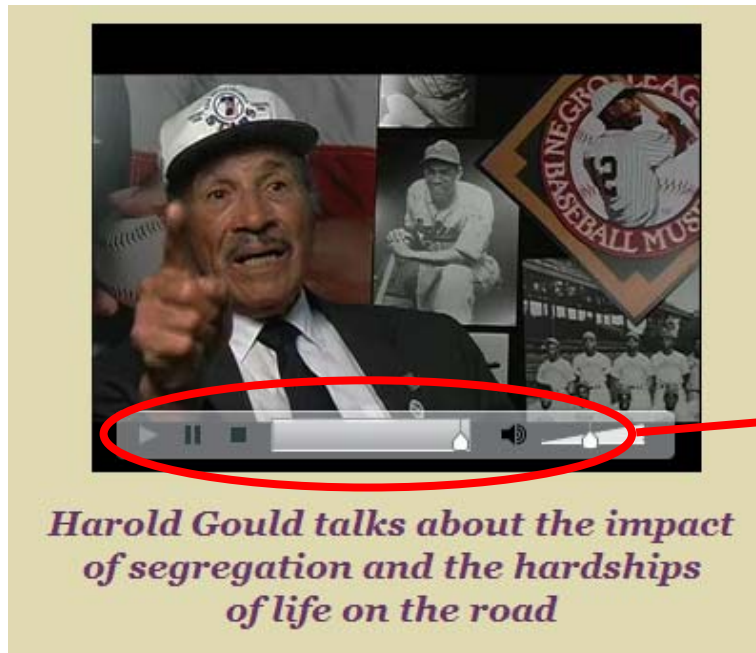
Movie clip using Real Player software.

Example #8: Graphic organizers and concept maps
Graphic organizers or concept maps are a very powerful support tool for diverse learners. A graphic organizer is a visual representations of information used for constructing meaning in reading, writing, and/or speaking. A graphic organizer can be developed quickly along with the initial presentation material. Using the versatility of the computer, graphic organizers be customized for individual learners or groups of learners. Also, multiple versions of the same graphic organizer can be created. A graphic organizer can be used in any of the following ways:
1.	An organizer with information filled in can provide a cognitive framework to organize information for the educator, and the learner. This type of organizer can be used:
    a.	Before the learning experience as an introductory exercise to develop background knowledge.
    b.	During the learning experience as a modified note taking tool.
    c.	After the learning experience as a review or study guide.
2.	An organizer with information partially filled in can provide cognitive prompts and structure for learners to organize new material. This type of organizer can be provided in different versions, with varying amounts of information provided. These can be used:

d. During the learning experience as a note taking tool.
e. After the learning experience as an assessment activity.
f. After the learning experience as a review or study guide.

SmartDraw from *http://smartdraw.com/*. This software contains many templates for mind maps, organizational charts, task charts, flyers, calendars, timelines, floor plans, etc. Templates and auto fill features allow quick design of graphic organizers that can be saved as Microsoft Word, Excel or PowerPoint, or Adobe PDF files. The website offers a free seven day trial that seems fully functional, but places a watermark on the finished product.

Inspiration from *http://www.inspiration.com/freetrial/index.cfm*. This software contains pictures, text and spoken words to be used in the creation of graphic organizers. There are three versions available: Inspiration is designed for learners ages 11 and older, Kidspiration for learners ages five to ten years and InspireData is designed for learners ages nine and up to interpret data by drawing conclusions and solving problems. The company offers a free trial download.

Below are three versions of the same graphic organizer. Using SmartDraw, the foundational graphic organizer was developed, saved into Microsoft Word, and then copied and modified twice as two separate files. In each of these versions, data was removed to leave only prompts. These three versions can be used in any of the ways described above. When paired with written text or speech, they become even more powerful. Learners with diverse reading, vision, and cognitive skills will benefit from seeing information in a visual format from having part of the cognitive framework presented for them and from different levels of prompting provided as they fill in new information. These graphic organizers support a curriculum developed on Negro Leagues History for the NLB eMuseum (Doswell, 2006a).

Figure 26. Completed graphic organizer for the Brief History of the Negro Leagues.

Version 1 – All pertinent information is included

Graphic Organizer for Lecture on Negro Leagues History

Blacks played on these types of teams

- Military
- College
- Company
- Community
- Professional

Important people in Negro League history

- Moses Fleetwood Walker (early Black player)
- Bud Fowler (early Black player)
- Andrew Rube Foster (founder of NL)
- Jackie Robinson (1st Black in the Major Leagues)

NL facts

- Founded by Andrew Rube Foster
- Founded at the Paseo YMCA in KC, MO
- Was the highest level of professional baseball played by Blacks
- Teams formed in the East, South and Midwest US, and in Latin America
- NL declined when Black fans followed Black players to the Majors in 1960's

Negro League History

Other related topics

- Community economics
- Ownership
- Wealth consolidation
- Latin influence
- Media coverage
- Military service
- Women's roles
- Civil Rights

1800's Blacks	1920 Negro	1945 Jackie Robinson

1800   1850   1900   1950

Negro Leagues in

Figure 27.   Partially completed graphic organizer for the same lecture.

Version 2 – Information is partially filled in – prompts are left

Graphic Organizer for Lecture on Negro Leagues History

Blacks played on these types of teams

- 1
- 2.
- 3.
- 4.
- 5.

Important people in Negro League history

- M_____ F_____ W _____ (early Black player)
- B__ F_____ (early Black player)
- A_____ R___ F_____ (founder of NL)
- J_____ R_____ (1st Black in the Major Leagues)

Negro League History

NL facts

- Founded by:
- Founded at:
- (What kind of baseball played by Blacks?
- Teams formed in
- NL declined when

Other related topics

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

1800's	1920	1945

1800   1850   1900   1950

110

Figure 28. Blank graphic organizer for the same lecture.

Version 3 – No information filled in

Graphic Organizer for Lecture on Negro Leagues History

Blacks played on these types of teams

- 1
- 2.
- 3.
- 4.
- 5.

Important people in Negro League history

- 1.
- 2.
- 3.
- 4.

Negro League History

NL facts

- 1.
- 2.
- 3.
- 4.
- 5.

Other related topics

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

1800   1850   1900   1950
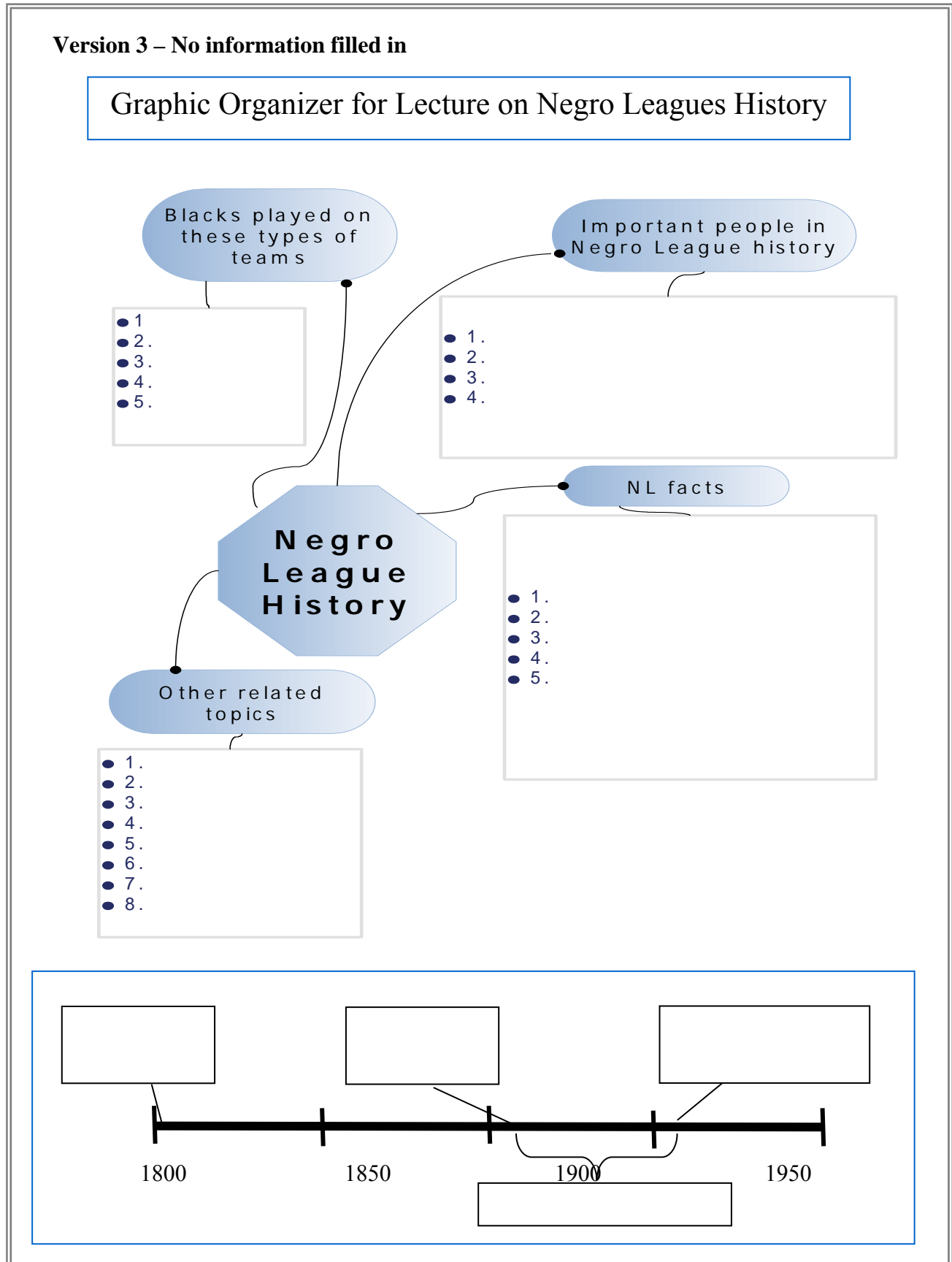
Text
There is no doubt that printed text is a central method for presenting content. Text is often used exclusively in instructional settings with the assumption that material that is printed is available to be learned. Educators may relegate other mediums to supplemental status because text is such a powerful medium.

Advantages of text
Text provides a static representation of content with the ability to be present despite the limitations of time and place. This characteristic of being ever-present allows text to overcome the transient nature of speech. Text reduces the memory demands of speech by providing a lasting record.

Disadvantages of text
One of the significant limitations of text is that it lacks the inherent expressiveness of speech. The reader is left to supply the emotive qualities on their own and this process is highly sensitive to individual differences that may produce content that is very different than was intended by the writer (Rose and Meyer, 2002). Another limitation of printed presentation material is that meaning can only be derived from reading the text. Learners vary greatly in their ability to decode and comprehend text. Thus, content delivery must be matched with the learners' skill level. Although tools such as readability scales can assist educators as they produce textual content, the print becomes a "one size fits all" delivery system and thus does not likely match a widely diverse group of learners. Obviously, the ability to gain knowledge from text is dependent upon the reader having the sensory ability to see the print. Again, this factor excludes the potential group of users who may have limited sight.

Increasing the flexibility of text
Because text is such a powerful tool to impart knowledge, strategic attention to the cognitive match between material and learner is critical. In order to plan for diversity among learners, educators should design curriculum materials that provide flexible text. The following list represents techniques for building in flexibility and thereby increasing accessibility:

1. Use digital text that can be manipulated by the reader in terms of size and contrast.
2. Combine speech and text together to double the sensory channels used by the learner.
3. Combine images with the text to deliver content that is not print-dependant.
4. Use icons to create picture-enhanced reading materials.
5. Write multiple versions of textual content, at varying readability levels.
6. Provide the same content using video and/or still photographs.
7. Use the Microsoft Word Auto Summary tool to highlight key points, and to create executive summaries.

It is evident that several of the methods listed above simply alter the method in which text is presented and others actually change the content of the material. This technique is described by Dr. Dave Edyburn as **cognitive rescaling** (Edyburn, 2004a). Edyburn advocates the use of technology tools to modify the difficulty of the cognitive processes needed to process content. Several of his strategies for cognitive rescaling include the

use of the Auto Summary tool in Microsoft Word and the use of icons to insert pictures into reading materials. These strategies are exemplified below.

Putting these techniques to work
Some of the techniques discussed in this section also appear in the section above that deals with speech. Because the option of using text to speech readers to translate digital text to spoken language is such a powerful support, it is helpful to explore that technique here as well.

> Combining text and speech to provide multisensory inputs is a powerful support for many learners. Digital text facilitates this option.

Text must be available in digital form in order for it to be recognized. In general, if text on the computer can be highlighted on the screen, it is digital text. Much information on the Internet is presented in **Portable Document Format (PDF)** that must be read with the Adobe Acrobat computer software. This text is not digital, but rather is an image of text much like a scanned picture of a printed page. In order to use this type of text it must be converted to digital media. There are also software tools available to accomplish this.

Digital speech is available from a variety of sources on the Internet. Several software companies offer free downloads. Explore the following sites to experiment with various tool or conduct an Internet keyword search for "speech to text" or "text readers".

> **PDF Text Reader 1.1** from CTdeveloping at *www.ctdeveloping.com*. This free download allows one to open a PDF file in the reader window. This process converts the text to a digital image that can be edited, manipulated and/or moved to another word processing application or to a text reader. The free download is subject to personal use only. An educator and professional version are available for purchase.

> **NaturalReader** at *www.naruralreaders.com* allows a computer to convert text to audio files such as MP3 or WAV (to be played on a CD player or iPod) from text files, MS Word files, MS Internet Explorer webpages, Adobe PDF files and email. The user can adjust speed, voice, quality, volume, zoom size, font and background color. The reader is available in male and female voices in five languages. The website offers a free download or the opportunity to purchase a package for as little as $39.99.

> **ReadPlease** at *www.readplease.com* opens a window on the desktop into which text is copied and pasted. Users can customize font and background color, use the low vision color option, and adjust voice choice and speed. The control buttons are easy to use so this tool works well when readers need to start and stop frequently (as in listening to test questions and choosing an answer or in listening to the reader read a printed worksheet). The reader also reads email **emotiocons** such as ☺ or ☹. The reader includes seven languages and highlights text as it is read. It required digital text so PDF files are not readable**.** The free download is a 30-day trial.

Example #9: Modifying font

A simple support such as providing print materials in large and/or bold font can prove very useful to many diverse learners. There are several individual reasons a learner may choose a larger/bolder print. Obviously, learners with different vision capabilities such as poor acuity, eye strain, color blindness or partial vision may benefit, but others may find larger/bolder font helpful when in low light environments or when fatigue is a factor. The mere fact that larger font limits the amount of information per page can be a helpful "chunking" technique, that of breaking information into smaller, more manageable sections. Chunking assists learners who may experience limited attention or vitality, differences in cognitive functioning and in motivation.

The following excerpt is from curriculum written for the NLB eMuseum (Doswell, 2006a). Changing the font size and style allows the educator and the learner to encounter the text differently.

Figure 29. Original text from a lecture on Negro Leagues History.

> **Version 1 - Original text**
> African-Americans began to engage the game of baseball in the mid to late 1800s. They played on military teams, college teams, and company teams. They eventually found their way to professional teams with white players. <u>Moses Fleetwood Walker</u> and <u>Bud Fowler</u> were among the first to participate. However, <u>racism</u> and "<u>Jim Crow</u>" laws would force them from these teams by 1900. Thus, black players formed their own units, "<u>barnstorming</u>" around the country to play anyone who would challenge them.

Figure 30. Modified text from a lecture on Negro Leagues History.

> **Version 2 - Larger font, stretched out**
> African-Americans began to engage the game of baseball in the mid to late 1800s. They played on military teams, college teams, and company teams. They eventually found their way to professional teams with white players. <u>Moses Fleetwood Walker</u> and <u>Bud Fowler</u> were among the first to participate. However, <u>racism</u> and "<u>Jim Crow</u>" laws would force them from these teams by 1900. Thus, black players formed their

own units, "barnstorming" around the country to play anyone who would challenge them.

Some learners experience black text on a white background as problematic. By making the text digital and placing it in a text box, the size and style can be modified and background and font colors can be changed by individual learners to meet their needs.

Figure 31. Example of modified text using different font and background colors

Version 3 – Digital text in a text box

African-Americans began to engage the game of baseball in the mid to late 1800s. They played on military teams, college teams, and company teams. They eventually found their way to professional teams with white players. Moses Fleetwood Walker and Bud Fowler were among the first to participate. However, racism and "Jim Crow" laws would force them from these teams by 1900. Thus, black players formed their own units, "barnstorming" around the country to play anyone who would challenge them.

African-Americans began to engage the game of baseball in the mid to late 1800s. They played on military teams, college teams, and company teams. They eventually found their way to professional teams with white players. Moses Fleetwood Walker and Bud Fowler were among the first to participate. However, racism and "Jim Crow" laws would force them from these teams by 1900. Thus, black players formed their own units, "barnstorming" around the country to play anyone who would challenge them.

Accessibility would be enhanced even more if these techniques were employed in a digital interactive environment such as on a computer screen. Learners could choose the text size, style and colors that best met their needs. This would represent universal design for learning at its best.

Example #10: Digital highlighting
This paragraph was taken from a lesson plan on women and the Negro Leagues for the NLB eMuseum (Chandler, 2006b). It was designed to be an article read before the lesson. Using Microsoft Word Auto Summary tool, the most important 50% of the content has been highlighted (Edyburn, 2004a). This tool allows either the educator or the learner to manipulate the amount of content to be marked by highlighting, thus providing a great deal of flexibility.

Figure 32. Modified text using the highlighting tool on Microsoft Word.

> **Pre-Reading Article**
> **Grade level 8.2**
>
> This lesson is about how women were involved with Negro Leagues Baseball. There are three ways they were involved:
> 1. As coaches and managers.
> 2. As players.
> 3. As wives of players.
>
> Part One: Coaches and managers
>   In 1935, Abe Manley started a Negro Leagues Baseball team named the Newark Eagles. His wife Effa Manley, was the manager of the team. She was a tough manager and she said the team was successful because the players were good. Effa Manley's father was Black, and her mother was White. Her skin was light, and even though she could have pretended to be White, she chose to be Black. She was pretty and smart. She fought for the rights of Blacks. She met her husband, Abe, at the 1932 World Series. He was a rich man who was involved in illegal business activities.
>   Effa managed the team, called plays and decided who played what position. She went on the road with them and was respected by the players. When the White professional baseball Leagues began signing Black players, Effa's teams were next. She lost three of her players to the major Leagues. She was the only woman to manage a professional baseball team in the history of baseball.

Example #11: Executive summaries
Microsoft Word Auto Summary also allows educators to cut out a percentage of highlighted text and create a summary. This example consists of the 50% highlighted material from the same article, only presented in a shorten version.

Pre-Reading Article
Grade level 8.2

This lesson is about how women were involved with Negro Leagues Baseball:
1. As coaches and managers.
2. As players.
3. As wives of players.

Part One: Coaches and managers
    In 1935, Abe Manley started a Negro Leagues Baseball team named the Newark Eagles. His wife Effa Manley was the manager of the team. Effa Manley's father was Black and her mother was White. Effa managed the team, called plays and decided who played what position. When the White professional baseball Leagues began signing Black players, Effa's teams were next. Effa ran the team for 3 years and was the first woman to own a Negro Leagues team.

Combining speech, images and text
When educators provide information in multiple formats, potential barriers are removed. As curriculum is developed, early in the planning stage, educators with a mind toward expanded access will create additional versions of the content to be presented. This process may be time consuming and expensive with traditional materials such as print, taped material and/or books. However, the increased use of digital technologies to store and present information has expanded the scope of options open to educators. Digital files have the capacity to combine and transform text, speech and images to create a more diversified set of options. The following list contains several examples of digital methods for combining media presentation:
1.   Talking books.
2.   American Sign Language (ASL) tracks.
3.   Descriptive videos.
4.   Text reading software.

Putting these techniques to work
Another cognitive rescaling strategy is the presentation of text that has been enhanced by **icons** (Edyburn, 2004a). The addition of small pictures or icon to a selection of text offers learners another mechanism to discern meaning. These are especially helpful for learners whose reading skills are limited. There are several software packages available to assist educators by automating the process

BoardMaker is a graphics database containing over 3,000 symbols in bitmapped clip art form. The program allows one to quickly find and paste pictures into a display, resize, store, retrieve and paste scanned or custom drawn pictures. The picture icons in the database are from the Picture Exchange Communication (PECS) system, a common form of icon-based communication for people who are

nonverbal. A single user copy costs $299. Available at *http://www.mayer-johnson.com.*

PCS Sign Language Animations are used to reinforce learning of sign language. Over 500 animated signs, pulling from both American Sign Language (ASL) and Signed Exact English (SEE), supplement the core PCS Sign Language Library (Volume I). These animations are designed to reinforce the sign, they are not recommended to serve as a comprehensive teaching program. A single use license costs $79. Available at *http://www.mayerjohnson.com.*

Media Magic 2 and Media Weaver 3.5 These two software packages contain multimedia word processors (Media Magic 2 for learners age 4 to 9, and Media Weaver for learners age 8 and up). They contain a rebus bar and word predictors, vocabulary words, pictures and recorded speech, text to speech and paint functions. Single user license costs $49. Found at *www.sunburst.com.*

Picture It allows educators to type in text, then with a click of the mouse add pictures and icons to enhance the readability. The software contains over 600 literacy support pictures with both black and white and color versions, clip art and the capability to import pictures. A single user license costs $295 from *www.slatersoftware.com*.

Writing With Symbols is a word/picture processing program allows you to type words with the option of having picture symbols appear with each word. It allows learners who do not recognize text to write with pictures and it allows text users to have a pictorial spell checker. A single use license costs $199. *Available from www.mayerjohnson.com.*

Example #12: Icon-enhanced text
This is a sample of text supported with pictures. This example was made with Picture It and was available at http://www.slatersoftware.com as a free sample.   It is part of a short biographical essay on George Washington Carver.

Figure 34. Modified text using icons to enhance vocabulary.
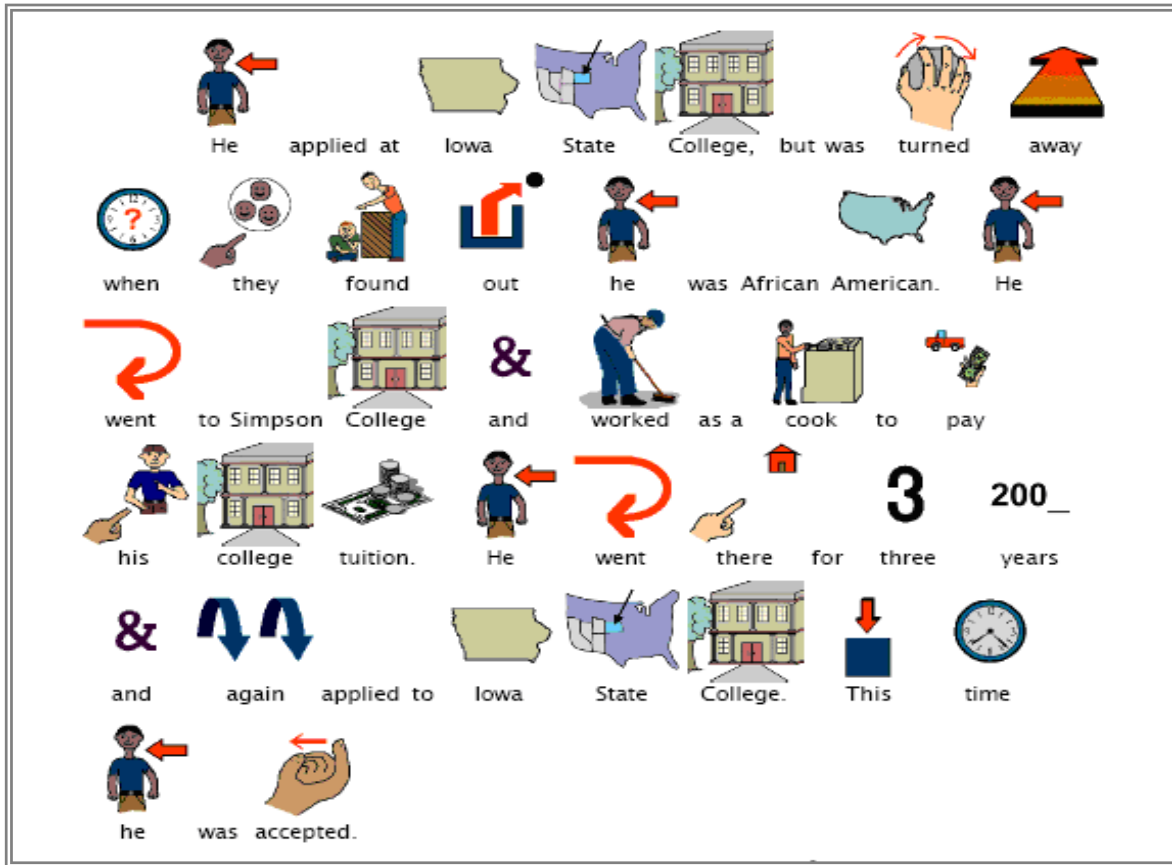
Example #13: Combining text, images and video
Appendix 1 consists of a full lesson plan from the Negro Leagues. It contains examples of text, images, and video. Note taking tools have been developed to highlight important information and activate background knowledge and graphic organizers accompany the lesson plan to be used in any or all of the ways described above.

> ***Teaching Every Student in the Digital Age: Universal Design for Learning***
> by David Rose and Anne Meyer. (2002) ASCD. Available in digital form at
> http://www.cast.org/teachingeverystudent/ideas/tes/

In their book *Teaching Every Student in the Digital Age*: *Universal Design for Learning* David Rose and Anne Meyer outline specific strategies to support presentation. In Chapter Five, the authors include:
1.   **Providing multiple examples.**
       Educators often use examples of specific content to help learners acquire concepts. The larger the number of examples and the better those examples embody the concept, the more effective they are. Using digital media to provide

multiple examples in a variety of sensory channels also enhances effectiveness by reaching learners who may have difficulty with a particular method of sensory input. Rose and Meyer suggest using collections of text, image, sound and video examples that can be digitally stored and expanded from year to year. Digital media offers the additional advantage of interactivity. Learners can manipulate digital examples to discover patterns and properties that represent the concept.

2.   **Highlight critical features.**
Educators assist learners in the identification of key features and patterns in the examples they provide. Learners must recognize the essential attributes of an example or set of examples to recognize the concept those examples represent. The use of labels on an image example provides this focus. Likewise, educators use intonation, pace and volume, gestures and facial expressions to highlight key points in examples that use speech. Text features such as italics, underlining, and font styles can mark critical elements in print examples. Digital tools applied to digital media examples can expand the capacity of educators to focus learners' attention on key features. These may include the ability to zoom in to a specific part of an image, color highlighting, animation, and the process of overlaying text and images onto video. Some tools allow educators to provide a continuum of supports that can be accessed by individual learners to meet their needs at the moment. An example of this type of support is a scrolling application that enlarges font through the use of a computer mouse or changes the color and intensity of a highlighting mark on the screen.

3.   **Provide multiple media and formats.**
It is clear that a single means of presentation does not reach every potential learner. Using text and print images (the traditional methods) excludes the learner who may have a different capacity for visual input. Presenting examples using speech alone does not reach the learner with **auditory or language processing differences**. Presentation using multiple methods of delivery increases learning in two important ways. First, learners can choose methods that most effectively match their needs; if one modality is not a viable input channel for a particular learner, another channel may be used. Second, multiple representations provide more repetitions of the content, thereby providing repeated practice opportunities. Research has shown that using multiple modalities not only increases access for learners with diverse needs, it improves learning generally for all learners (Siegil, 1995).

4.   **Support background knowledge.**
The process of learning is one of incorporating new knowledge into previous knowledge. Obviously, learners differ considerably in the background knowledge they bring to the learning environment. Educators support this process by helping learners tie their background knowledge to new concepts and by providing missing related information. These goals are accomplished when educators require the learner to reflect upon their own experiences in relation to the new content they are presenting. Learning key vocabulary prior to encountering words in the midst of the presentation, providing vocabulary supports during the presentation, and the use of graphic organizers are also effective methods to connect background knowledge. Digital media are helpful supports in this area

because they are flexible and because they can be linked to other information such as those on the internet. Learners can access supports as they need them.

Section Two – Process

Multiple means of engagement, to tap into learners' interests, offer appropriate challenges, and increase motivation (Center for Applied Special Technology, [CAST], 2006).

- Scaffolds
  - · Study guides
  - · Cognitive prostheses
  - · Instructional unit resource guides
  - · Webquests
  - · Manipulatives
  - · Virtual reality and simulations
  - · Tiered learning activities

Students with diverse learning needs often have some skills sets that are more developed than others. As we discussed previously, learners have preferred learning channels and benefit when new concepts are presented in using that learning channel. Likewise learners differ in their ability and preferences as they manipulate and learn information. This set of learning activities relate to the process of learning or engaging with the material. Most learners can engage with content, even that which is fairly complicated and abstract, if they are provided with support. We will focus on three methods for providing support during the engagement process:
1. Scaffolds.
2. Cognitive prosthesis.
3. Tiered learning activities.

Scaffolds
Rose and Meyer (2002) discuss scaffolds as a means for learners to practice a new skill in context and advocate the use of scaffolds to support some parts of the new skill while the learner practices other, specific parts. Rose and Meyer use the example of a set of training wheels on a beginner's bicycle. The training wheels support part of the balance required for the new skill, but allow the beginning rider to practice using the pedal, handle bars, etc. In the world of curriculum design, similar tools can support the learning process. Like training wheels, curricular scaffolds are only useful to a learner who needs them. Using them beyond that point inhibits the learning experience.

> **WARNING!** The use of scaffolds and supports for learners who do not need them leads to shallow and unchallenging learning experiences. When given the choice to use supports, most learners will make a choice to use them only if they are needed. However, in situations where learners may not be able to make the best choice for themselves, educators will need to support good decisions.

Study Guides
The use of study guides is a common **curricular scaffold**. A study guide can help the learner organize and prioritize reading material, provide a visual image of complex concepts, or represent a cognitive framework on which new information can be attached to previously known information. Educators often design study guides that consist of questions to be answered during reading. Reflective questions, as well as those that require the reader to find certain pieces of data will help focus the reader, activate background knowledge and provide a framework on which to organize new information.

Putting these techniques to work
The amount of cues or supports any learner may require may vary according to their readiness level, the degree of interest they have in the subject, and their particular learning style.

CAST's eTrekker Project has created a software tool to assist learners in the process of gathering information on the internet. It contains scaffolds for the organization of information in all three areas (presentation, process and product) and is flexible to allow educators to customize the tools for individuals or groups of diverse learners. Learn more about it at *http://udl.cast.org*.

Example #14: Research tool
Educators frequently use the Internet as a way for learners to access information. Study guides are particularly helpful when learners are conducting research. Anyone who has spent any time "surfing the web" will soon find out that doing meaningful research using the Internet can be time consuming and confusing. One can get easily lost in the tangle of linked pages, become drawn off the topic, and encounter sources that may be of questionable value to the task at hand.

Version 1 – Structured and specific
Consider the following excerpt from a high school social studies lesson plan on the Negro Leagues written for the NLB eMuseum (Barragree, 2006a). The learning activity for this lesson is to research material from an assigned period in history and then use that information to create a magazine page.

> Group students into groups of four, then student groups choose one time period to research together... Each student in each group then selects one issue or event to "cover" from the time period selected. As students are researching their selected issue or event, they fill in headlines, headings, names, photographs, etc. on their page layout. Ensure students understand this is a very important step before they begin creating their magazine (Barragree, 2006a).

This lesson activity is designed to use two, sixty minute class periods. The instructions are very open-ended and provide a lot of room for individual choices, judgment and

critical thinking skills. While some learners will welcome this limitless approach, others will find it threatening and overwhelming. In response to this need, a scaffold was created in the form of a research tool to guide learners through the research process. This tool limits choice, but focuses learners on the process of retrieving crucial information from several web sites and provides a hard copy record of that information so that when the learners return to their cooperative learning group, they can make a valuable contribution. The tool was created by Lori Mott (2006).

Figure 35. Structured research tool.

RESEARCH TOOL for TIMEWARP – 1900 vs. Now

http://www.time.com/time/time100/timewarp/timewarp.html

Check each item off as you complete it.

1. _____ On the Home Page, locate the tab that says United States (at the top of the page). Click it and read the information about how the United States has changed during the years 1900-1998. Pick one item that you think your group would like to include in your magazine and write it below.

2. _____In 1900 _____.
   _____In 1998_____.

3. _____On the left side of the page, find the box that says *TIME* 100 Polls. Click on the third item – Event of the Century. There are 20 events listed. Choose two important ones that you would like to share with your team. Record them below.

4. _____Event _____ Year _____.

5. _____Back on the left side of the page, find the *TIME* 100 Polls, and click on the second item – Person of the Century. There are 20 people listed. Choose one important one you want to find out more about and share with your team. Record their name below.

6. _____ Name _____.

7. _____Go to *www.askjeeves.com*.

8. _____Type in the name of the important person you chose –followed by the word "biography". For example, in the search box, you would type Adolph Hitler biography. Click the SEARCH button.

9. _____You will find a page of potential websites with information about your important person. They will include pictures and text. There may be a picture of your person at the top. If there is, you will need to print it out, or copy it here. To copy, put your pointer on the picture, and hold down the right button on your

mouse. The menu will appear, and move the pointer to COPY. Once COPY is highlighted, click once with the left mouse button. This will copy the picture.

10. _____ (If you printed out your picture, skip this step.) To paste your picture, put your pointer over the X below, and click the right button on your mouse again. The menu will appear and you will choose PASTE. Click the left mouse button again. This will paste the picture onto this worksheet.

X

11. _____You will need to record the reference for the picture you printed or copied. To do this, go back to the askjeeves page, and find the word Source (its blue), under the picture. Click it once.

12. _____This page will contain the Image URL. It will be blue also. Record it here. Image URL: _____.

13. _____ To find some information about your important person, find the heavy red line on the page, and the words, Back to Your Results. Click on those words.

14. _____ You will now be back on the search results page. Choose a page and go hunting for some important facts about your important person. Find out some of the following information and write it down on the chart below. You also need to write down the URL of each page you cite, so that you can provide references.

Fact	Information	Reference (URL)
Date of birth		
Date of death		
Accomplishment		
Accomplishment		
Other		
Other		

15. _____ Use the same process to do some research about the event that you chose in step 4. Go to askjeeves.com and conduct a search.

16. _____ Complete the chart below to organize what you find.

Version 2 – Open ended
This version of a research tool is much less structured. It provides initial instructions to ensure that learners start their research in a reliable source, but then allows more individual freedom and choice on the part of the learner. This example is taken from another Negro Leagues lesson plan for the NLB eMuseum, in which learners are asked to find examples of oral tradition, folklore and/or opinion in order to create a magazine page (Barragree, 2006b). The instructions have been edited to include only that information that pertains to the scaffold process.

3.   Although the lesson plan suggests that students research and find three examples of African American and/or Negro Leagues oral tradition/folklore, some students may not be able to accomplish this in the time allowed or without considerable adult support. Consider asking them to find one example.

4.   When assigning groups, assign one student to find an example from the slave interviews. Direct them to *http://memory.loc.gov/ammem/snhtml/snvoices00.html* and have them pick a narrative from the list.

5.   Assign another student to find an example from the Negro Baseball Leagues history. Direct them to *http://www.charliethejugglingclown.com/baseball.htm* to read about the Indianapolis Clowns, one of the NLB clown teams.

6.   Provide the note-taking card (see below) for students to keep track of their research. This information will be used when they join their group to report on what they found. It will allow them to offer meaningful input to the group's decision.

Figure 36. Open ended research tool.

I researched a story about: _____

One (or some) of the important people were :
_____

The thing about it that stuck with me the most was:
_____

I found some fact/folklore/opinion in this story. It was:
_____

I think it would make a good storyboard because:

_____

Example #15: Reading/note-taking tool or concept maps
Note-taking tools and concept maps were discussed earlier as a way for diverse learners to record new information while it is being presented. This process can be further enhanced when the information recorded on the note taking tool is re-organized, augmented or sifted by the learner and placed in a graphic organizer. These cognitive steps deepen the learner's engagement with the material, thus encoding and creating new meaning from the content.

This chart represents a very simple note taking tool for use during research, but it could also be used for a lecture or video situation. It was developed to accompany a Negro Leagues lesson plan for the NLB eMuseum (Baillargeon, 2006). Learners sift information to sort out the "Big Ideas" listed across the top of the chart and focus on three organizations that have been formed to meet the needs of African Americans. By providing this structure, learners determine pertinent from non-pertinent information.

Figure 37. Note taking tool to capture "big ideas".

Aftermath For Freedom Seekers - BIG Idea Comparison Chart

Name of Black Institution	Mission	Location	Activities	History
National Association for the Advancement of Colored People (NAACP)	Ensure political, educational, social and economic equality of rights of minority groups. To eliminate racial hatred and racial discrimination.	National office- Baltimore Maryland, 7 Regions serving 5 countries	demonstrations court cases lobbying	(when and why it was formed) Formed in 1909 to fight for civil rights.
National Urban League	Empowering African Americans to enter the economic and social mainstream. To make "The American Dream" possible for African Americans.	New York	voter registration drives boycotts, training program, lobbying, volunteerism, government programs	1910-A merger of other groups-to bring educational and employment opportunities to blacks
Negro Baseball Leagues	Provide professional opportunities for black baseball players.	Formed in Kansas City, MO	leagues, barnstorming, tours, promoted economic development in communities,	1920-Leagues formed to give black players opportunities to play despite segregation and racism in professional leagues.

By providing learners with an additional tool such as a Venn Diagram, learners can compare and contrast the information from the Big Idea Chart.

Figure 38. Venn Diagram as a note taking tool.

Directions: Compare/contrast the mission of two of the Black Institutions from the lecture/reading

Institution #1

Institution #2
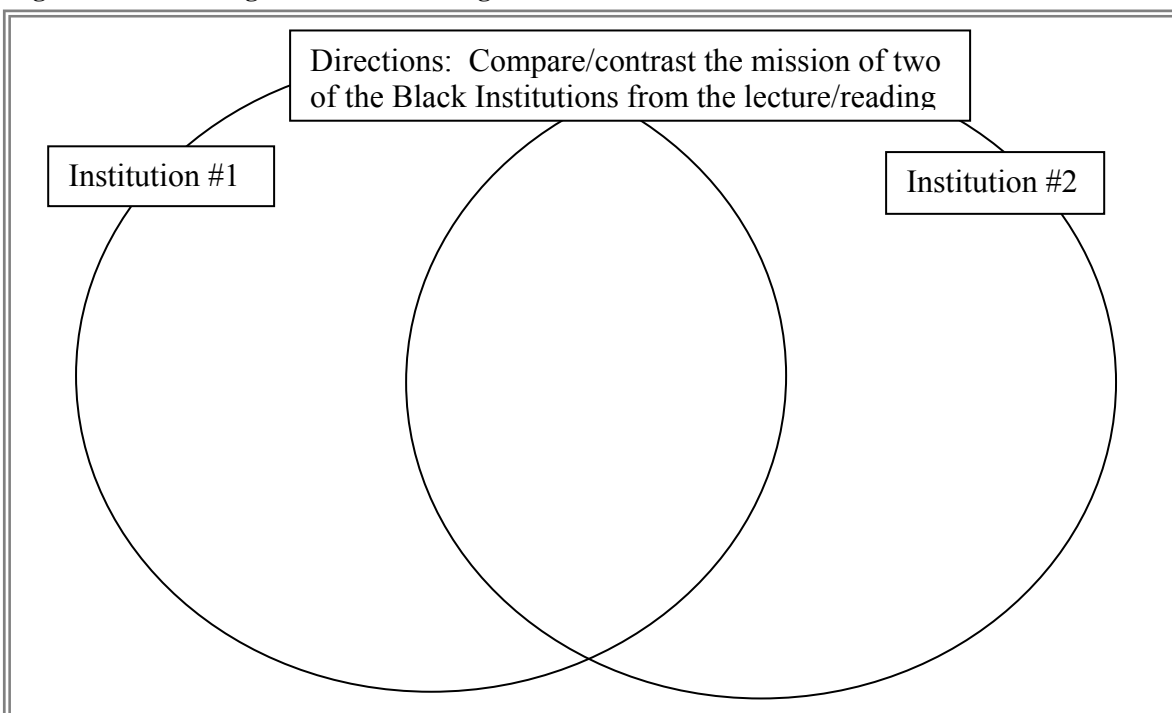
Cognitive Prostheses

A **prosthesis** is a device designed to replace a missing part of the body or to make a part of the body work better (United States National Library of Medicine, 2006). Cognition refers to the process of thinking. Therefore, a **cognitive prosthesis** is defined as a device that replaces or improves the function of a thinking process. Originally designed for patients suffering from brain injury, cognitive prosthesis are often developed by computer scientists and rehabilitation professionals who work with patients with brain injuries. Although the application of assistive technology in this sense is primarily for rehabilitation purposes, the result is a compensatory strategy which can be used to maximize an individual's strengths and abilities in order to compensate for acquired deficits (Cole and Matthews, 1999). Mundane examples of cognitive prostheses include alarmed wristwatches, speed dialing, calculators and **Personal Digital Assistants (PDAs).** These tools enhance cognitive processes by supporting portions of the cognitive load of specific tasks.

We all use cognitive prostheses every day. Consider the timer on the kitchen oven. This device keeps track of passing time, which is a function that many people have the ability to do with their minds. However, chefs may choose to use the timer to perform this function in order to devote their thoughts to the coordination of the meal, to converse while cooking, or any number of other mental activities. The same is true of the alarm

clock. While some people may be able to awaken themselves by "programming" a mental process that interrupts sleep, most of us require an additional support to accomplish this task.

This application can be extended to the learning environment. Tools such as cognitive prostheses are powerful ways to increase access in the cognitive environment and hold great potential for curriculum developers who subscribe to the principals of universal design for learning. Some typical, well known examples of cognitive prostheses in this domain include spell checkers, copy/paste functions, readability statistics, handheld translators, and electronic dictionaries. This handbook explores the expansion of this concept to include auto summary features, Internet search engines, and speech to text readers.

One controversial cognitive prosthesis from the world of education is the use of a calculator. Educators have debated the relevance of mathematical equations solved with a calculator, arguing that the device performs computation instead of the student. Yet, it is common to see graphing and scientific calculators being used in upper level mathematics classes in many educational settings. The question here is not the value of calculators, but rather the purpose for their use. Just because a chef is mentally able to keep track of passing time does not mean that he/she may not benefit from the use of an oven timer. This is an important fact to keep in mind as educators discuss the value of these tools in the learning process.

David Edyburn has written extensively on the use of assistive technology to assist students with diverse learning needs. He contends that technological applications can and should be used as cognitive prostheses and trains educators in their use. While assistive technology has traditionally been seen **as augmentative communication devices**, or modified computer keyboards, and used with individuals who experience physical disabilities, Edyburn suggests that software such as text-to-speech, and Internet search engines can also benefit learners who experience cognitive disabilities such as memory difficulties, reading disabilities and cognitive limitations. He contends that learners, especially those in the upper grades experience so much failure as a result of their limited access to the curriculum, that there is an appropriate time to augment their performance, even compensate for their limitations with technological solutions (2000, 2003a, 2004b, 2005).

The purpose of this handbook is to expand the access to curriculum materials for any and all learners with diverse needs. The decision to use or not use any of the techniques and strategies included in the handbook lies with the educator. Therefore, the use of cognitive prostheses is included in order that educators can make informed decisions regarding their potential use.

Important considerations when designing cognitive prostheses
When making decisions about the use of cognitive prostheses, educators could benefit from reflecting on the following issues:
1. What is the purpose/goal of the activity?
2. What added benefit would the cognitive prosthesis provide?
3. Would the use of a cognitive prosthesis limit the learner's experience?

4.	What is the setting in which the cognitive prosthesis will be used?
(What is helpful and appropriate in a museum setting will differ from a classroom setting.)

This set of general design methodologies will make materials more accessible to individuals with cognitive challenges. They can be applied to computer screens or print materials:
1.	Use of clear, uncluttered layout.
2.	Use of graphics and animation that contribute to, rather than distract from learning.
3.	Use of consistent commands, features and directions from screen to screen or page to page.
4.	Combined use of pictures and audio prompts for navigation.
5.	use of linear designs of software operation.
6.	Inclusion of options to manipulate appropriate sequencing and pacing.
7.	Inclusion of opportunities for repetition and positive practice.
8.	Use of "error minimization" features, such as removing buttons from the screen at times when use is inappropriate.
9.	Use of frequent audio feedback, both for error correction and positive reinforcers.
10.	Use of customization options that allow professionals to adapt the materials to the unique needs of a variety of learners.

Putting these techniques to work
There are many software packages and Internet sites available on the Internet that will assist learners with cognitive learning tasks. The first group consists of tools learners can use to complete learning activities. The software assists learners by supporting portions of the cognitive load.

ReadPlease at *www.readplease.com* opens a window on the desktop into which text is copied and pasted. Users can customize font and background color, use the low vision color option, and adjust voice choice and speed. The control buttons are easy to use so this tool works well when readers need to start and stop frequently (as in listening to test questions and choosing an answer or in listening to the reader read a printed worksheet). The reader also reads email **emotiocons** such as ☺ or ☹. The reader includes seven languages and highlights text as it is read. It requires digital text so PDF files are not readable**.** The free download is a 30 day trial.

Carol Ann Tomlinson writes extensively in the area of differentiated instruction. One of her most useful tools is The Equalizer, shown below (Tomlinson, 1999). Each of the "sliders" adjusts the learning activity in a particular domain. By reflecting on the relative cognitive load inherent in the activity, educators can strategically adjust the activity to reach diverse learners.

Figure 39. Tomlinson's representation of The Equalizer
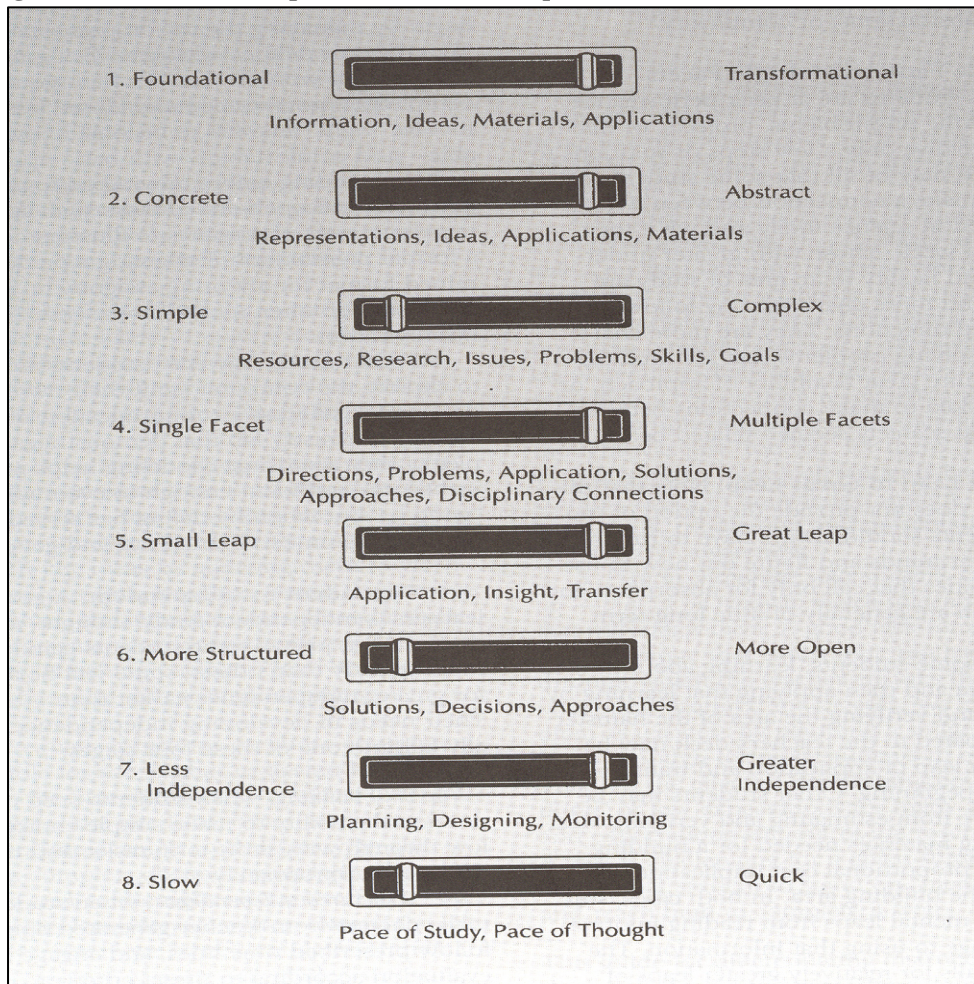
Cognitive prosthesis can be easily developed as curriculum is designed. Consider the ease with which the graphic organizer in example # 8 is duplicated using a word processing software application. Different levels of support are created as portions of the content are supplied for the learner. Features such as word banks also provide support for the cognitive load of a learning activity.

Example #16: Picture/word bank
This cognitive prothesis was designed to accompany a lesson plan that was written for the NLB eMuseum (Mott, 2006b). The learning activity was the design of a t-shirt depicting the negative aspects of segregation. In order to provide cognitive support, examples and images were included to initiate the cognitive process so that the learner could participate in the activity.

Figure 40. Word and picture bank..

Picture/Word Bank for Jim Crow T-Shirt

Nicodemus
Lynching
Segregation
Racism
Colored

George Wallace was a politician in the 1950's who supported segregation.

References:
www.magicravenphotography.com
www.pbs.org
www.xroads.virginia.edu
www.pbsvideodb.pbs.org
www.laheritage.org
www.nps.gov
http://www.cnn.com/ALLPOLITICS/stories/1998/09/14/wallace.obit/wallace.bio.html

ReadMark, at *http://www.geocities.com/threehillssoftware/readmark.html* provides a description and link to download a 30-day trial version. This product creates a movable marker on the screen that can be moved by using the mouse or arrow keys on top of a document, a web page, or any other image; and can be used as a place holder for reading on a computer screen.

Inspiration software at *www.inspiration.com* allows learners to create dynamic, interactive graphic organizers, and supports the writing process. The company offers a free download.

Ask Jeeves is an easy to use search engine that will accept queries in the form of a question. Search results are simple to follow and stay in a separate window. This feature makes the site less confusing to use than some other search engines. Find it at *www.askjeeves.com.*

4Kids.org is a team of educators, writers, artists, technology specialists and students that produces a weekly newspaper article and maintains the www.4Kids.org website. Their vision is to pursue more effective ways of creating learning environments for all children through advancing technologies such as the Internet. Find it at *www.4Kids.org*. The site contains a listing of links to knowledge-based sites that are learner-friendly.

How Stuff Works. This science site allows learners to explore how all the things we use every day really work. At *www.howstuffworks.com* you can investigate an internal combustion engine or the human body.

World Fact Book is provided by the Central Intelligence Agency at *www.odci.gov/cia/publications/factbook.* This social studies site contains information on continents, countries, oceans, land formations, and much more. It includes peoples from around the world, governments and climates.

The **Students for the Exploration and Development of Space (SEDS)** at *www.seds.org* is an astronomy site that includes a Web telescope which allows students to see comets, black holes and far-off galaxies. There are also excellent images and sounds, such as the latest Pathfinder photos of the "Red Planet."

Kathy Schrock's Guide for Educators is a categorized list of sites useful for enhancing curriculum. Find it at *http://school.discovery.com/schrockguide.*

Trackstar is a site that allows educators to create maps or "tracks" of websites. The site clusters selected web sites together and creates a lesson plan for learners to follow, educator directions can be embedded inside. Find it *at http://trackstar.4teachers.org.*

Instructional Unit Resource Guides

Edyburn advocates a lesson planning process that incorporates resources from the Internet, a tiering system for lesson content. He trains educators to develop these lessons using a template called Instructional Unit Resource Guides.

Example #17: Instructional Unit Resource Guide
A complete example is included as Appendix 2. The example was developed by Barb Melvin, Occupational Therapist and Carolyn Dale, High School Language Arts Teacher during a workshop conducted by Edyburn in March, 2006.

WebQuests
This inquiry-oriented activity involves interacting with resources on the Internet. They can be appropriate for almost any age learner or content. According to Dodge (2001), there are six parts to a successful WebQuest. They are:
1. Introduction - This is where the learner is oriented to what is coming. This section should raise the learner's interest by making the topic relevant, visually interesting, important, urgent, and/or fun.
2. Task - A description of what the learner will have done at the end of the exercise. This can be a product or a verbal act. It is important that the learner is allowed input into what the task will be and that options are provided.
3. Process - Here, the educator makes suggestions regarding the steps of discovery, including strategies for dividing the task and descriptions of the roles to be played or perspectives to be taken by each learner. An educator may also provide learning advice, which relates to helping learners with interpersonal skills. This is also where an answer sheet or a guided notes template may be included.
4. Resources - These can be pre-selected web pages the educator has located to help the learner accomplish the task at hand. An educator may choose to create the web pages or to utilize ones already present on the Internet. Other resources, such as books, interviews, and video can be used as well.
5. Evaluation - In this section, the educator not only evaluates the learner's progress but the effectiveness of the WebQuest as well. An evaluation rubric is most commonly used for this purpose. Learners should be made aware of the assessment process from the very beginning and a copy of the rubric should be included in the WebQuest.
6. Conclusion - The conclusion provides an opportunity to:
    a. Summarize the experience.
    b. Encourage reflection about the process.
    c. Extend and generalize what was learned.
    d. Give the learner a sense of closure,
    e. Open a path into the next lesson (p. 3).

 WebQuest is a website hosted by Bernie Dodge. It contains articles about webquests, a database of webquests that have been submitted by educators, and a site that will provide educators with the structure to create their own webquest. Find it at *http://webquest.org*.

Example #18: WebQuest
Appendix 3 contains an example of a WebQuest developed for learners ages 13 and up on the subject of civil rights leaders.

Manipulatives

The use of hands-on learning activities is a powerful way to increase access. Learners who prefer kinesthetic input channels will benefit greatly from the opportunity to use touch and physical movement to encode information. The use of manipulative objects moves the cognitive process from an abstract to more concrete domains. Models and physical exemplars are often included in museum curriculum materials and serve an important function as they bring concepts to real life.

When physical objects are not available, educators can create hands on activities with ideas and concepts. This process of creating a "cognitive manipulative" replicates the hands-on advantage of moving information from one physical location to another, but is accomplished with concepts instead of objects (S. Robinson, personal communication, March, 2000). This technique can be applied to almost any print resource and is a powerful way to make a learning activity a group activity. A rudimentary application of this strategy is the sorting of facts into groupings according to an assigned attribute. Consider this example that uses content from Example #11.

Example #19: Cognitive manipulative sorting activity
Use this worksheet that was developed as a scaffold to a lecture on the social and political organizations that emerged during and after the civil rights era.

Figure 41. A cognitive manipulative chart.

Aftermath For Freedom Seekers - BIG Idea Comparison Chart

Name of Black Institution	Mission	Location	Activities	History
National Association for the Advancement of Colored People (NAACP)	Ensure political, educational, social and economic equality of rights of minority groups. To eliminate racial hatred and racial discrimination.	National office-Baltimore Maryland, 7 Regions serving 5 countries	demonstrations court cases lobbying	(when and why it was formed) Formed in 1909 to fight for civil rights.
National Urban League	Empowering African Americans to enter the economic and social mainstream. To make "The American Dream" possible for African Americans.	New York	voter registration drives boycotts, training program, lobbying, volunteerism, government programs	1910-A merger of other groups-to bring educational and employment opportunities to blacks
Negro Baseball Leagues	Provide professional opportunities for black baseball players.	Formed in Kansas City, MO	leagues, barnstorming, tours, promoted economic development in communities,	1920-Leagues formed to give black players opportunities to play despite segregation and racism in professional leagues.

134

Remove the content from the chart and use it as the sorting tool.

Figure 42. Blank template for the cognitive manipulative.

Aftermath For Freedom Seekers - BIG Idea Comparison Chart

Name of Black Institution	Mission	Location	Activities	History
				(when and why it was formed)
National Association for the Advancement of Colored People (NAACP)				
National Urban League				
Negro Baseball Leagues				

Place the details on separate cards or slips of paper. Cut them apart and shuffle them.

Figure 43. Details for the cognitive manipulative.

training programs	National office-	demonstrations	lobbying
court cases	Baltimore Maryland,	barnstorming tours	voter registration drives
government programs	7 Regions serving	empowering African	provide professional
Kansas City, MO	5 countries	Americans to enter the	opportunities for black
eliminate racial hatred	leagues	economic and social	baseball players.
and racial discrimination.	1909 to fight for	mainstream.	represented the highest
1920-formed to	civil rights	volunteerism	level of baseball for
give black players	1910-a merger of other	promoted economic	African Americans
opportunities to play	groups-to bring	development in	boycotts
despite segregation and	educational and	communities	ensure political,
racism in professional	employment opportunities	to make the "The American	educational, social and
leagues.	to blacks	Dream " possible for	economic equality of
New York	lobbying	African Americans.	rights of minority groups.

135

Use the cards as a cooperative learning activity in either of the following ways:
1.   Place all the cards in the center of a table, have each learner draw a card, read it to the group then place it on the chart where it belongs.
2.   Assign each learner as a representative of one of the activity organizations. Deal out all the cards. Player 1 draws one card from the player on his/her left. If the card belongs on the chart for the organization he/she represents, the player places the card on the correct place on the chart, if not, the player holds onto the card. Play continues in this way until all the detail cards are placed correctly on the chart.

Almost any text material or print resource can be turned into a cognitive manipulative just by cutting it apart. Cognitive manipulatives make great cooperative learning activities. Most interactive museum exhibits are elaborate cognitive manipulatives.

Virtual reality and simulations
When physical models are unavailable or impractical, virtual versions can fulfill a similar function. There are many websites and software applications that offer this option. Content can be explored in lab-like settings without the need for renewable supplies and resources and without the safety and supervision concerns frequently associated with laboratory activities. The increasing affordability of LCD projectors make these applications a viable alternative to live demonstrations for large groups because an educator can project the image from one computer onto a screen.

Example #20: Situational simulation
The Internet contains many examples of simulation activities designed by educators. These allow learners to go beyond role play and actually get physically and emotionally involved in the learning.

This example is titled Paths of Resistance and deals with Jim Crow laws. It can be found at *http://www.jimcrowhistory.org/resources/simulations.htm*.

Example #21: Online games
Many museums host web pages of online learning activities.

Tiered Learning Activities

One of the techniques for differentiation that provides increased access to the learning process is the use of a planning pyramid. This tool allows educators to sift curriculum content for diverse groups or individuals.   Planning tiered learning embodies the spirit of universal design because it emphasizes strategic decision making during the initial design phase. Educators must determine what aspect of the learning activity is to be manipulated (content, process or product) and how it will be modified (readiness, interest oo learning style). Learners may be assigned different learning objectives and be assigned different learning activities. However, the activities in which they engaged reflect a consistent learning path towards those objectives.

Putting these techniques to work

For the purposes of explanation, this example of the pyramid will be described as an activity for which the decision has been made to differentiate the content by readiness level. The middle section of the pyramid is the largest and usually includes the learning objectives for lessons that are typically planned for learners whose readiness level can be predicted. This level may contain multiple learning objectives, but does not represent any adjustment. It can be compared to a lesson blueprint and would typically be representative of most traditional lesson plans. Differentiation occurs when the teacher expands this blueprint in both directions. The bottom level of the pyramid characterizes the most basic level of knowledge that is acceptable mastery for this content. In this example in which the decision has been made to differentiate the content of the lesson by readiness level, this tier may be appropriate for learners with cognitive limitations. These learning objectives are less complex and represent a grasp of the main points of the activity. In contrast, the top level of the pyramid describes the learning objectives that are above and beyond the predictable norm. It should be noted that the planning pyramid is not limited to three levels. Educators may find it necessary to plan instruction on several levels, depending on the diversity among their learners. Figure 36 illustrates a three-level planning pyramid.

Figure 44. The planning pyramid

What a few learners will know and be able to do.

What most learners will know and be able to do.

What all learners will know and be able to do.
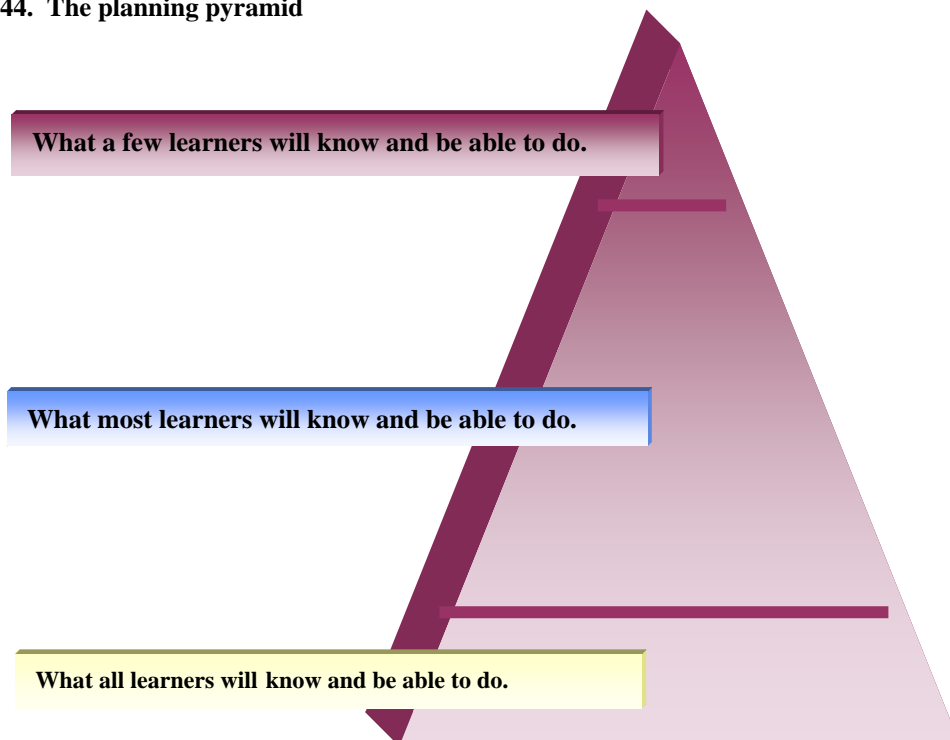
Example #22: Tiered learning activity

This is an example of a history learning activity designed for learners ages 13 and up. It represents differentiation in the process level by readiness. This lesson plan was created by John Marron (n.d.), and is included here in its entirety.

Figure 45. Example of a tiered lesson on the Civil War.

Tiered Lesson Plan: Causes of the Civil War

Standard
This lesson will cover national standard of US history era five/standard thirteen/level four/number two: "Understands events that fueled the political and sectional conflicts over slavery and ultimately polarized the North and the South (e.g., the Missouri Compromise, the Wilmot Proviso, the Kansas-Nebraska Act)" (www.mcrel.org)

Background
Prior to giving this assignment the students will receive lectures and readings explaining the rising conflicts prior to and throughout the 1850's. They will receive material through lectures and readings on the following historical figures and events: Nat Turner, Elijah Lovejoy, William Lloyd Garrison, Henry Clay, John Calhoun, Stephan Douglas, Fredrick Douglass, Harriet Beecher Stowe's Uncle Toms Cabin, John Brown and Harper's Ferry, Dred Scott Case, Abraham Lincoln, Lincoln/Douglas debates, Kansas-Nebraska Act, and the Presidential Nominating Conventions of 1860.

Tiered by process
This lesson will be tiered by process. Different groups of students will receive different assignments to exhibit their understanding of the ideas presented. The easier assignments will be longer in length to accommodate for the difference in the difficulty of assignments.

Tiered by readiness
This lesson will be tiered by readiness. The students who are able to think, synthesize and evaluate the facts given them, will be given an evaluation assignment. The students

who are able to analyze the facts will be given analytical problems. Finally, the students who learn only by memorization and comprehension will be given a basic assignment.

Guide in tiering
I will tier this lesson by groups of readiness, in ways that I think will be the most beneficial for the different students. I will take into account, their ability to evaluate history, analyze history, or comprehend history. I will group the students as I feel it will be the best way for them to learn. Although I will be dividing the assignments into three different groups of types of students, the students will NOT be working in groups to answer these questions. The will work as individuals, and they will present individual ideas and views.

Make up of tiers
Tier I will be made up of students who I feel will benefit best from a simpler form of learning, such as defining and giving the significance of various key terms or people and answering basic questions. Some of the terms they will be expected to identify will be:

Slavery, Nat Turner, Elijah Lovejoy, William Lloyd Garrison, abolitionists, Henry Clay, John Calhoun, Stephan Douglas, popular sovereignty, Fredrick Douglass, Harriet Beecher Stowe's Uncle Toms Cabin, John Brown and Harper's Ferry, Dred Scott Case, Abraham Lincoln, republicans, democrats, Lincoln/Douglas debates, Kansas-Nebraska Act, and the Presidential Nominating Conventions of 1860, etc.

Tier II would be comprised of students that I felt capable of taking historical facts and analyzing them to show how these people/events led to the escalation of conflict that led to the civil war. I would give these students various questions that asked them to link certain events to the causes of the civil war. Some example questions that I may ask of these students are:

1) How did the publishing of Harriet Beecher Stowe's Uncle Toms Cabin help lead to civil war?
2) What did the Dred Scott Case decide? What did it mean for slaves and former slaves? Did the Supreme Court overstep its constitutional limits in their decision?
3) What were the differing points of view in the Lincoln/Douglas debates?
4) What key figure in this time period favored popular sovereignty? How did other key figures react to his ideas?
5) What were the views of the abolitionists? What were the differences in views held by Lovejoy, Garrison, and Douglass?
6) What role did John Brown and Harper's Ferry play in escalating the rift between North and South?
7) What caused the Democratic Presidential Appointing Convention in Charleston, SC to break up? What were the effects of this?

These students will be expected to answer these questions in a complete manner. Most answers should consist of at least one or two paragraphs, sometimes more. They will be

expected to show full understanding of these terms, and how they led to an escalation of conflict between the North and the South.

Tier III students will be those students who I feel have a good grip on the ideas presented and can think critically and explain how these key terms/figures/events eventually led to the civil war. I would ask these students to present a 3-4 page essay on how the key points of the lecture and readings ended up causing the civil war. These students will be expected to provide their own ideas on why these situations occurred and what the effects of these events were. These students will be given more freedom to handle the material. Their own ideas will shape their responses and mold the essay.

Assessment
These students will be eligible to earn equal points on their respective assignments. For example, this assignment may be worth 50 points. The Tier I students would have 25 terms to identify at two points apiece. The Tier II students would have 10 questions at five points per question. The Tier III students' essays would be worth 50 points in itself. In this way, the students doing the harder work would only be expected to present one essay, and be able to receive the same credit as the students who must do 25 easier identifications.

On the test, I would assess their knowledge through basic multiple-choice questions to measure their understanding of key concepts and ideas. These questions would all have been covered in lectures or assigned readings. I would then give about 25 identifications (worth five points apiece) and 5 essays (worth 10 points apiece). The students would be responsible for completing a combination of these totaling to 30 points. In this manner, the students who learned by knowledge and comprehension would have the option of using the method by which they were assigned to show their knowledge of the key concepts. Those who were able to analyze and/or evaluate the history would have the option of writing essays to demonstrate their knowledge of the subject. This way no student would have an unfair advantage over others because of the differing assignments.

Section Three – Product

Multiple means of expression, to provide learners' alternatives for demonstrating what they know (Center for Applied Special Technology, [CAST], 2006).

●   Product Options
      · Multiplie products
      · Layered learning activities
      · RAFTS
      · Blogs
      · Pod casts
      · Self assessments

To support expression, educators should provide multiple, flexible methods of expression and apprenticeship. Demonstrating new skills requires learners to put all the pieces of the

process together and elicits feedback from a broader audience. These activities affect motivation and self efficacy and are very important. By providing varied methods of demonstration, educators can provide meaningful experiences to diverse learners. When designing curriculum, educators may be unacquainted with the learners who will eventually use the materials. Therefore, multiple means of expression should be developed so there are options available to diverse learners.

Layering the curriculum is a specific tiering technique. It was developed by Kathie Nunley (2003) and uses new brain research to create a planning pyramid that differentiates the lesson product by interest. Layering allows learners a great deal of control as they choose their learning activity from a "menu". The "Big Ideas" of the lesson are divided into layers (usually 3 layers are used because this coincides with the typical grading pattern of A, B or C grades that are considered to be satisfactory performance). Layers are distinguished from one another by the complexity of the tasks according to Bloom's Taxonomy. Simple, basic concepts go into the "C" layer; more complex thinking skills go in the "B" layer; and the most complex, higher-level thinking skills are assigned to the "A" layer. Each layer contains several activity choices that represent different learning styles, readiness levels and accessibility paths.

> Dr. Kathie Nunley's Layered Curriculum website contains newsletters and training resources on her technique of layered curriculum. It also contains lesson plan samples using layering. Find it at *http://help4teachers.com/index.htm.*

Putting these techniques to work
Differentiating the learning activities is an effective way to provide flexible products. A menu of possible products offered to learners allow them to differentiate their own learning. Here is a list of possible product options educators might use:
1.   Make a model of…
2.   Draw a map showing…
3.   Write a journal form the point of view of…
4.   Make a **Venn Diagram** comparing and contrasting…
5.   Write a poem about…
6.   Do a written report on…
7.   Write a myth or legend explaining…
8.   Produce a video news report about…
9.   Role play…
10.   Create song lyrics and music to tell about…
11.   Make a time line showing…
12.   Make a speech about…
13.   Write a diary entry dated…
14.   Design a game to teach about…
15.   Interview…, creating at least 5 interview questions.
16.   Do a Power Point presentation on…
17.   Do an oral report using visuals about…
18.   Explain… in paragraph form
19.   Write a short story about…
20.   Make a word search about…
21.   Design a study guide for…
22.   Conduct an email interview with…

23.   Make a mobile showing…
24.   Use a digital camera to…
25.   Make a scrapbook of…
26.   Create a mural showing…
27.   Make a chart to show…
28.   Arrange a display showing…
29.   Create a mosaic depicting…
30.   Write and direct a one-act play about…
31.   Evaluate the effect of…
32.   Do a concept map or web showing…
33.   Develop a picture dictionary on the topic of…
34.   Create a brochure about…
35.   Create jeopardy questions about…
36.   Make a picture postcard showing…
37.   Write an editorial expressing your opinion about…
38.   Tape a radio report telling about…
39.   Make a **diorama** showing…
40.   Write an epilogue to…
41.   Write a letter describing…
42.   Draw a comic strip about…
43.   Construct an information cube with the following information on it…
44.   Construct puppets and put on a puppet show about…
45.   Develop a pro and con chart about…
46.   Make a flow chart showing…
47.   Search the Internet for information about…
48.   Make a crossword puzzle about…
49.   Make a collage of…
50.   Design a symbol of…
51.   Design a T-shirt showing…
52.   Make an illustrated booklet of…
53.   Generate a graph to show…
54.   Debate with a fellow learner…
55.   Do a slide show on the computer about…
56.   Make a poster showing…
57.   Design a bookmark about…
58.   Write a **shape story** about…
59.   Do a scale drawing of…
60.   Do a sand painting for…
61.   Lead a discussion on…
62.   Read a book about…
63.   Design a plan to…

Dr. Carol Ann Tomlinson's Equalizer is repeated here because it is relevant when considering the type of product learners will be required to complete (1999). Each of the domains on The Equalizer represents differing levels of cognition and sophistication. Therefore, this tool is useful when developing alternative activities.

Figure 46. Tomlinson's representation of The Equalizer
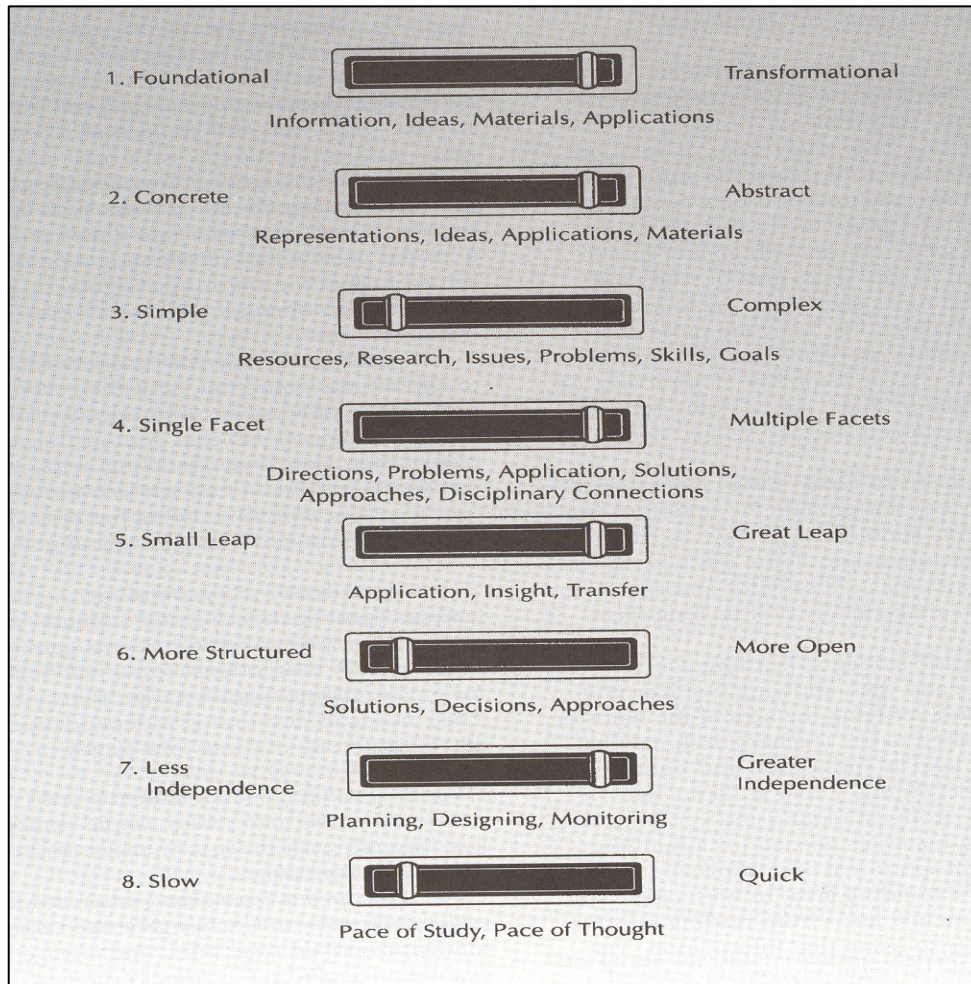
Example #23: Multiple product options
This lesson consists of a lecture on the Buffalo Soldiers and a menu of product options. Consider all the possible ways learners could demonstrate their mastery of the content in this lesson plan taken from the NLB eMuseum curriculum (Chandler, 2006a).

Figure 47. Example of a learning activity with multiple products.

Brief History of Buffalo Soldiers and Baseball
Full Article, Alternate Reading Level (621 words - 8.0 GE)

Black soldiers

143

In 1866, Congress passed the law creating military regiments, made up of only Black soldiers. There were two units that fought on horseback. These units were called the cavalry units. There were another four that fought on foot. They were called infantry regiments. Each of these fighting units had about 1,000 Black men in them.

The cavalry units, were led by White officers. The army sent them west to fight the Indians. They were good fighters. Because of this, they were given the most difficult assignments. The Indians called these troops Buffalo Soldiers because their fighting spirit reminded them of buffalo. These Buffalo Soldiers won many fights against the Indians. They were famous for their bravery.

Soldiers and baseball
When these soldiers were not fighting there was time to play. Baseball was the choice during the summer months. Black soldiers played against White soldiers. Sometimes Black soldiers played against the White people who lived near their forts.

Many people came to watch the games at Fort Douglas, in Utah. This team was called the Colored Monarchs. Players became famous. James Flowers was one of the many Black soldiers that played baseball during their time in the military.

Buffalo Soldiers played baseball at Fort Ethan Allen in Vermont. The games were played on Sunday. That is, until a minister from the town complained. He said the games created a bad environment for the town's young people. The Fort's commander argued that this was not the case but the Army stopped the baseball games between soldiers and people who lived in town. This decision forced the Buffalo Soldier to play games only against other soldiers.

On October 5, 1909, 900 men of the U.S. Army's 25th Infantry Regiment were transferred to Fort Lawton in Washington State. They were famous for their baseball team. They won the US Army championship and were rated the best amateur team in the county. In the Army, Black soldiers played against White soldiers. Some problems did happen. The Buffalo Soldiers won most of their games. They were also good boxers. Sometime fights broke out between Black and White players over a bad call by the umpires. Sometimes boxing matches were arranged between units.

Option 1: Activity for this lesson plan is to have students map out the geographic locations on a world map where the Buffalo Soldiers were stationed. Have them next, look at the climate of these areas and decide what kind of conditions these soldiers would have played baseball in. *http://www.drought.unl.edu/whatis/climographs.htm.*

Option 2: Have students do a website search and find other information about black soldiers and attempt to find the names of soldiers that played baseball or were veterans that played during the years of the Buffalo Soldier.

Option 3: Activity: Students are to write a RAFT (see below) that explores the possible social issues raised by the Buffalo Soldiers' Sunday baseball games at Fort Ethan Allen. The use of the RAFT below allows for considerable differentiation in depth of material, synthesis of information, creativity, and autonomy and interest levels.

Buffalo Soldiers at Fort Ethan Allen

10TH CAV, ST. MARY'S, MT, 1894
© MONTANA HISTORICAL SOCIETY

The Buffalo Soldiers brought character and life to Fort Ethan Allen. In their everyday recreation they played baseball and basketball. They often played baseball games against the civilian teams in the area until this was stopped by a complaint. A local minister, who was upset that these games were held on Sundays, wrote to the War Department and stated that they furnished an "Attraction for the young people to an environment which was not the best for them." The commander of the Tenth replied that no one was compelled to come to these games, but the military responded to the minister's pressure and the Sunday games were banished.

The commander was upset by this action; he remarked that there was more vice just outside the post in "disreputable dives" than took place in the form of Sunday baseball games. Unfortunately the policy did not change, so the men were forced to play against other military or professional teams.

This information was retrieved from *http://personalweb.smcvt.edu/thefort/ history/BuffaloSoldiers.htm.*

R – Role: Your role is that of the Fort Commander.

A – Audience: Your audience is US Army headquarters, your superior officer.

F – Form: A letter of appeal.

T – Topic: The benefits of Sunday baseball games and why they should not be banned.

Option 4: Below is a Power Point presentation developed as an alternative activity. The original activity requires the learner to write an essay and this version applies technology to record the learner's thoughts. The structure and organization is presented to the learner, thus compensating for potential difficulties in cognition, writing ability or executive functioning. This support allows the learner to focus their energy on the content, not the presentation.

Buffalo Soldiers Power Point Activity

What's In A Name?

The Buffalo Soldiers

Slide 1.

What's In A Name?

In this activity you will use the Internet to learn about the Buffalo Soldiers, and how they got their name. You will compare and contrast the Buffalo Soldiers, and the American Bison (the Buffalo) to see how the American Indians came to call the Black regiments of the US Army the Buffalo Soldiers.

Slide 2.

Write as many facts as you can about Buffalo Soldiers.

Try these websites to learn more:
http://washingtontimes.com/arts/20030516-102239-6606r.htm

http://www.buffalosoldier.net/home.htm

1.
2.
3.
4.
5.
6.
7.
8.

Slide 3.

Write some facts about buffalos.

Use these websites to help you:
http://www.oaklandzoo.org/atoz/azbison.html

http://www.montana.edu/~wwwcbs/pictures.html
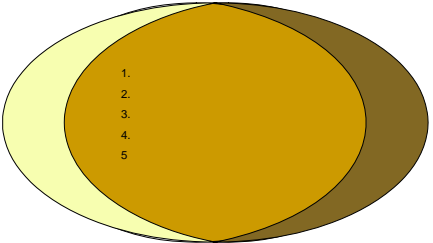
1.
2.
3.
4.
5.
6.
7.
8.

Slide 4.

Which facts do you have in both circles? Write them in the middle.

1.
2.
3.
4.
5

Slide 5.

Why would the American Indians name the Black soldiers "Buffalo Soldiers?

Slide 6.

Example #24: Layered learning activities
This example was written for the NLB eMuseum (Barragree, 2006c) and contains multiple product options for learners to choose. Note that each level of learning activities (assignments) requires an oral defense. Learner must complete and defend all the activities in the C level to progress to the B level, etc. Higher level thinking skills are

146

required in the A level than the other two. This aspect is what makes layered curriculum such an effective way to differentiate by interest and readiness level.

Figure 48. Example of a layered learning activity.

Negro Leagues Baseball

You must complete the required number of points in each section and defend each submission individually and orally before moving on to the next section. <u>A maximum of two assignments per person will be accepted per day so manage your time accordingly</u>.

C Level Assignments: A maximum of 40 points can be earned at this level.	Points Possible	Points Earned	Teacher's Signature
Write a one page paper on one of the following players: Fleetwood Walker, Satchel Paige, Josh Gibson, or "Cool Papa Bell".	5		
Listen to the taped selection of *Black Diamond* by McKissack and McKissack and write a one page summary of the information.	5		
Go to the following website and listen to interviews with NLB players and relatives, orally tell or write a one page paper on what NLB was like during this time.	5		
Draw five NLB player trading cards, include a drawing of the player, position played, and team(s) played for, team logo, and career starting and ending dates.	5		
Write a diary entry from a NLB player's perspective for four days, include a description of at least one game.	5		
Listen to music from Ella Fitzgerald or Duke Ellington. Tell or write the meaning of one of their songs.	5		
Read the article at: *http://www.infoplease.com/spot/negroLeagues1.html* and create a timeline from the information.	5		
Watch one of the Negro Leagues videos and tell or write about the conditions NLB players endured and how they were treated by Whites and society as a whole.	5		
Recreate a typical NLB stadium using whatever materials you want.	5		
Draw signs (one point per sign) depicting "separate but equal" facilities and/or treatment.	5		

Assignment	Points Possible	Points Earned	Teacher's Signature
What are Jim Crow laws? Describe, draw, or write a summary.	5		
Define segregation, integration, discrimination, racism, and slavery (one point per word).	5		
Tell, draw, or write one paragraph answering this question. Does slavery still exists today, and if so, why?	5		
Reenact a situation in which you or someone you know was discriminated against, and explain why you think it was discrimination.	5		
Define Negro Renaissance and name three important contributors of the time.	5		
Write a poem or a song that reflects upon NLB.	5		
Draw a cartoon depicting any NLB team(s), player(s), or owner(s).	5		
Create an artist's sketch of a woman involved in the NLB, be sure to color and label the sketch for full credit.	5		
B Level Assignments: Choose one for 20 points	Points Possible	Points Earned	Teacher's Signature
Research NLB innovations, how did they contribute to the success of NLB? What, if any, other innovations could have helped save NLB? How would these have helped? What else could have been done to prolong NLB? Write a 3-4 page paper.	20		
Listen to Ted Williams' Hall of Fame induction speech. Write a 3-4 page paper detailing if you agree with his proposal to induct NLB players into the Hall of Fame, and support your position with historical information.	20		
What was the major turning point in NLB? Why? Write a 3-4 page paper and support your position with historical information.	20		
A Level Assignments: Choose one for 30 points	Points Possible	Points Earned	Teacher's Signature
Research Black women in NLB, choose one woman to write a six page historically based story about NLB from her perspective.	30		
Create an interactive timeline showing the history of NLB from its inception to its demise. Then post your timeline to a classroom website. See me for the directions on how to create an interactive timeline.	30		

Research court cases dealing with segregation   30
and/or discrimination and/or integration. Write a
summary of at least 3 cases. Choose one case, and
write a trial transcript of what you think occurred in
court include both the defending and prosecuting
points of view.

Example# 25: RAFTs

> RAFTs are powerful learning activities because they offer a wide variety of options that can be differentiated by readiness level, interest level or learning style. Some options can use technology supports.

RAFTs are writing prompts that can be differentiated by varying the concrete/abstract level, creativity level, concept depth level, etc. RAFTS offer a variety of product options as well. R = role, A = audience, F = format, T = topic. By offering learners different combinations of options, learners can choose options that fit their individual needs, thus increasing motivation.

This series of RAFTS was developed for the NLB eMuseum (Doswell, 2006a) on the topic of the First Colored World Series in 1924. The Kansas City Monarchs prevailed over Hilldale of Philadelphia. The RAFT chart contains 100 different writing combinations.

Figure 49. Example of multiple RAFT options for a learning activity.

Role	Audience	Format	Topic
A newspaper reporter for the Kansas City Times	The citizens of Philadelphia	An invitation	The potential profit to be made from the Negro World Series
Ed Bolden	The coach of the Hilldale of Philadelphia	A letter or article	The thrill of the moment
A 12 year old Black boy from Philadelphia	The family of the character chosen in the Role column	A poem	The implications of this series on race relations
The mother of Jose Mendez	The patrons of the the local newspaper	A song	The caliber of Negro League Players
The mayor of Kansas City in 1924	The pitcher of the opposing team	An illustration	A play-by-play of a portion of one of the games

Example #26: Blogs

> **e Blogger** allows users to set up blogs, free of charge. Find it at

www.blogger.com/start.

This example is from a lesson plan created for the NLB eMuseum (Barragree 2006d). The lesson includes a description of blogs and a step-by-step set of instructions for creating a blog that was used as the learning activity for the lesson.

Description of a blog: A web log (or blog) is a web-based space for writing where all the writing and editing of information is managed through a web browser and is immediately and publicly available on the Internet. A blog site is managed by an individual who compiles lists of links to personally interesting material, interspersed with information and editorial. Individuals use the public aspect of the blog to check where other people "are at" and to see what others are learning, but also to gauge their own progress compared to others. Blogs are able to integrate the personal aspect of a traditional learning journal that documents a learner's thoughts and ideas about a topic(s) with the publishing capability of the web. The blog is a way of documenting learning and collecting information for self-analysis and reflection.

Figure 50. Example of a learning activity using a blog.

Blog Activity

Learning activity: Students will use the blog to organize their thoughts and findings on oral traditions, folklore, negro Leagues baseball, NL players, and other cultures' oral traditions and folklore. The blogging experience is about not only putting thoughts on the web, but hearing back from and connecting with other students and like-minded people. Therefore students are able to observe others' learning through reading each other's learning journal blogs.

Creating a blog: eBlogger allows for lots of control. Go to the "Settings" page and you can modify things like time stamps, who can comment, etc. The best way to control access is to limit members of the blog. You can then add members by adding in their email addresses which makes it a private blog. You can even create a mirror blog for others to read and respond as well.

1.. Click on "Set up Blog Now."
2. Enter some basic information-name, email address, etc.
3. Choose a pre-made template for your blog or make your own if you like.
4. Under "Settings" click on members and add member (student) email addresses. An invite email is sent to each member and they must accept in order to begin blogging. This allows you to see who has accessed the blog.
5. Under "Settings" click on archive, select the frequency you want to archive the blog postings.
6. Under "Settings" click on comments, under who can comment set it to only members of this blog. Now only members (students) you have allowed can comment on this page.
7. After you make all the changes you want under "Settings", be sure to click on the republish button to update your changes.
8. To begin blogging, click on "Posting" and blog

Example #27: Pod casts

Podcasting's initial appeal was to allow individuals to distribute their own "radio shows," but the system quickly became used in a wide variety of other ways, including distribution of <u>school lessons</u>, official and unofficial audio tours of museums, conference meeting alerts and updates, and by police departments to distribute public safety messages. The recent wide availability of MP3 players makes pod casts an up and coming media format. To create a pod cast, learners would initially create a story, either in print or using a video camera. There are instructions posted on the Internet to convert a digital movie to a pod cast and there are software packages available to record them directly.

Audacity is a free, easy-to-use audio editor and recorder for Windows, Mac OS X and Linux. Creates podcasts; record audio up to 24-bit 96kHz; convert tapes and records to MP3 or CD; edit OGG, MP3 and WAV files; cut, copy, splice, and mix sounds together, change the speed or pitch of a recording. Import sound files, edit them, and combine them with other files or new recordings. Export recordings in several common formats. Download it free from *http://www.topdrawerdownloads.com/download/104513*.

Example #28: Self-assessment
Having learners reflect upon their learning is a powerful tool. Like other supportive materials, self-assessment tools should offer flexible response formats. Consider this example from one of the NLB eMuseum lesson plans.

Figure 51. Example of a structured self assessment tool.

Version 1: Structured and tight
Answer the questions below to create a written assessment of the work that you did during the project.

A. Content Knowledge
What new things did you learn while you worked on this project? List at least 3.

    1.   _____
    2.   _____
    3.   _____

B. Collaboration and Teamwork
Fill out the chart to list how you helped your team.
    What I did   How it helped
1.

2.

3.

151

C. Technology Improvement
List at least one new thing you learned about using technology to get your ideas
across:

Figure 52. Open ended self assessment tool.

Version 2: Open ended
Take a moment and fill in the graphic organizer with the information you learned from
this activity.

Chapter Three

- <u>Self</u> Assessment
- Priorities

Introduction

The 28 examples included in this handbook were created by a team of educators from museums and schools. Not all museums will have the luxury of this kind of team, however all museums can increase the accessibility of materials they create. Partnerships with school educators, especially special educators will prove very helpful in this process. Additionally, time and technology resources may be limited for some museums. Many of the techniques included in this handbook use simple tools that are probably on the desktop in the museum office. One computer that is connected to the Internet is all that is needed to download most of the software tools that were used in these examples.

<u>Self</u> Assessment

Educators from both museums and schools may find it helpful to critique curriculum materials using this rating scale. Items have been created using Carol Ann Tomlinson's Equalizer model (1999) and Robert Mace's Principles of Universal Design (1997). Educators can examine curriculum for elements of accessibility in the areas of cognitive load, readiness, interest, motivation and learning style. It may also be helpful to have colleagues use the scale to rate materials created by each other in order to ensure that intuitive assumptions have not been made during the design phase that would decrease the materials' accessibility.

Figure 53. Curriculum material accessibility scale.

Curriculum Material Accessibility Scale

#	Item					
1	**Information and ideas are…**	Foundational **5**	**4**	**3**	**2**	Transformational **1**
2	**Representations and applications are…**	Concrete **5**	**4**	**3**	**2**	Abstract **1**
3	**Problems, goals, research and issues are…**	Simple **5**	**4**	**3**	**2**	Complex **1**
4	**Directions, solutions, approaches and applications are…**	Single facet **5**	**4**	**3**	**2**	Multiple facets **1**
5	**Applications, insight and transfer skills are…**	Small leaps **5**	**4**	**3**	**2**	Great leaps **1**
6	**Solutions, decisions, and approaches are…**	More structured **5**	**4**	**3**	**2**	More open **1**
7	**Planning, designing and monitoring are…**	Less independence **5**	**4**	**3**	**2**	More independence **1**
8	**Pace of study and thought is…**	Slow **5**	**4**	**3**	**2**	Quick **1**
9	**Presentation of content contains…**	At least 3 methods **5**	**4**	**3**	**2**	Only one method **1**
10	**Process of engagement is…**	Flexible **5**	**4**	**3**	**2**	Rigid **1**
11	**Product offers…**	At least 3 options **5**	**4**	**3**	**2**	Only one option **1**
12	**Activity uses…**	At least 2 sensory modes **5**	**4**	**3**	**2**	One sensory mode **1**
13	**Required use of the materials is…**	Simple and intuitive **5**	**4**	**3**	**2**	Complex-requires instruction **1**
14	**Information and ideas are…**	Easily perceived **5**	**4**	**3**	**2**	Indistinct **1**
15	**Tolerance for error is…**	High **5**	**4**	**3**	**2**	Low **1**
16	**Physical effort required is…**	Low **5**	**4**	**3**	**2**	High **1**
17	**Space for approach and use is…**	Large **5**	**4**	**3**	**2**	Small **1**
18	**Format of text is…**	Digital **5**	**4**	**3**	**2**	Print **1**
19	**Materials are…**	Interactive **5**	**4**	**3**	**2**	Static **1**
20	**Variety of materials is…**	Large **5**	**4**	**3**	**2**	Small **1**

154

The higher the score on these twenty questions, the higher the level of accessibility.

References:
Center for Applied Special Technology (CAST). (2006). *What is universal design for
        for learning?.* Retrieved February 5, 2006 from http://www.cast.org/research/udl/

Priorities
Once educators become aware of the critical need to make their curriculum materials accessible, the biggest barrier to achieving this goal will be the availability of resources. Initially, educators would be well served to set small goals that will require minimal additional resources of:
1.   Time.
2.   Staff.
3.   Equipment.

This goal setting process should be guided by the educator's ability to prioritize. It is much easier to design accessible supportive materials for new curriculum than it is to retrofit existing curriculum. Start with a new project. As text is being prepared, create a digital version and store the material using a digital method. This will allow the manipulation of that text in a variety of ways. Seek out supportive images that supplement the content of that text. Explore digital photographs and movie clips. Finally, identify the "big ideas" of the material. What is it you want all learners to gain from the experience, despite their diverse skill levels, interests and physical attributes? Create one scaffold that captures these big ideas and store it digitally, along with the text and image files. This basic set of data will provide a foundational set of materials from which other scaffold materials can be created. It may be helpful to store this data set as separate files, but together in a folder for easy retrieval. Educators will be able to find materials quickly if the format of the digital file is also recorded. Using a chart like figure 46 may be helpful.

Figure 54. Curriculum materials storage chart.

Title of the content:		
TEXT		
File name:	Location:	Format:
IMAGES/SOUNDS		
File name:	Location:	Format:
BIG IDEAS: 1.	**2.**	
3.	**4.**	

File name:	Location:	Format:

Summary

When professional educators working in schools or museums, seek to increase the scope of the curriculum they design they will benefit from these techniques. When applied during the initial design phase of the curriculum development process, these techniques will enhance the accessibility of curriculum and; therefore, enhance the delivery of content to learners and patrons with varied learning needs. These tools are also effective when used to retrofit already existing curricular materials; however, they may be more difficult and time consuming to implement after the fact. Therefore, the reader is encouraged to reflect upon the many diverse consumers that may benefit from a wider range of options and make a strategic decision to incorporate supports for those consumers as the development process unfolds. This decision will ultimately benefit many potential consumers.

Museum patrons who do not think about the museum's collection do not benefit from their museum experiences. The process of cognition varies greatly among patrons, both those with and those without disabilities. Physical differences such as mobility and sensory diversity have a profound impact on a patron's cognitive experience. Therefore, enhancing the accessibility of the mental process a museum visitor engages in has the potential to deliver a museum's content to a wider audience. The methods in this handbook utilize the principles of universal design; a set of design strategies that are already in use in the physical environment of many museums. The handbook seeks to expand these applications to the cognitive experiences that are delivered through curriculum materials.

It goes without saying that the educational system is greatly concerned with the process of cognition. Curriculum design has typically been the task of school educators and the methods and tools presented in this handbook are based on educational research and practice. Teachers will find these techniques useful in the lesson planning process as well.

The diversity represented by any group of potential learners can be an important part of the learning equation. Learners' capacities are not inherent; capacities are defined by the interplay between learners' abilities and the tools they use. When educators design additional supportive tools for learners to use, diverse groups of learners can reach the same learning goal, but can use different paths to achieve it. In schools, this process is imperative as educators are challenged to "Leave No Child Behind" and in museums the potential diversity represented by prospective patrons is unlimited.

Anyone who embraces the task of imparting knowledge must do so with an eye toward accessibility. This can be done by bringing rich learning experiences to all learners via materials that are truly accessible. When accomplished in the early planning stages, designing accessible materials is a creative, natural process.

References

4Kids.org. (n.d.) 4Kids.org. Retrieved November 19, 2006 from www.4Kids.org

Adaptive Environments. (2003). *Universal design.* Retrieved January 31, 2006, from

       http://www.adaptiveenvironments.org/index.php?option=Content&Itemid=3

American Association of Museums. (2005). *Accreditation program standards*. Retrieved

       March 4, 2007, from http://www.aam-

       us.org/museumresources/accred/upload/Characteristics%20of%20an%20Accredit

       able%20Museum%201-1-05.pdf

Association of Science Technology Centers. (2004). *Accessible Practices*. Retrieved

       March 26, 2006, from http://www.astc.org/resource/access/index.htm

Amberton University. (n.d.) Glossary of library terms. Retrieved December 20, 2006

       from http://www.amberton.edu/VL_terms.htm

Baillargeon, T. (2006). Aftermath of freedom fighters lesson plan. Retrieved December

       15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006a). Publishing history lesson plan. Retrieved December 15, 2006

       from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006b). Folklore and oral history lesson plan. Retrieved December 15,

       2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006c). Negro leagues baseball lesson plan. Retrieved December 15, 2006

       from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006d). Blogging baseball lesson plan. Retrieved December 16, 2006

       from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Berninger, V., Abbott, R., Abbot, S., Graham, S., & Richards, T. (2002). Connections

between language by hand and language by eye. *Journal of Learning Disabilities,*

35 (1), 39-56.

Boston Museum of Science. (2001b). *Star Wars: Where science meets imagination:*

Accessibility. Retrieved February 11, 2006, from http://www.mos.org/doc/1870

Boston Museum of Science. (2001c). *Universal design (accessibility).* Retrieved January

23, 2006, from http://www.mos.org/exhibitdevelopment/access/index.html

Center for Applied Special Technology. (2006). *What is universal design for learning?*

Retrieved February 5, 2006, from http://www.cast.org/research/udl/

Center for Universal Design (1997). *The principles of universal design version 2.0.*

Raleigh NC: North Carolina State University. Retrieved July 16, 2006, from

http://www.design.ncsu.edu:8120/cud/about_ud/docs/English.pdf

Center for Universal Design (2006a). *About universal design.* Retrieved July 14, 2006,

from http://www.design.ncsu.edu/cud/about_ud/about_ud.htm

Center for Universal Design (2006b). *Universal design in housing*. Retrieved July 14,

2006, from http://www.design.ncsu.edu/cud/about_ud/docs/UD_Housing.pdf

CITES. (2006). Glossary of acronyms and technical terms. Retrieved December 20, 2006

from http://www.cites.uiuc.edu/glossary/index.html

Chandler, E. (2006a). Buffalo soldiers lesson plan. Unpublished manuscript.

Chandler, E. (2006b). Women and negro baseball leagues lesson plan. Retrieved

December 15, 2006 from http://coe.k-

state.edu/nlbemuseum/resource/lessonplans.html

Cole, E., and Matthews, M. (1999). Cognitive prosthetics and telerehabilitation:

Approaches for the rehabilitation of mild brain injuries. In J. Murner & T. M.

Ettlin (Eds.), Distorsion & Leichte Traumatische Himverletzung

Behandfungskonzepte (pp 111-120). Basel, Switzerland.

DataCore Technology, Inc. (2006). Glossary of terms. Retrieved December 19, 2006

from http://www.data-core.com/glossary-of-terms.htm

Dodge, B. (2001). FOCUS: Five rules for writing great WebQuests. *Learning & Leading with Technology,* 28 (8).

Doswell, R. (2006a). Colored world series lesson plan. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Doswell, R. (2006b). A brief history of the negro leagues. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Edyburn, D. (2003a). *Assistive technology for students with mild disabilities: From consideration to outcome measurement*. Presented at Closing The Gap,

Minneapolis, MN.

Edyburn, D. (2004a). Cognitive rescaling strategies. *Closing The Gap*. Retrieved

November, 23, 2006, from

http://www.paec.org/fdlrstech/SummerInstitute/fdlrs2004/Edyburn/PDFs/Cognitiverescaling.pdf

Edyburn, D. (2004b). Rethinking assistive technology. *Special Education Technology Practice*, 5(4), 16-23.

Edyburn, D. (2005). *A primer in universal design (UD) in education.* Retrieved March

11, 2006, from http://www.uwm.edu/~edyburn/ud.html

Howard, G., Ellis, H., & Rasmussen, K. (2004). From the arcade to the classroom:

Capitalizing on students' sensory rich media preferences in disciplined-based

learning. *College Student Journal.* 38(3), 431-441.

IDEA (2004). *Selected sections of individuals with disabilities education act*

  H.R. 1350, SECTION 602: Definitions. Retrieved July 9, 2006 from

  http://www.kansped.org/ksde/laws/idea04/602.doc

Katz, J., Stecker, N.A., & Henderson, D. (1992). Introduction to central auditory

  processing. In J. Katz, N.A. Stecker & D. Henderson (Eds.), *Central auditory*

  processing: A Tran disciplinary view (pp. 3-8). St. Louis: Mosby Year Book, Inc.

Kess, S. (1970). *Explanation of Tax reform act of 1969: P.L. 91-172.* Chicago, Chicago

  Review Press.

Kierman, L. & Tomlinson, C. (1997). *Why Differentiate Instruction*? Alexandria, Va.:

  Association for Supervision and Curriculum Development.

Library of Congress. (n.d.). *HR1350.* Retrieved March 26, 2006, from

  http://thomas.loc.gov/cgi-bin/query/F?c108:1:./temp/~c108ku8qRE:e16556

Mace, R. (1997). *What is universal design?* Retrieved January 24, 2006, from

  http://www.design.ncsu.edu:8120/cud/newweb/about_ud/aboutud.htm

Majewski, J. (n.d.). *Smithsonian guideline to accessible exhibition design.* Retrieved

  January 23, 2006, from http://www.si.edu/opa/accessibility/exdesign/start.htm

  http://web.mit.edu/campaign/styleguide/glossary.html

Marron. (n.d.). Tiered lesson plan: Causes of the civil war. Retrieved November 26, 2006

  from http://www.bsu.edu/web/jfmarron/tlpcauses.html

McNeil, J. (1997). *Disabilities affect one fifth of all Americans.* Census Brief 97-5.

  Retrieved July 14, 2006, from

  http://www.census.gov/prod/3/97pubs/cenbr975.pdf

Melvin, B. & Dale, C. (2006) Persuasive writing: Instructional unit resource guide.

  Unpublished manuscript.

Mott, L. (2006a). Research tool for time warp activity. Retrieved December 15, 2006

    from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Mott. L. (2006b). The dirty laundry of segregation. Unpublished manuscript.

National Multiple Sclerosis Society. (2004). *Glossary*. Retrieved March 26, 2006, from

    http://www.nationalmssociety.org/I%20-%20N.asp

Nebraska Department of Education. (n.d.). Glossary. Retrieved December 19, 2006 from

    http://www.nde.state.ne.us/READ/FRAMEWORK/glossary/general_u-z.html

Negro Leagues Baseball Museum. (n.d.). Retrieved March 29, 2006, from

    www.nlbm.com

North Central Regional Educational Laboratory. (2004). *Glossary of education terms and*

    acronyms. Retrieved February 17, 2006, from

    http://www.ncrel.org/sdrs/areas/misc/glossary.htm

Nunley, K. (2003). Layered curriculum brings teachers to tiers. *Education Digest* 69(1),

    31-37. Retrieved November 30, 2006 from

    http://proquest.umi.com.er.lib.ksu.edu/pqdlink?Ver=1&Exp=11-29-

    2011&FMT=7&DID=424927581&RQT=309&clientId=48067

Orkwis, R. (1999). *What is curriculum access?* The ERIC Clearinghouse on Disabilities

    and Gifted Education. Retrieved March 26, 2006, from

    http://ericec.org/digests/e586.html

Peirce, R., & Adams, C. (2004). Tiered lessons: One way to differentiate mathematics

    instruction. *Gifted Child Today,* 27(2), 58-67.

Prestia, K. (2004). Incorporate sensory activities into the classroom. *Intervention in*

    School and Clinic, 39(3), 172-175.

Rehabtool. (2004). What's assistive technology? Retrieved December 19, 2006 from

      http://www.rehabtool.com/at.html#Speech%20and%20Augmentative%20Commu

      nication%20Aids

Rose, D., and Meyer, A. (1998). *Learning to read in the digital age*. Brookline Books.

      Digital version. Retrieved October 1, 2006, from

      http://www.cast.org/teachingeverystudent/ideas/tes/

Rose, D., and Meyer, A. (2002). *Teaching Every Student in the Digital Age: Universal*

      Design for Learning. ASCD. Digital version. Retrieved October 1, 2006, from

      http://www.cast.org/teachingeverystudent/ideas/tes/

Schumm, J.S., Vaughn, S., & Harris, J. (1997). Pyramid power for collaborative

      planning. *Teaching Exceptional Children*, 29(6), 62-66.

System for Adult Basic Education Support. (n.d.). *Glossary of useful terms.*

      Retrieved April 14, 2006, from http://www.sabes.org/assessment/glossary.htm

Tokar, S. (2003). *Universal design: An optimal approach to the development of hands-on*

      exhibits in science museums. Retrieved January 12, 2006, from

      http://www.stevetokar.com/images/pdf_files/Tokar_UD_thesis.pdf

Tomlinson, C. (1999). *The differentiated classroom: Responding to the needs of all*

      learners. Alexandria, VA: Association for Supervision and Curriculum

      Development.

Tomlinson, C. (2000). Reconcilable differences? Standards-based teaching and

      differentiation. *Educational Leadership, 58(1), 6-11.*

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction and*

      understanding by design: Connecting content and kids. Alexandria, VA:

      Association for Supervision and Curriculum Development.

United States Department of Education. (2003). *Overview: Fact sheet on the major*

   provisions of the conference report to H.R. 1, the no child left behind act.

   Retrieved February 16, 2006, from http://www.ed.gov/nclb/landing.jhtml

United States Department of Justice. (2005). *ADA references and technical materials.*

   Retrieved February 12, 2006, from

   http://www.usdoj.gov/crt/ada/publicat.htm#Anchor-ADA-44867

United States National Library of Medicine. (2006). Medical encyclopedia. Retrieved

   November 19, 2006, from

   http://www.nlm.nih.gov/medlineplus/ency/article/002286.htm

Van Garderen, D., & Whittaker, C. (2006). Planning differentiated, multicultural

   instruction for secondary inclusive classrooms. *Teaching Exceptional Children,*

   38(3), 12-20.

VanSciver, J. (2005). Motherhood, apple pie, and differentiated instruction. *Phi Delta*

   Kappan, 86(7), 534.

WordReference. (2005). English Dictionary. Retrieved April 1, 2006, from

   http://www.wordreference.com/definition

Bibliography

4Kids.org. (n.d.) 4Kids.org. Retrieved November 19, 2006 from www.4Kids.org

Adaptive Environments. (2003). *Universal design.* Retrieved January 31, 2006, from

http://www.adaptiveenvironments.org/index.php?option=Content&Itemid=3

American Association of Museums. (2005). *Accreditation program standards*. Retrieved

March 4, 2007, from http://www.aam-

us.org/museumresources/accred/upload/Characteristics%20of%20an%20Accredit

able%20Museum%201-1-05.pdf

Association of Science Technology Centers. (2004). *Accessible Practices*. Retrieved

March 26, 2006, from http://www.astc.org/resource/access/index.htm

Amberton University. (n.d.) Glossary of library terms. Retrieved December 20, 2006

from http://www.amberton.edu/VL_terms.htm

Baillargeon, T. (2006). Aftermath of freedom fighters lesson plan. Retrieved December

15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006a). Publishing history lesson plan. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006b). Folklore and oral history lesson plan. Retrieved December 15,

2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006c). Negro leagues baseball lesson plan. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006d). Blogging baseball lesson plan. Retrieved December 16, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Berninger, V., Abbott, R., Abbot, S., Graham, S., & Richards, T. (2002). Connections

between language by hand and language by eye. *Journal of Learning Disabilities,*

35 (1), 39-56.

Boston Museum of Science. (2001b). *Star Wars: Where science meets imagination:*

Accessibility. Retrieved February 11, 2006, from http://www.mos.org/doc/1870

Boston Museum of Science. (2001c). *Universal design (accessibility).* Retrieved January

23, 2006, from http://www.mos.org/exhibitdevelopment/access/index.html

Center for Applied Special Technology. (2006). *What is universal design for learning?*

Retrieved February 5, 2006, from http://www.cast.org/research/udl/

Center for Universal Design (1997). *The principles of universal design version 2.0.*

Raleigh NC: North Carolina State University. Retrieved July 16, 2006, from

http://www.design.ncsu.edu:8120/cud/about_ud/docs/English.pdf

Center for Universal Design (2006a). *About universal design.* Retrieved July 14, 2006,

from http://www.design.ncsu.edu/cud/about_ud/about_ud.htm

Center for Universal Design (2006b). *Universal design in housing*. Retrieved July 14,

2006, from http://www.design.ncsu.edu/cud/about_ud/docs/UD_Housing.pdf

CITES. (2006). Glossary of acronyms and technical terms. Retrieved December 20, 2006

from http://www.cites.uiuc.edu/glossary/index.html

Chandler, E. (2006a). Buffalo soldiers lesson plan. Unpublished manuscript.

Chandler, E. (2006b). Women and negro baseball leagues lesson plan. Retrieved

December 15, 2006 from http://coe.k-

state.edu/nlbemuseum/resource/lessonplans.html

Cole, E., and Matthews, M. (1999). Cognitive prosthetics and telerehabilitation:

Approaches for the rehabilitation of mild brain injuries. In J. Murner & T. M.

Ettlin (Eds.), Distorsion & Leichte Traumatische Himverletzung

Behandfungskonzepte (pp 111-120). Basel, Switzerland.

CT Developing. (2006). PDF text reader. Retrieved October 15, 2006 from

http://www.ctdeveloping.com/ctdeveloping/products/pdftextreader_info.asp

DataCore Technology, Inc. (2006). Glossary of terms. Retrieved December 19, 2006

from http://www.data-core.com/glossary-of-terms.htm

Deshler, D. D., Robinson, S., & Mellard, D. F. (2004). Instructional principles for

optimizing outcomes for adolescents with learning disabilities. In M. K. Riley &

T. A. Citro (Eds.), Best practices for the inclusionary classroom: Leading

researchers talk directly with teachers. Weston, MA: Learning Disabilities

Association Worldwide.

Discoveryschool. (2006). Kathy Schrock's guide for educators. Retrieved November 19,

2006, from http://school.discovery.com/schrockguide/

Dodge, B. (2001). FOCUS: Five rules for writing great WebQuests. *Learning & Leading
with Technology,* 28 (8).

Doswell, R. (2006a). Colored world series lesson plan. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Doswell, R. (2006b). A brief history of the negro leagues. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Edmunds, A.L. (1999) Cognitive credit cards: Acquiring learning strategies. *Teaching
Exceptional Children*, 31 (4), 68073. Retrieved November 30, 2006 from

http://vnweb.hwwilsonweb.com.er.lib.ksu.edu/hww/shared/shared_main.jhtml?_r

equestid=88555

Edyburn, D. (2000). *Assistive technology and students with mild disabilities*. Focus on

Exceptional Children, 32(9), 1-24.

Edyburn, D. (2001a). Critical issues in special education technology research: What do we know? What do we need to know? In M. Mastropieri & T. Scruggs., (Eds.). Advances in learning and behavioral disabilities, Volume 15, NY: JAI Press, pp.95-118.

Edyburn, D. (2001b). Models, theories and frameworks: Contributions to understanding special education technology. *Special Education Technology Practice,* 3(2), 16-24.

Edyburn, D. (2003a). *Assistive technology for students with mild disabilities: From consideration to outcome measurement*. Presented at Closing The Gap, Minneapolis, MN.

Edyburn, D. (2003b). Learning from text. *Special Education Technology Practice*, 5 (2), 16-27.

Edyburn, D. (2004a). Cognitive rescaling strategies. *Closing The Gap*. Retrieved November, 23, 2006, from http://www.paec.org/fdlrstech/SummerInstitute/fdlrs2004/Edyburn/PDFs/Cognitiverescaling.pdf

Edyburn, D. (2004b). Rethinking assistive technology. *Special Education Technology Practice*, 5(4), 16-23.

Edyburn, D. (2005). *A primer in universal design (UD) in education.* Retrieved March 11, 2006, from http://www.uwm.edu/~edyburn/ud.html

Edyburn, D. (2206). Cognitive prostheses for students with mild disabilities: Is this what assistive technology looks like? *Journal of Special Education Technology*, 21(4), 62-65.

Edburn, D. (2007). Re-examining the role of assistive technology in learning. *Closing the Gap*. 25(5), 1-5.

How Stuff Works. (2006). How stuff works. Retrieved November 19, 2006, from

    www.howstuffworks.com

Howard, G., Ellis, H., & Rasmussen, K. (2004). From the arcade to the classroom:

    Capitalizing on students' sensory rich media preferences in disciplined-based

    learning. *College Student Journal.* 38(3), 431-441.

IDEA (2004). *Selected sections of individuals with disabilities education act*

    H.R. 1350, SECTION 602: Definitions. Retrieved July 9, 2006 from

    http://www.kansped.org/ksde/laws/idea04/602.doc

Inspiration. (n.d.). Inspiration software. Retrieved November 19, 2006, from

    http://www.inspiration.com

Jatala, S. & Seevers, R. (2006). Nature and use of curriculum in special education.

    Academic Exchange Quarterly, 10(1), 192-197.

Katz, J., Stecker, N.A., & Henderson, D. (1992). Introduction to central auditory

    processing. In J. Katz, N.A. Stecker & D. Henderson (Eds.), *Central auditory*

    processing: A Tran disciplinary view (pp. 3-8). St. Louis: Mosby Year Book, Inc.

Kay, R. (2006). Evaluating strategies used to incorporate technology into preservice

    education: A review of the literature. *Journal of Research on Technology in*

    Education. 38 (4). 383-408.

Kess, S. (1970). *Explanation of Tax reform act of 1969: P.L. 91-172*. Chicago, Chicago

    Review Press.

Kierman, L. & Tomlinson, C. (1997). *Why Differentiate Instruction*? Alexandria, Va.:

    Association for Supervision and Curriculum Development.

Library of Congress. (n.d.). *HR1350*. Retrieved March 26, 2006, from

    http://thomas.loc.gov/cgi-bin/query/F?c108:1:./temp/~c108ku8qRE:e16556

Mace, R. (1997). *What is universal design?* Retrieved January 24, 2006, from

        http://www.design.ncsu.edu:8120/cud/newweb/about_ud/aboutud.htm

Majewski, J. (n.d.). *Smithsonian guideline to accessible exhibition design.* Retrieved

        January 23, 2006, from http://www.si.edu/opa/accessibility/exdesign/start.htm

        http://web.mit.edu/campaign/styleguide/glossary.html

Marron. (n.d.). Tiered lesson plan: Causes of the civil war. Retrieved November 26, 2006

        from http://www.bsu.edu/web/jfmarron/tlpcauses.html

McNeil, J. (1997). *Disabilities affect one fifth of all Americans.* Census Brief 97-5.

        Retrieved July 14, 2006, from

        http://www.census.gov/prod/3/97pubs/cenbr975.pdf

Melvin, B. & Dale, C. (2006) Persuasive writing: Instructional unit resource guide.

        Unpublished manuscript.

Mott, L. (2006a). Research tool for time warp activity. Retrieved December 15, 2006

        from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Mott. L. (2006b). The dirty laundry of segregation. Unpublished manuscript.

National Multiple Sclerosis Society. (2004). *Glossary*. Retrieved March 26, 2006, from

        http://www.nationalmssociety.org/I%20-%20N.asp

NaturalReader. (2006). Naturalreader. Retrieved October 15, 2006, from

        http://www.naturalreaders.com/index.htm

Nebraska Department of Education. (n.d.). Glossary. Retrieved December 19, 2006 from

        http://www.nde.state.ne.us/READ/FRAMEWORK/glossary/general_u-z.html

Negro Leagues Baseball Museum. (n.d.). Retrieved March 29, 2006, from

        www.nlbm.com

North Central Regional Educational Laboratory. (2004). *Glossary of education terms and acronyms.* Retrieved February 17, 2006, from

http://www.ncrel.org/sdrs/areas/misc/glossary.htm

Nunley, K. (1996). Going for the goal: multilevel assignments cater to students of differing abilities. *The Science Teacher*, 63(6), 52-57. Retrieved November 30, 2006 from

http://proquest.umi.com.er.lib.ksu.edu/pqdlink?vinst=PROD&fmt=6&startpage=-1&ver=1&clientid=48067&vname=PQD&RQT=309&did=10096127&exp=11-29-

2011&scaling=FULL&vtype=PQD&rqt=309&TS=1164916196&clientId=48067

Nunley, K. (2003). Layered curriculum brings teachers to tiers. *Education Digest* 69(1), 31-37. Retrieved November 30, 2006 from

http://proquest.umi.com.er.lib.ksu.edu/pqdlink?Ver=1&Exp=11-29-2011&FMT=7&DID=424927581&RQT=309&clientId=48067

Orkwis, R. (1999). *What is curriculum access?* The ERIC Clearinghouse on Disabilities and Gifted Education. Retrieved March 26, 2006, from

http://ericec.org/digests/e586.html

Peirce, R., & Adams, C. (2004). Tiered lessons: One way to differentiate mathematics instruction. *Gifted Child Today,* 27(2), 58-67.

Prestia, K. (2004). Incorporate sensory activities into the classroom. *Intervention in School and Clinic,* 39(3), 172-175.

ReadPlease. (2005) Readplease. Retrieved October 15, 2006, from

http://www.readplease.com/english/readplease.php

Rehabtool. (2004). What's assistive technology? Retrieved December 19, 2006 from

http://www.rehabtool.com/at.html#Speech%20and%20Augmentative%20Commu

nication%20Aids

Robinson, S. (2005). Universal design for learning. Retrieved November 26, 2006 from

http://www.specialconnections.ku.edu/cgi-

bin/cgiwrap/specconn/main.php?cat=instruction&section=main&subsection=udl/

main

Rose, D., and Meyer, A. (1998). *Learning to read in the digital age*. Brookline Books.

Digital version. Retrieved October 1, 2006, from

http://www.cast.org/teachingeverystudent/ideas/tes/

Rose, D., and Meyer, A. (2002). *Teaching Every Student in the Digital Age: Universal

Design for Learning*. ASCD. Digital version. Retrieved October 1, 2006, from

http://www.cast.org/teachingeverystudent/ideas/tes/

Savage, R., Cornish, T., Manly, T. & Hollis, C. (2006). Cognitive processes in children's

reading and attention: the role of working memory, divided attention, and

response inhibition. *British Journal of Psychology* 97(3), 365-386.

Schumm, J.S., Vaughn, S., & Harris, J. (1997). Pyramid power for collaborative

planning. *Teaching Exceptional Children*, 29(6), 62-66.

Siegil, M. (1995). More than words: The generative power of transmediation for learning.

Canadian Journal of Education, 20(4), 455–475.

Slater Software. (2006). Free stuff. Retrieved November 26, 2006 from

http://www.slatersoftware.com/document.html

Students for the Exploration and Development of Space (2005). Students for the

exploration and development of space. Retrieved November 19, 2006, from

www.seds.org

System for Adult Basic Education Support. (n.d.). *Glossary of useful terms.*

Retrieved April 14, 2006, from http://www.sabes.org/assessment/glossary.htm

Tokar, S. (2003). *Universal design: An optimal approach to the development of hands-on exhibits in science museums*. Retrieved January 12, 2006, from

http://www.stevetokar.com/images/pdf_files/Tokar_UD_thesis.pdf

Tomlinson, C. (1995). *How to Differentiate Instruction in Mixed Ability Classrooms,* Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (1999). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (2000). Reconcilable differences? Standards-based teaching and differentiation. *Educational Leadership, 58(1), 6-11.*

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction and understanding by design: Connecting content and kids*. Alexandria, VA: Association for Supervision and Curriculum Development.

Trackstar. (2006) Trackstar. Retrieved November 19, 2006, from

http://trackstar.4teachers.org/trackstar/;jsessionid=A9516CD0521917594BB7095D5BE69D40

United States Department of Education. (2003). *Overview: Fact sheet on the major provisions of the conference report to H.R. 1, the no child left behind act.* Retrieved February 16, 2006, from http://www.ed.gov/nclb/landing.jhtml

United States Department of Education. (2005). *History of IDEA*. Retrieved March 26, 2006, from http://www.ed.gov/policy/speced/leg/idea/history30.html

United States Department of Justice. (2005). *ADA references and technical materials.*

Retrieved February 12, 2006, from

http://www.usdoj.gov/crt/ada/publicat.htm#Anchor-ADA-44867

United States National Library of Medicine. (2006). Medical encyclopedia. Retrieved

November 19, 2006, from

http://www.nlm.nih.gov/medlineplus/ency/article/002286.htm

Van Garderen, D., & Whittaker, C. (2006). Planning differentiated, multicultural

instruction for secondary inclusive classrooms. *Teaching Exceptional Children,*

38(3), 12-20.

VanSciver, J. (2005). Motherhood, apple pie, and differentiated instruction. *Phi Delta*

Kappan, 86(7), 534.

World Fact Book (n.d) World fact book. Retrieved November 19, 2006, from

www.odci.gov/cia/publications/factbook

WordReference. (2005). English Dictionary. Retrieved April 1, 2006, from

http://www.wordreference.com/definition

Glossary

Accessibility - The ability of a product to have the user actively engage and use that product (Orkwiss, 1999). Capable of being reached (WordReference, 2005).

Assistive Technology - The use of a device, item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability. (Library of Congress, n.d.).

Auditory Processing - the ability of the brain to process incoming auditory signals. The brain identifies sounds by analyzing their distinguishing physical characteristics frequency, intensity, and temporal features. These are features that are perceived as pitch, loudness, and duration. Once the brain has completed its analysis of the physical characteristics of the incoming sound or message, it then constructs an "image" of the signal from these component parts for comparison with stored "images." If a match

occurs, the brain can then understand what is being heard (Katz, Stecker, & Henderson, 1992).

Augmentative communication device - alternate methods of communicating needs, feelings, ideas, and perceptions through the use of electronic and non-electronic devices that provide a means for expressive and receptive communication for persons with limited or no speech. Examples include communication boards, speech synthesizers, text-to-speech software and hardware, head wands, light pointers, mouth sticks, signal systems, telephony equipment, etc. (Rehabtool, 2004).

Cognition - High level functions carried out by the human brain, including comprehension and use of speech, visual perception and construction, calculation ability, attention (information processing), memory, and executive functions such as planning, problem-solving, and self-monitoring (The National Multiple Sclerosis Society, 2004)

Cognitive prosthesis - a device that replaces or improves the function of a thinking process (Cole and Matthews, 1999).

Cognitive rescaling – an adaptation that modifies the difficulty of cognitive processes needed to process content (Edyburn, 2004).

Curricular scaffold- An instructional technique in which the teacher breaks a complex task into smaller tasks, models the desired learning strategy or task, provides support as students learn to do the task, and then gradually shifts responsibility to the students. In this manner, a teacher enables students to accomplish as much of a task as possible

without adult assistance. (North Central Regional Educational Laboratory (NCREL), 2004).

Differentiated Instruction - A method of teaching that requires teachers to begin where students are rather than at the front of a curriculum guide, and to accept and build upon the premise that learners differ in important ways (Tomlinson, 1999).

Digital - Referring to the electronic storage and presentation of information (Center for Applied Special Technology, 2006).

Diorama - A picture or series of pictures representing a continuous scene (WordReference, 2005).

Educator - One trained in teaching; a teacher; a specialist in the theory and practice of teaching; a person whose occupation is to educate (System for Adult Basic Education Support, n.d.).

Emotiocons- A group of keyboard characters that take on facial expressions and are used to express emotion in text-based electronic communication, ie e-mail, discussions, or conferencing (Sacramento State, n.d.)

Engagement- That part of the learning process in which the learner is occupied with the content. (Rose & Meyer, 2002).

Executive functioning – a cognitive process that operates to schedule competing action plans, and is related to the control of attention through habituation and/or inhibition processes (Savage, Cornish, Manly, and Hollis, (2006).

Individuals with Disabilities Education Act (IDEA) - HR1350, Federal legislation re-authorized in 1997, then again in 2004. The title was changed to the Individuals with Disabilities Education Improvement Act (IDEIA) with the 2004 re-authorization. (United States Department of Education, 2005).

Icons- a pictorial image used in a graphical user interface to represent a program, a command, a link to a Web page, etc. (Amberton, n.d.).

Negro Leagues Baseball Museum (NLBM) - A privately funded, non-profit organization dedicated to preserving the rich history of African American Baseball (NLBM, n.d.).

No Child Left Behind - H.R. 1, The No Child Left Behind Act is a reform of the Elementary and Secondary Education Act (ESEA), enacted in 1965. It redefines the federal role in kindergarten through twelfth grade education to help improve the academic achievement of all American students. It has four major components (a) accountability for results, (b) flexibility at the state and local level, (c) expanded options for parents, and (d) emphasis on research-base teaching methods (U.S. Department of Education, 2003).

Personal Digital Assistants (PDAs) - A handheld device that combines computing, telephone/fax, and networking features. A typical PDA can function as a cellular phone, fax sender, and personal organizer. Many PDAs incorporate handwriting and/or voice recognition features. PDAs also are called palmtops, handheld computers, and pocket computers (CITES, 2006).

Portable Document Format (PDF) - Portable Document Format. PDF is a universal file format that preserves the fonts, images, graphics, and layout of any source document, regardless of the application and platform used to create it. Adobe PDF files are compact and complete, and can be shared, viewed, and printed by anyone with free Adobe Reader software (DataCore, Inc., 2006).

Prosthesis - a device designed to replace a missing part of the body or to make a part of the body work better (United States National Library of Medicine, 2006).

Readiness – a way of looking at a learner's academic functioning skills, that includes current knowledge, understanding, and skill as it relates to what is being studied. Readiness varies from learner to learner, and within an individual learner; either according to content area, daily attitude, state of health, etc. (Tomlinson, 1999; Van Garderen & Whittaker, 2006).

Shape story – a type of graphic organizer in which the learner takes notes in a non-linear fashion. The text creates a design that reflects an important aspect of the content.

Tiered lessons – a method of differentiating instruction by planning lessons in which learners may be assigned different learning objectives, and be assigned different learning activities. However, the activities in which they engaged reflect a consistent learning path towards those objectives (Tomlinson, 1999).

Universal Design - The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (Mace, 1997).

Universal Design for Learning - A blueprint for creating flexible goals, methods, materials, and assessments that accommodate learner differences (Center for Applied Special Technology, 2006).

Venn diagram - in concept mapping, overlapping circles that show those features either unique or common to two or more concepts (Nebraska Department of Education, n.d.).

WebQuest - This inquiry-oriented activity that involves interacting with resources on the Internet. They can be appropriate for almost any age learner or content. According to Dodge (2001), WebQuests contain the following six elements: introduction, task, process, resources, evaluation and conclusion.

Appendices

Appendix 1: Complete Negro Leagues Baseball eMusuem Lesson Plan

This lesson plan was developed by Lori Mott, Negro Leagues Scholar in March, 2006.

Negro Leagues Scrapbook

Key Features of Powerful Teaching and Learning:
(National Council for the Social Studies. A Vision of
Powerful Teaching and Learning in the Social Studies:
Building Social Understanding and Civic Efficacy.
http://www.socialstudies.org/positions/powerful/)

Grade Level: 9-12

Subject: Social Studies

Standards:
NCSS Standards: I, II, III,
IV, V, X
ISTE Standards: 2,3,4,5
Missouri Standards: 2, 5, 6,

<u>Meaningful</u>: Emphasizes social, political, and cultural issues of Black America and the Negro Leagues in the 20th century.

<u>Integrated</u>: Students will use technology to explore Black America and the Negro Leagues in the 20th century.

<u>Challenging</u>: Students will use a variety of skills to demonstrate their understanding of major ideas, eras, themes, and turning points in the history of the United States during the first 75 years of the 20th century.

<u>Active</u>: Students will work in teams to create a scrapbook. Each member will play a role in the development of the final project.

Purpose/Rationale/Introduction:
Students will compile a scrapbook of photographs, quotations, and notes, representing the perspective of a Negro Leagues baseball player. The scrapbook will be from the point of view of a fictional character, and will include artifacts examining the Negro Leagues, travels, family, and life during segregation and the civil rights movement. The scrapbook should include photographs with captions, letters, news headlines, and any other materials students wish such as maps, souvenirs, and mementos.

Objectives:
1. Students will be able to identify key events in the United States and the Negro Leagues from 1900-1975.
2. Students will create a detailed timeline of the key events in the United States and the Negro Leagues from 1900 to 1975.
3. Students will create a historical-fiction scrapbook using key events in history.

Materials/Primary Resources: Electronic scrapbook resources: Internet access, PowerPoint, and handouts
Rubric
Physical scrapbook resources: construction paper, scissors, glue, and markers

Procedures & Activities:
Day 1 & 2: Students will receive the Quest Page with the assignment and rubric. The instructor should explain the assignment and discuss the requirements of the rubric. Students will work in teams of 3-5 to complete assignment 1.

Day 3: Students will begin work on assignment 2. In assignment 2 students will begin to organize their research. They will also begin to sketch the layout of the scrapbook.

Day 4-6: Students will work on the construction of the scrapbook following the criteria in the rubric and assignments two and three.

Day 7 & 8: Students will present their finished scrapbook to the class.

Extension and Enrichment: Create of scrapbook of your own detailing your life experiences and key historical events.

Online Resources:
Negro Leagues Sites
　　　　http://www.nlbm.com/
　　　　http://mlb.mlb.com/NASApp/mlb/mlb/history/mlb_negro_Leagues.jsp
　　　　http://www.nlbpa.com/index.html
　　　　http://www.negroLeaguesbaseball.com/index.html
　　　　http://www.blackbaseball.com/

　History Sites
　　　　http://memory.loc.gov/ammem/
　　　　http://www.thehistorymakers.com/
　　　　http://lcweb2.loc.gov/ammem/aap/timelin3.html

Assessment: Students should be assessed using the rubric. Students should receive the rubric prior to the start of the project.

Alternate Assessment: Students will write an obituary for their great grandfather or grandmother detailing the events in his/her life.

The Scrapbook of a Negro Leagues Baseball Player

Introduction: Last summer you were visiting your grandparents. While watching a baseball game on T.V. your grandfather mentions that your great grandfather played professional baseball in the Negro Leagues. This piqued your interest and you began to ask your grandparents questions about your great-grandfather and the Negro Leagues. Your grandfather asks if you would like to look at a box of his photographs, letters, and journals. As you are looking through the large box, your grandfather states that he always wanted to organize his memorabilia into a scrapbook for others to see. He asks if you would be willing to complete this project.

The Task: You will create a scrapbook detailing the experiences of your great grandfather both as a baseball player and a Black male living during segregation. The scrapbook will be from the point of view of a fictional character, and will include artifacts examining the Negro Leagues, travels, family, and life during segregation and the civil rights movement. The scrapbook should include journal entries, photographs with captions, letters, news headlines, and any other materials students wish such as maps, souvenirs, and mementoes.

A scrapbook is a collection of artifacts and personal memorabilia, organized in an album. The album may be organized chronologically or by theme.

Your scrapbook will be historical fiction meaning the character will be fictional but the setting and events will be rooted in actual history.

Process: You will work as a team of 3-5 to complete the following assignments. Within your team you should assign individual roles to complete the project.

> Project Manager (Team Leader) - The role is to keep the team on task, monitor progress, and assists the technology leader and researchers.
>
> Technology Leader - Responsible for the building the electronic scrapbook.
>
> Researcher(s) - Responsible for collecting and organizing information and maintaining historical accuracy. Researchers are also responsible for the creation of artifacts to support each event.

Assignment 1: Your great grandfather lived from 1901 to 1975. Complete a timeline of key events that he would have experienced or would have impacted his life, both on and off of the baseball diamond. As a team, determine which of these events would have had the most impact and include them in the timeline

- The timeline should include at least 15 key historical events.

- Each event should have a detailed description. (Who, What, Why, Where, When, How)

Assignment 2: As a team, decide how you will present and organize the material for the scrapbook. The information can be organized either chronologically or by themes. Students have the option of creating an electronic journal with PowerPoint, Microsoft Publisher, etc. or creating a hard copy scrapbook. Use the graphic organizer and storyboard to map out the layout of your scrapbook. Your scrapbook should:

- Include at least 3 baseball related experiences.

- Include at least 7 events outside of baseball that would have made an impact on him during his lifetime.

- A journal entry and at least two other artifacts such as photographs with captions, letters, news headlines, and any other materials such as maps, souvenirs, mementoes, etc should support each of these events.

Assignment 3: Create an electronic scrapbook using the specifications listed above. Your scrapbook should also include:

- A title page with the names of each student

- Bibliography page

Assignment 4: Present your scrapbook to your grandparents (class).

Scrapbook Rubric

	Beginning	Developing	Accomplished	Exemplary	Score
	1	2	3	4	
Preparedness	Unable to accomplish any assignments by the required due date	Unable to accomplish most assignments by the required due date	Able to complete most of the assignments by the required due date	Able to complete all assignments by the required due date	
Cooperation	Team members did not work together to complete assignments	Team members rarely worked together to complete assignments	Team members usually worked together to complete assignments	Team members worked together to complete assignments	
Historically Accurate *The scrapbook is historical fiction. Some events will be fictional but should reflect the time period.	Scrapbook is not historically accurate	Scrapbook contains some historical inaccuracies	Scrapbook is virtually historically accurate	Scrapbook accurately represents important ideas and events	
Use of Artifacts	Artifacts are not related to topic and do not meet assignment criteria	Artifacts adequately related to topic but do not meet assignment criteria	Artifacts are relevant and meet most of assignment criteria	A variety of artifacts are used to portray event and meet assignment criteria	
Scrapbook Design/ Creativity	No organization of page layout. Background and graphics are not appealing.	Page Layout somewhat organized Some of the background and graphics are appealing and enhance the scrapbook.	Most of the page layout is organized. Most of the background and graphics are visually appealing and enhance the scrapbook.	The scrapbook is well organized and background and graphics are visually appealing and enhance the scrapbook.	
Spelling and Grammar	More than six spelling and grammar errors found on final scrapbook	Four or more spelling and grammar errors found on final scrapbook.	Two or more spelling and grammar errors found on final scrapbook	One or less spelling and grammar errors found on final scrapbook	
Citations	No Citation Page	Some citations. Cited incorrectly	Most of the scrapbook is cited. Some citations incorrect	All of the scrapbook is cited correctly	

Quest Page to record main ideas

1.	2.	3.	4.
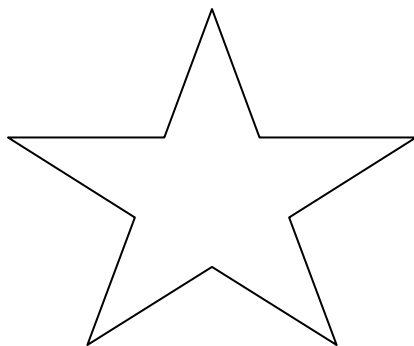
5.		6.

7.	8.	9.	10.

Quest Page to record details

Event	Journal Topic	Artifacts	Resources
1		1 2	1 2 3
2		1 2	1 2 3
3		1 2	1 2 3
4		1 2	1 2 3
5		1 2	1 2 3
6		1 2	1 2 3
7		1 2	1 2 3
8		1 2	1 2 3
9		1 2	1 2 3
10		1 2	1 2 3

Timeline of your Great Grandfathers Life
Include at least 15 events in your timeline. Each event should be detailed be sure to include who, what, why, where, and when.
Events

Event   Year

1900

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

201

Use this chart to plan the story board for your presentation.

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

Appendix 2: Instructional Unit Resource Guide

Persuasive Writing

Instructional Unit Resource Guide
Based on Principles of Universal Design and Differentiated Instruction

High School Curriculum

Developed by:
  Carolyn Dale
  Barb Melvin

  Auburn Washburn School District #437

Authors' Note

This instructional resource guide is intended for use in the high school English classroom for persuasive writing techniques. This aligns with the Kansas State Writing Standards. The purpose of the guide is to assist teachers in finding additional resources to engage students with the use of technology, particularly students with disabilities. This guide contains both teacher resources and student-centered websites and activities.

In this unit the students will learn to present a position or an opinion in a written format, using one or details necessary to expand the main topic to support the writer's position of a quality to present to others. The student will have an introduction, body, and conclusion to reinforce the organized structure of the writing.

Standards

Standard 1 – Writing: The students write effectively for a variety of audiences, purposes, and contexts.
Benchmark 4: The student writes <u>persuasive</u> text using the writing process.

Instructional Examples:
The teacher…
--Instructs students to make posters intended to persuade viewers to subscribe to a point of view (i.e., access to web sites, homework, school uniforms, laws about noise).
--Encourages students to try to sell not only ordinary, realistic goods and services, but also bizarre and unusual ones.
--Have book talk groups read (or re-read) novels or chapter books set in the time of the American Revolution in which main characters start off with one point of view or opinion, then change, amend, or bolster their opinion as the story progresses.
--Presents other common examples of persuasive writing, such as film or book reviews, theater reviews, restaurant reviews, editorial articles, political position papers, government proposals, proposed legislation, and advertisements.

Resources for locating state standards:

Kansas Curricular Standards

Planning Pyramid

What should students know?

Review the following article: Schumm, J.S., Vaughn, S., & Harris, J. (1997). Pyramid power for collaborative planning. Teaching Exceptional Children, 26(6), 62-66.

Some students will

-develop a clear and purposeful thesis statement and sufficient ideas to persuade reader
-build a focused argument in the persuasive mode that uses the persuasive techniques of logical thinking, appeals to reason, authority, and /or emotion.
-provide sufficient evidence, examples, and expert opinions to support author's position
-properly cite information from other sources
-effectively argue opposing arguments
-edit and produce final product of a quality to present to others following -research format specified by teachers

Most students will

-create a thesis sentence stating opinion
-use one or more of the following to support opionion: research, personal experience, prior knowledge, observations
-arrange information in logical sequence
-write an organized piece that includes intoduction, body and conclusion.
-edit and produce a final product of a quality to present to others

All students will

-develop an opinion statement
-provide and organize ideas of support in paragraph form
-conclude with a statement that reinforces the original opinion statement
-provide a finished document of a quality to present to others

Teacher Library

Resources for locating instructional materials:

Lesson ideas and helps for teachers

Writing: Instructional Philosophy and Teaching Suggestions
     http://www.sasked.gov.sk.ca/docs/mla/write.html
  TrackStar
    http://trackstar.4teachers.org/

     Track#264620
Use this track and its resources for learning how to write a persuasive essay as well as find support activities.It includes a very good graphic organizer.

        Track #137738:
 This Track will teach persuasive writing techniques by exploring "up to date" movie, music, restaurant, video game, and automobile reviews. Students will be asked to identify elements of persuasive language, facts and opinions, and finally create their own persuasive review and publish it on the web.

      Track #137738
This track includes persuasive writing tips, rubrics, and ideas for topics.

Study Guides and Strategies
    http://www.studygs.net/wrtstr4.htm
    This provides the teacher and student a very useful step by step guide to writing a persuasive essay

Student Samples

    http://www.eduplace.com/kids/hme/k_5/showcase/5-6/persuasive.html
       A student sample providing a sample of a basic persuasive essay
    http://www.janschipper.com/Example_Persuasive.htm
      Another student sample including research

Writing Prompts for Persuasive Essays

    http://home.earthlink.net/~jhholly/persuasive.html
    http://www.leeogle.org/byron/bhs/library/persuasion.htm
    http://www.leeogle.org/byron/bhs/library/persuasion.htm
    http://www.delmar.edu/engl/wrtctr/handouts/persuasive.htm
    http://www.leeogle.org/byron/bhs/library/persuasion.htm
    http://www.tengrrl.com/tens/018.shtml
4 Teachers
    http://4teachers.org/

Learner Activities

Resources for locating instructional materials:

TrackStar
http://trackstar.4teachers.org/
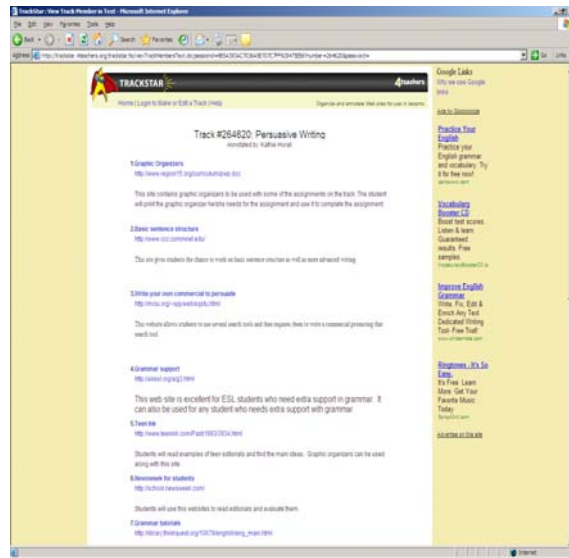
Guides to the Writing Process

http:// http://www.geocities.com/fifth_grade_tpes/five.html   five areas of writing
curry.edschool.virginia.edu/go/edis771/98webquests/student/scarlyoung/WQ2Powers1.html
http://www.tengrrl.com/tens/018.shtml   persuasive topics
http://www.delmar.edu/engl/wrtctr/handouts/persuasive.htm   guide for students
http://www.engl.niu.edu/wac/persuade.html   more student guides
http://www.janschipper.com/Example_Persuasive.htm   student sample
http://www.eduplace.com/kids/hme/k_5/showcase/5-6/persuasive.html   sample
http://www.studygs.net/wrtstr4.htm   student guide
http://www.studygs.net/wrtstr4.htm   GOOD break down of how to write persuasive
http://search.lycos.com/index.php?src=sf&query=persuasive+essay&offset=20hhttp://www.ttms.org/PDFs/04%20Writing%20Process%20v001%20(Full).pdf

Assessment

Resources for locating assessment materials:

Scoring Guide for Student Projects
http://www.ncrtec.org/tl/sgsp/index.html
RubiStar
http://rubistar.4teachers.org
Ruberic
http://www.mcps.k12.md.us/departments/isa/elit/hs/RUBRIC.HTM
Evaluation Rubric
http://170.142.130.39/rubric/search.htm

Electronic Quizzes
http://school.discovery.com/quizcenter/quizcenter.html
http://www.funbrain.com
http://quizstar.4teachers.org/
http://www.studygs.net/wrtstr4.htmhttp://home.cogeco.ca/~rayser3/paradev.txt
http://home.earthlink.net/~jhholly/persuasive.html
http://cctc.commnet.edu/HP/pages/darling/grammar.htm

If students **need test taking practice** as a study strategy for mastering the content of the unit, then...

Try Quia
http://www.quia.com
Quiz Hub
http://www.kidshub.org/

Modifications
Planning for Academic Diversity

For **students that cannot read at grade level**...
> Try text to speech http://www.readplease.com

If students have **difficulty mastering the vocabulary** of the unit, some suggestions include...
> Try a picture dictionary http://www.enchantedlearning.com/Dictionary.html
> Try a talking dictionary http://www.webster.com/
> Try the visual thesaurus http://www.visualthesaurus.com

If you have students who **need the instructional materials in a language other than English**...
> Try Babel Fish http://babelfish.altavista.com

If you have students who have **difficulty with organization,** then…
> Consider using computer programs such as
>> Inspiration http://inspiration.com
>> Draft Builder
>> http://www.donjohnston.com/catalog/writeco/ver/writecoverfrm.htm

If you have students who have **difficulty with handwriting**, (either speed or accuracy), then...
> Consider voice control computer programs such as…
> www.e-speaking.com/free_computer_voice_control_dictation_software.htm
> www.dragontalk.com/NATURAL.htm

> Consider allowing them to speak their answers in Kidspiration
> http://www.inspriration.com
> or Dragon Naturally Speaking
> www.dragontalk.com/NATURAL.htm

If you have students that have **difficulty with spelling,** then…
> Consider allowing the student to use a computer word prediction program such as Co-Writer from Don Johnston Company
>> http://donjohnston.com/catalog/catalog.htm

If you have students who **need to hear what they have written**, then …
> consider using a computer reader program such as Read Please or Write Out Loud
>> http://donjohnston.com/catalog/catalog.htm
> http://www.readplease.com

If you have **students who need additional challenge**, then...
> Search Google or TrackStar for enrichment activities

If your unit **requires students to conduct research**, you might want to...
> Use the NewsTracker http://my.yahoo.com

Appendix 3: WebQuest

Page 1

Civil Rights WebQuest

EXAMPLE PPT AS WEB PAGE   EXAMPLE PPT AS PPT FILE

As we have read in the textbook, the Civil Rights movement took place over decades, with plenty of people playing important roles.

Using the information you gained in the Treasure Hunt and some other sites I will have you visit (or revisit), you will be placed in the shoes of of those leaders. And you will have a decision to make and defend.

Click TASK on the menu buttons on the left to begin.

Thurgood Marshall   The Rev. Dr. Martin   Malcolm X
                           Luther King, Jr.

Photo Credits:

Thurgood Marshall Outside the Supreme Court [Online Image] Available
http://corbis.altavista.com/referrals/av_image_details.asp?linkid=2623&imageid=11108347, 07/09/01
Martin Luther King Jr. [Online Image] Available
http://www.lifemag.com/Life/mlk/mlk02.html, 07/11/01
Malcolm X [Online Image] Available
http://jfklancer.com/Political.html, 07/11/01

(c) 2001-2003 William Duck
Wicomico HS
201 Long Avenue
Salisbury, MD 21804
bduck@wcboe.org

Page 2

Task

Your job is to visit web sites to gather information on the philosophies of either Thurgood Marshall, Martin Luther King, or Malcolm X, depending on your assignment.

Using that information, you will craft a reaction to a fictional civil rights crisis in a Northeastern city that is opposing school integration by not enforcing busing routes.

You and your group partners will create a 10-slide PowerPoint presentation showing how your leader would react—what he might do, and what he might say. It MUST be consistent with his beliefs on Civil Rights and integration and how to achieve to gains.

You will utilize the philosophies and methods used by the Civil Rights leader you researched, and be able to cite principles of that leader's philosophy to show that your reaction is consistent with that leader's beliefs.

Let's begin by clicking on PROCESS on the left menu buttons….

Page 3

Process - General

By 1970, the Rev. Dr. Martin Luther King, Jr. and Malcolm X were dead and Thurgood Marshall was an Associate Justice of the U.S. Surpreme Court.

In that year, South Boston, MA, found itself torn aprt by protests concerning a U.S. District Court order mandating the busing of students to schools outside their neighborhoods to integrate the city's schools.

Many white parents protested the busing, and many moved outside the city to avoid busing. the situation took many years to resolve in the courts and the streets and left many with feelings of racial hatred that would never completely disappear.

You have chosen one of these three Civil Rights Leaders. You will research the beliefs and actions of this leader, and you will craft a Powerpoint Presentation to give your group's response to the nonenforcement of the busing routes that is aligned with the beliefs and actions of the assigned leader.

Click on the photo or the name you chose to research:
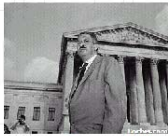
Thurgood Marshall

The Rev. Dr. Martin Luther King, Jr.

Malcolm X

Page 4

Resources

POWERPOINT TUTORIAL

WEBSITES

U.S. Dep't. of Justice - Description of different Civil Rights protected by the federal government.

WithyLaw - Short timeline featuring main Civil Rights laws.

Cornell Law School - Detailed discussion of federal laws that define our Civil Rights.

The Boston Herald - A look back at the busing crisis after busing ended in 1999.

School Integration in Boston - A detailed look at the entire Boston busing crisis, including details of the first demonstrations against busing.

Associated Press - AP article about the end of busing in Boston 25 years after its start.

Photo Tour - Seattle Times site of photos from Civil Rights movement.

BOOKS
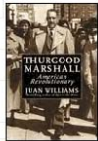
Williams, J. (1998) Thurgood Marshall: American Revolution-ary. New York: Times Books.

*Rowan, C. T. (1997) Dream Makers, Dream Breakers: The World of Justice Thurgood Marshall Boston : Little Brown & Co.
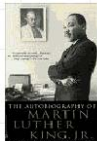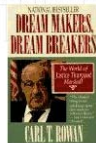
*King, M. L., Jr. (1998 ed.) The Autobiography of Martin Luther King, Jr. New York : Intellec-tual Properties Management/ Warner Books

*X, M., and Haley, A. (1965.) The Autobiogra-phy of Malcolm X. New York : Ballantine Books

This WebQuest was developed by William Duck, Wicomico High School, Salisbury, MD. He can be contacted at bduck@wcboe.org It was retrieved November 26, 2006 from http://webquest.org/

Appendix 4 : Acknowledgments

This handbook was reviewed and validated using a research and design model that relied on three sets of experts in the fields of museums and education. Their feedback was crucial to both the format and the content of the handbook. Special thanks go to these professionals who gave their time and expertise to the study.

Expert reviewers	Profession/organization
Dr. Dave Edyburn	Associate Professor, University of Wisconsin
Ann Fortescue	Director of Education and Visitor Services, Senator John Heinz Pittsburgh Regional History Center, in association with the Smithsonian Institution.
Tom Coleman	Accessibility Specialist (Retired), National Park Service, United States Department of the Interior.
David Bakke	Naturalist and Education Liaison. Muscatine Nature Center, Muscatine Iowa.
Sherry Reed	Professional Development and Curriculum, Greenbush Educational Service
Dr. Vicki Smith	Assistant Director of Special Education, Holton Special Education Cooperative, Holton, Kansas.
Linda Rosenblum	Training/Education Specialist, Brown vs. Board of Education National Historic Site, Topeka, Kansas.
Dan **Carey**-**Whalen**	Education Coordinator, Kansas Historical Society.
Mary Madden	Education and Outreach Division, Kansas State Historical Society.

CHAPTER V: Conclusion

Introduction

Chapter five summarizes the research and development activities used to create *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. This chapter also presents the conclusions, implications, and recommendations for future studies form the study.

Summary of Activities

The purpose of this study was to develop a resource for school and museum educators who partner to create curriculum materials for museums. The goal of the resource was to guide professionals in the development of materials that expand the learning process to learners with diverse needs. The research and development methodology developed by Borg and Gall (1989) was adapted and used for this study.

The proof of concept for *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* was conducted in the spring of 2006. A need was identified and the researcher proceeded to conduct information gathering and literature review from January 2006 through August 2006. A draft of the handbook was developed between September 2006 and December 2006. The Preliminary Field Test was conducted in January 2007 with five national leaders in the fields of fields of museum education, universal design for learning, exhibit design, curriculum design, differentiated instruction, and diverse learners. Revisions to the handbook, based on the feedback form the Preliminary Field Test, were completed in February 2007. The Main Field Test was conducted in late February 2007 with seven practicing potential users from schools and museums who had an understanding of curriculum development and a desire to increase the accessibility of the curriculum materials

they created. Revisions to the final handbook, based on recommendations from the Main Field Test were competed in March, 2007.

Research Questions and Results

The purpose of this study was to develop a resource for school and museum educators who partner to create curriculum materials for museums. The following research questions were established and answered.

How could the themes of universal design and differentiated instruction be applied to the development of accessible museum curriculum materials?

Museum professionals were well aware of federal mandates of accessibility in their buildings and galleries and had taken steps to removed architectural barriers. Consequently, the extension of that same concept into the cognitive domain seemed reasonable, albeit new to more than one reviewer. Therefore, museum educators were able to use their current schema of universal design to assimilate the concept of universal design for learning. This created a bridge between the physical and cognitive domains. Likewise, some of the museum educators who reviewed the product had designed curriculum for their collections, and thus were able to apply the themes their previous work. Once that connection was developed using universal design for learning, the addition of differentiated instruction merely provided further enrichment.

For school educators, the cognitive domain was a familiar and comfortable arena and therefore, the application of educational concepts was not new. However, the study revealed that the conceptual framework of physical accessibility, as in universal design, provided a critical scaffold, even for the school educator. Curriculum design professionals, assistive technology experts, and special educators agreed that although the goal of education was to teach all learners, true cognitive access had not been achieved in most curriculum materials. Therefore,

the use of universal design for learning and differentiated instruction was helpful. These themes demonstrated the need for an expanded view of accessible materials. The product created a call to action and a road map to accomplish this goal.

Can examples be created using the techniques of universal design and differentiated instruction to demonstrate increased accessibility in the cognitive domain?

The study resulted in 37 separate examples. Explanations were created to explore potential curricular barriers and subsequent improvements in cognitive accessibility. Reviews validated the usefulness and clarity of the examples. The study was limited to two dimensional examples due to the product format.

Conclusions

The purpose of this study was to develop a resource for school and museum educators who partner to create curriculum materials for museums. *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* addressed two primary audiences: educators who work in schools; and educators who work in museums. The handbook was purposefully designed to include information to address the research questions that were developed in this study as well as to provide additional resources and information to assist educators who wish to increase the accessibility of the curriculum materials they create. Internet and print resources were included to provide tools for educators. Statutory information was included to provide a legal framework for the application of accessibility technique beyond the physical plant to the cognitive domain. The following conclusions were drawn from this study:

1. There was a need for the handbook. Proof of concept experts and field test participants found the book filled a gap in their practice. Interest in the handbook was high, as evidenced by the fact that reviewers from both field tests kept the handbook for six

weeks, despite the requested three week deadline, and said that they intended to read the material carefully because it was interesting and informative. Eight of the 12 reviewers requested copies of the finished product.

2. The handbook was useful to both intended audiences. Both groups of educators supplied feedback that indicated a high level of usefulness. Each group made suggestions that would narrow the focus of the handbook to customize the content to their respective group. Museum educators found the handbook expanded their thinking to include cognitive accessibility. School educators reported that the handbook increased their skills in designing learning activities to reach more students.

3. Differentiated instruction and universal design could be applied to museum curriculum materials. The partnership between Kansas State University and the Negro Leagues Baseball Museum demonstrated that curriculum materials could be designed to teach a core academic subject such as social studies. The handbook provided specific instructions in the application of differentiated instruction techniques and universal design principles to that curriculum. Additionally, the resulting materials served as examples for other potential museum curriculum.

4. Physical accessibility was accepted as an important concern for museum educators. Museum professionals were mindful of the Americans with Disabilities Act (ADA), passed in 1990. This mandate provided a useful bridge to accessibility in the cognitive domain. Museum educators were willing to plan for cognitive accessibility when it was brought to their attention. The guide accomplished this by demonstrating how that accessibility to could achieved.

5. Cognitive accessibility was accepted as an important concern for school educators. However, educators lack training in the techniques that result in cognitive accessibility. Likewise, educators were not aware of the power of technology to lighten the burden of designing multiple versions of curriculum materials. The handbook provided technology resources and detailed instruction.

6. Both museum and school educators especially appreciated the digital resources in the handbook. Examples that included the use of these resources were cited as helpful. Digital examples prompted expanded thinking on the part of reviewers, resulting in other suggested applications such as use in the gallery.

Implications

The development of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* provided an important resource for educators in museums and schools as they designed curriculum that was usable by diverse learners. As museums have continued to hold education as an important goal, and as museum personnel have partnered with school leaders to bring the museum collection to the classroom, and visa versa, accessibility in the cognitive domain has become a challenge. The handbook provided a tool to help educators understand and apply the techniques of differentiated instruction and universal design for learning to meet that challenge. The many examples included in the handbook provided step by step instructions in the application of each technique. The digital and print resources included in the handbook provided additional support. The following implications resulted from the study:

1. The handbook should be strategically posted on the NLBM eMuseum website. This will allow educators interested in museum curriculum to have full access to the guide, and to the entire set of curriculum materials developed by the Kansas State University

partnership with the Negro League Baseball Museum. Once educators use the lesson plans on that website, they will expand their ability to reach all learners (Edyburn, 2003a, 2003b, 2007; Pisha & Coyne, (2001). This increase in the scope of their teaching will increase their motivation to plan for diverse learners themselves. It is imperative that the resource be immediately accessible to them when they demonstrate readiness (Tomlinson, 1999). Additionally, as the partnership produces new material, the guide can be updated accordingly. Therefore, the NLBM eMuseum provides a valuable location for the handbook.

2. The handbook should be digitized and formatted as a website with links to video and digital photographs. Tutorials should be created to demonstrate the techniques contained in the guide. These tutorials will expand the guide beyond the two dimensional limitations of print and allow a deeper level of interaction between educators and the handbook, thereby increasing engagement (Tokar, 2003a; Waite, Kirlkey, Pendleton, & Turner, 2005).

3. The guide will be used as a consultative tool with the Brown vs. Board of Educational National Historic Site as curriculum is developed. The researcher will apply the techniques outlined in the guide in collaboration and consultation with the museum education staff and teachers from local school districts. The museum computer laboratory will provide digital access to new curriculum materials that highlight the museum's collection.

4. The handbook should be edited to create two additional handbooks; one for museum educators and one for school educators. This will allow each version to be used in different ways.

a. The Museum educator handbook should be used with museum personnel who design exhibits and those who give gallery tours. The need for cognitive accessibility is also evident in the gallery because the format and content of many museum exhibits presents significant cognitive barriers to patrons. The over-reliance on printed text is a significant barrier to patrons who may have different cognitive skills (Rose & Meyer, 2002) to the point that educational benefit is minimal.

b. The museum educator handbook should be used to train museum educators as they develop educational materials. The handbook will be made available to the American Association of Museums as both a digital and print resource. Opportunities to present the handbook at Museum Educator's Roundtable conferences will be sought. A brochure or compact disc should be made that introduces the handbook. This product will be used to create interest in the topic of cognitive accessibility to university professors who teach museum studies courses. A review of museum studies programs from a sample of ten university websites revealed no mention of accessibility in any course description. However, most programs promised that graduates would become well equipped to undertake professional responsibilities in museums. The handbook should be used to increase the awareness of university professors in the potential gap between the museum collections, curriculum materials, and potential patrons.

c. The school educator handbook will be used to train general and special education administrators, teachers and paraprofessionals. The specific techniques and examples will be powerful training tools both for pre-service educators in universities and colleges, and for practicing educators as ongoing professional development (Edyburn, 2000, 2005; Peirce & Adams, 2004; Robinson, 2005; Schumm, Vaughn, & Harris, 1997). Most

public schools are engaged in a process of continuous improvement that incorporates the integration of technology and the application of differentiated instruction. Building and district level administrators are charged with boosting the achievement of underserved learners. The handbook will provide a valuable resource to their professional development as instructional leaders.

d. The school educator handbook will be posted on the Kansas Educational Resource Center website in the section titled Assisting Students with Special Needs. This is a strategic placement for the handbook because the website is the primary source for Kansas Curriculum Standards. Teachers will access this website to search for lesson plans and curriculum materials to deliver the state approved curriculum.

e. The school educator handbook will be submitted to the Journal of Special Education Technology, an online publication of the Council of Exceptional Children (CEC). The CEC is the most highly recognized professional organization of special educators and will provide a wide venue for the handbook. Professionals who are already interested in the use of technology to create access will reference the handbook here.

5. A guide sheet should be developed, outlining the big ideas for quick reference. Museum and school educators are busy professionals (Cooley & Yovanoff, 1996). A condensed version of the guide will allow them to monitor ongoing curriculum development to ensure that strategies and techniques included in the guide are put to continuous use.

Recommendations for Future Research

The following are recommendations for future studies in this area:

1. Future studies should apply the techniques of differentiated instruction and universal design for learning to the design of museum exhibits. The scope of *Accessible Museum*

Curriculum: A Handbook for Museum Professionals and Educators is specifically limited to the design of curriculum. Attention to the increased cognitive accessibility in the museum exhibit is a logical extension.

2. Future studies should expand the use of computer-assisted learning tools to expand the physical accessibility of curriculum. Although this study focused on the cognitive domain, the curriculum may continue to present barriers for learners with diverse physical skills such as sight, hearing and mobility.

3. Future studies should explore the use of museum collections as a platform for teaching math and reading because those areas are the focus of No Child Left Behind. Educators have been forced to narrow their curriculum scope and to prioritize math and reading. Additionally, museum field trips expenditures are more likely to be approved in these areas. The classroom learning that can occur before and after a physical visit to the museum can be enhanced with lesson plans that are accessible to all learners.

4. Future studies should compare learning rates and depth in diverse groups of learners using curriculum materials that are designed to be accessible to the learning of groups using traditional materials. Although this study suggested higher content mastery would be achieved using accessible curriculum, the researcher did not intend or attempt to address this research question. This assumption was not raised by any of the field test reviewers, perhaps because reviewers assumed greater accessibility would result in greater learning, or because reviewers were operating from a frame of reference that emphasized access rather than outcomes. However, further exploration into the ultimate effectiveness of increased accessibility on learning is warranted.

5. Future studies should evaluate the usability and effectiveness of *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* in assisting educators to develop curriculum that is truly accessible to diverse learners.

Summary

Accessibility continues to be of concern to educators in schools and museums. When museums partner with education to create lesson plans around museum content, they will benefit from an additional step; to design supportive materials to increase the accessibility of those lessons. This step can be accomplished by applying the techniques of differentiated instruction and universal design for learning.

Although much had been written about each of these principles in the school setting, there was no guidance on methods that integrate the concepts within the environment of museum curriculum. *Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators* provided instruction, materials, and resources that allowed professionals from both disciplines to develop rich and varied opportunities to engage with museum content for people with disabilities, people with varied needs, and ultimately, all people.

REFERENCES

Adaptive Environments. (2003). *Universal design.* Retrieved January 31, 2006, from

> http://www.adaptiveenvironments.org/index.php?option=Content&Itemid=3

Amberton University. (n.d.) Glossary of library terms. Retrieved December 20, 2006 from

> http://www.amberton.edu/VL_terms.htm

American Association of Museums (n.d.). *What is a museum?* Retrieved July 17, 2006, from

> http://www.aam-us.org/aboutmuseums/whatis.cfm

American Association of Museums. (1998). *Everyone's welcome: The Americans with*

> *disabilities act and museums*. Washington, D.C.: American Association of Museums.

American Association of Museums. (2002). *Museums and diversity: A national initiative to*

> *foster and sustain inclusive practices.* Retrieved March 26, 2006, from http://www.aam-
>
> us.org/museumresources/div/National-Statement-on-Diversity.cfm

American Association of Museums. (2005). *Accreditation program standards*. Retrieved March

> 4, 2007, from http://www.aam-
>
> us.org/museumresources/accred/upload/Characteristics%20of%20an%20Accreditable%2
>
> 0Museum%201-1-05.pdf

Art Institute of Chicago. (2004). *Lesson plans*. Retrieved August 6, 2006 from

> http://www.artic.edu/aic/students/trc/lessonplans.html

Association of Science Technology Centers. (2004). *Accessible Practices*. Retrieved March 26,

> 2006, from http://www.astc.org/resource/access/index.htm

Association for Supervision and Curriculum Development. (2006*). A lexicon of learning: What*

> *educators mean when they say...* Retrieved April 1, 2006, from

http://www.ascd.org/portal/site/ascd/menuitem.4247f922ca8c9ecc8c2a9410d3108a0c/te

mplate.article?articleMgmtId=3f533f4062520010VgnVCM1000003d01a8c0RCRD

Australian Government: National Archives of Australia. (n.d). *Glossary.* Retrieved March 26,

2006, from http://www.naa.gov.au/recordkeeping/er/guidelines/14-glossary.html

Axup, J. (2002). *Usedesign.com: Usability*. Retrieved March 26, 2006, from

http://www.userdesign.com/usability.html

Baillargeon, T. (2006). Aftermath of freedom fighters lesson plan. Retrieved December 15, 2006

from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006a). Publishing history lesson plan. Retrieved December 15, 2006 from

http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006b). Folklore and oral history lesson plan. Retrieved December 15, 2006 from

http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006c). Negro leagues baseball lesson plan. Retrieved December 15, 2006 from

http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006d). Blogging baseball lesson plan. Retrieved December 16, 2006 from

http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Berninger, V., Abbott, R., Abbot, S., Graham, S., & Richards, T. (2002). Connections between

language by hand and language by eye. *Journal of Learning Disabilities,* 35 (1), 39-56.

Borg, W., & Gall, M. (1989). *Educational research an introduction* (Fifth Edition ed.). White

Plains, NY: Longman.

Boston Museum of Science (2001a). *Field trip guide*. Retrieved August 6, 2006 from

http://www.mos.org/doc/1353

Boston Museum of Science. (2001b). *Star Wars: Where science meets imagination: Accessibility.* Retrieved February 11, 2006, from http://www.mos.org/doc/1870

Boston Museum of Science. (2001c). *Universal design (accessibility).* Retrieved January 23, 2006, from http://www.mos.org/exhibitdevelopment/access/index.html

Brooklyn Expedition. (n.d.). *Glossary*. Retrieved March 26, 2006, from http://www.brooklynexpedition.org/structures/glossary_latin.html

Center for Applied Special Technology. (2006). *What is universal design for learning?* Retrieved February 5, 2006, from http://www.cast.org/research/udl/

Center for Universal Design (1997). *The principles of universal design version 2.0.* Raleigh NC: North Carolina State University. Retrieved July 16, 2006, from http://www.design.ncsu.edu:8120/cud/about_ud/docs/English.pdf

Center for Universal Design (2006a). *About universal design.* Retrieved July 14, 2006, from http://www.design.ncsu.edu/cud/about_ud/about_ud.htm

Center for Universal Design (2006b). *Universal design in housing*. Retrieved July 14, 2006, from http://www.design.ncsu.edu/cud/about_ud/docs/UD_Housing.pdf

Chandler, E. (2006a). Buffalo soldiers lesson plan. Unpublished manuscript.

Chandler, E. (2006b). Women and negro baseball leagues lesson plan. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

CITES. (2006). Glossary of acronyms and technical terms. Retrieved December 20, 2006 from http://www.cites.uiuc.edu/glossary/index.html

Cole, E., and Matthews, M. (1999). Cognitive prosthetics and telerehabilitation: Approaches for the rehabilitation of mild brain injuries. In J. Murner & T. M. Ettlin (Eds.), Distorsion &

Leichte Traumatische Himverletzung Behandfungskonzepte (pp 111-120). Basel, Switzerland.

Cooley, E. & Yovanoff, P. (1996). Supporting professionals-at-risk: Evaluating interventions to reduce burnout and improve retention of special educators. *Exceptional Children,* 62(4), 336-356.

DataCore Technology, Inc. (2006). Glossary of terms. Retrieved December 19, 2006 from http://www.data-core.com/glossary-of-terms.htm

Dodge, B. (2001). FOCUS: Five rules for writing great WebQuests. *Learning & Leading with Technology,* 28 (8).

Doswell, R. (2006a). Colored world series lesson plan. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Doswell, R. (2006b). A brief history of the negro leagues. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

DuFour, R., Eaker, R. and DuFour, R. (Eds.). (2005). *On Common Ground.* Bloomington, IN: Solution Tree.

Edyburn, D. (2000). *Assistive technology and students with mild disabilities*. Focus on Exceptional Children, 32(9), 1-24.

Edyburn, D. (2003a) *Assistive technology for students with mild disabilities: From consideration to outcome measurement*. Presented at Closing The Gap, Minneapolis, MN.

Edyburn, D. (2003b). Learning from text. *Special Education Technology Practice*, 5 (2), 16-27.

Edyburn, D. (2004a). Cognitive rescaling strategies. *Closing The Gap*. Retrieved November, 23, 2006, from

http://www.paec.org/fdlrstech/SummerInstitute/fdlrs2004/Edyburn/PDFs/Cognitiverescaling.pdf

Edyburn, D. (2004b). Rethinking assistive technology. *Special Education Technology Practice*, 5(4), 16-23.

Edyburn, D. (2005). *A primer in universal design (UD) in education.* Retrieved March 11, 2006, from http://www.uwm.edu/~edyburn/ud.html

Edburn, D. (2007). Re-examining the role of assistive technology in learning. *Closing the Gap*. 25(5), 1-5

Fullan, M. (2001) *The new meaning of educational change (3rd ed.).* New York, NY: Teachers College Press:

Howard, G., Ellis, H., & Rasmussen, K. (2004). From the arcade to the classroom: Capitalizing on students' sensory rich media preferences in disciplined-based learning. *College Student Journal.* 38(3), 431-441.

IDEA (2004). *Selected sections of individuals with disabilities education act H.R. 1350, SECTION 602: Definitions.* Retrieved July 9, 2006 from http://www.kansped.org/ksde/laws/idea04/602.doc

Indiana Department of Education. (2005). *Definition of terms*. Retrieved April 10, 2006 from http://www.doe.state.in.us/asap/definitions.html

Institute of Museum and Library Services. (2002). *True needs true partners: Museums serving schools*. Retrieved March 26, 2006, from http://www.imls.gov/pdf/m-ssurvey.pdf

Jatala, S. & Seevers, R. (2006). Nature and use of curriculum in special education. *Academic Exchange Quarterly,* 10(1), 192-197.

J. Paul Getty Museum, (n.d.) *Teacher programs and resources*. Retrieved August 7, 2006 from

    http://www.getty.edu/education/for_teachers/building_lessons/

Kansas Education Statutes. (2004). *Chapter 72: Schools, article 9: Special education,*

    definitions. Retrieved March 26, 2006, from http://www.ksde.org/cgi-

    bin/searchstatutes?statute=72-962&rpttype=2&search=&maxres=10&andor=AND

Katz, J., Stecker, N.A., & Henderson, D. (1992). Introduction to central auditory processing. In J.

    Katz, N.A. Stecker & D. Henderson (Eds.), *Central auditory processing: A Tran*

    disciplinary view (pp. 3-8). St. Louis: Mosby Year Book, Inc.

Kay, R. (2006). Evaluating strategies used to incorporate technology into preservice education:

    A review of the literature. *Journal of Research on Technology in Education.* 38 (4). 383-

    408.

Kess, S. (1970). *Explanation of Tax reform act of 1969: P.L. 91-172*. Chicago, Chicago Review

    Press.

Kierman, L. & Tomlinson, C. (1997). *Why Differentiate Instruction*? Alexandria, Va.:

    Association for Supervision and Curriculum Development

Kudlick, C. (2005). *The local history museum, so near and yet so far.* The Public Historian, 2,

    75-81. Retrieved March 26, 2006, from

    http://caliber.ucpress.net/doi/abs/10.1525/tph.2005.27.2.75

Lawton-Henry, S. (2002). *Another ability: Accessibility primer for usability specialists.* Paper

    presented at the Usability Professionals' Association Annual Conference, Orlando, FL.

    Retrieved April 14, 2006 from http://www.uiaccess.com/upa2002a.html

Library of Congress. (n.d.). *HR1350*. Retrieved March 26, 2006, from http://thomas.loc.gov/cgi-

    bin/query/F?c108:1:./temp/~c108ku8qRE:e16556

Mace, R. (1997). *What is universal design?* Retrieved January 24, 2006, from

      http://www.design.ncsu.edu:8120/cud/newweb/about_ud/aboutud.htm

Majewski, J. (n.d.). *Smithsonian guideline to accessible exhibition design.* Retrieved January 23,

      2006, from http://www.si.edu/opa/accessibility/exdesign/start.htm

      http://web.mit.edu/campaign/styleguide/glossary.html

Marron. (n.d.). Tiered lesson plan: Causes of the civil war. Retrieved November 26, 2006 from

      http://www.bsu.edu/web/jfmarron/tlpcauses.html

Massachusetts Institute of Technology (n.d.) *Style guide: Glossary*. Retrieved March 26, 2006,

      from http://web.mit.edu/campaign/styleguide/glossary.html

McNeil, J. (1997). *Disabilities affect one fifth of all Americans.* Census Brief 97-5. Retrieved

      July 14, 2006, from http://www.census.gov/prod/3/97pubs/cenbr975.pdf

Melvin, B. & Dale, C. (2006) Persuasive writing: Instructional unit resource guide.

      Unpublished manuscript.

Micro2000. (2004). *Glossary*. Retrieved March 26, 2006, from

      http://www.micro2000uk.co.uk/hardware_glossary.htm

Mott, L. (2006a). Research tool for time warp activity. Retrieved December 15, 2006 from

      http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Mott. L. (2006b). The dirty laundry of segregation. Unpublished manuscript.

National Multiple Sclerosis Society. (2004). *Glossary*. Retrieved March 26, 2006, from

      http://www.nationalmssociety.org/I%20-%20N.asp

Nebraska Department of Education. (n.d.). Glossary. Retrieved December 19, 2006 from

      http://www.nde.state.ne.us/READ/FRAMEWORK/glossary/general_u-z.html

Negro Leagues Baseball Museum. (n.d.). Retrieved March 29, 2006, from www.nlbm.com

North Central Regional Educational Laboratory. (2004). *Glossary of education terms and acronyms.* Retrieved February 17, 2006, from

http://www.ncrel.org/sdrs/areas/misc/glossary.htm

Nunley, K. (2003). Layered curriculum brings teachers to tiers. *Education Digest* 69(1), 31-37. Retrieved November 30, 2006 from

http://proquest.umi.com.er.lib.ksu.edu/pqdlink?Ver=1&Exp=11-29-2011&FMT=7&DID=424927581&RQT=309&clientId=48067

Orkwis, R. (1999). *What is curriculum access?* The ERIC Clearinghouse on Disabilities and Gifted Education. Retrieved March 26, 2006, from http://ericec.org/digests/e586.html

Peirce, R., & Adams, C. (2004). Tiered lessons: One way to differentiate mathematics instruction. *Gifted Child Today,* 27(2), 58-67.

Pilgrim, D. (1992) *The accessible museum: Model programs of accessibility for disabled and older people*. Washington, D.C.: The American Association of Museums.

Pisha, B., & Coyne, P. (2001). Smart from the start: The promise of universal design for learning *Remedial and Special Education.* 22(4). 197-210.

Prestia, K. (2004). Incorporate sensory activities into the classroom. *Intervention in School and Clinic,* 39(3), 172-175.

Punya, M., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

Rehabtool. (2004). What's assistive technology? Retrieved December 19, 2006 from

http://www.rehabtool.com/at.html#Speech%20and%20Augmentative%20Communcatio n%20Aids

Robinson, S. (2005). Universal design for learning. Retrieved November 26, 2006 from

> http://www.specialconnections.ku.edu/cgi-

> bin/cgiwrap/specconn/main.php?cat=instruction&section=main&subsection=udl/main

Roe, C. et al. (1997). *The principles of universal design, version 2.* Retrieved January 27, 2006,

> from http://www.design.ncsu.edu:8120/cud/newweb/about_ud/udprinciples.htm

Rose, D., and Meyer, A. (1998). *Learning to read in the digital age*. Brookline Books. Digital

> version. Retrieved October 1, 2006, from

> http://www.cast.org/teachingeverystudent/ideas/tes/

Rose, D., & Meyer, A. (2002). Teaching every student in the digital age: Universal design for

> learning. [Electronic version] Association for Supervision and Curriculum Development.

> Danvers, MA.

Sayler, M. (1993). *Glossary: Terms encountered in gifted education.* Retrieved February 17,

> 2006, from http://www.coe.unt.edu/gifted/Resources/GLOSSARY.htm

Sindelar, P., Shearer, D., Yendol-Hoppey, D. & Leibert, T. (2006). The sustainability of

> inclusive school reform. *Exceptional Children,* 72(3), 317-331.

Schumm, J.S., Vaughn, S., & Harris, J. (1997). Pyramid power for collaborative planning.

> *Teaching Exceptional Children*, 29(6), 62-66

Smithsonian Center for Education and Museum Studies. (2006). *Smithsonian education*

> Retrieved August 6, 2006 from

> http://www.smithsonianeducation.org/educators/index.html

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannottie, N., & Angeles, J. (2000)

> *Teachers' tools for the 21st century: A report on teachers' use of technology* (Statistical

> Analysis Report NCES 2000-102). Washington, DC: National Center for Education

Statistics. Retrieved July 21, 2006, from

http://nces.ed.gov/surveys/frss/publications/2000102/

System for Adult Basic Education Support. (n.d.). *Glossary of useful terms.*   Retrieved

April 14, 2006, from http://www.sabes.org/assessment/glossary.htm

Tokar, S. (2003a). Keeping all visitors in mind: Universal design at the museum of science.

[Electronic version]. *Exhibitionist, Spring*, 31-34.

Tokar, S. (2003b). *Universal design: An optimal approach to the development of hands-on*

exhibits in science museums. Retrieved January 12, 2006, from

http://www.stevetokar.com/images/pdf_files/Tokar_UD_thesis.pdf

Tomlinson, C. (1999). *The differentiated classroom: Responding to the needs of all learners*.

Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (2000a). Differentiation of instruction in the Elementary grades: ERIC digest.

ERIC Clearinghouse on Elementary and Early Childhood Education

Tomlinson, C. (2000b). Reconcilable differences? Standards-based teaching and differentiation.

Educational Leadership, 58(1), 6-11.

Tomlinson, C. (2006c). An alternative to ability grouping. *Principal Leadership (Middle School*

Edition), 6(8), 31-32.

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction and understanding*

by design: Connecting content and kids. Alexandria, VA: Association for Supervision

and Curriculum Development.

United States Department of Education. (2003a). *Overview: Fact sheet on the major provisions*

of the conference report to H.R. 1, the no child left behind act. Retrieved February 16,

2006, from http://www.ed.gov/nclb/landing.jhtml

United States Department of Education (2003b). *25th annual report to congress on the*

implementation of the individuals with disabilities education act Volume (1). Retrieved

July 15, 2006, from http://www.ed.gov/about/reports/annual/osep/2003/25th-vol-1.doc

United States Department of Education. (2004a). *Digest of education statistics.* Retrieved July

17, 2006, from http://nces.ed.gov/programs/digest/d04/definitions.asp#p

United States Department of Education. (2004b). *Public law 108-446*. Retrieved April 14, 4006,

from http://frwebgate.access.gpo.gov/cgi-

bin/getdoc.cgi?dbname=108_cong_public_laws&docid=f:publ446.108

United States Department of Education. (2005a). *History of IDEA*. Retrieved March 26, 2006,

from http://www.ed.gov/policy/speced/leg/idea/history30.html

United States Department of Education. (2005b). *HR1350*. Retrieved March 26, 2006, from

http://thomas.loc.gov/cgi-bin/query/F?c108:1:./temp/~c108ZmhWRe:e16556

United States Department of Justice. (2003). *ADA standards for accessible design: Title III*

regulations. Retrieved February 5, 2006, from http://www.ada.gov/stdspdf.htm

United States Department of Justice. (2005). *ADA references and technical materials.* Retrieved

February 12, 2006, from http://www.usdoj.gov/crt/ada/publicat.htm#Anchor-ADA-44867

United States National Library of Medicine. (2006). Medical encyclopedia. Retrieved November

19, 2006, from http://www.nlm.nih.gov/medlineplus/ency/article/002286.htm

Van Garderen, D., & Whittaker, C. (2006). Planning differentiated, multicultural instruction for

secondary inclusive classrooms. *Teaching Exceptional Children, 38*(3), 12-20.

VanSciver, J. (2005). Motherhood, apple pie, and differentiated instruction. *Phi Delta Kappan*,

86(7), 534.

Waite, T., Kirlkey, J., Pendleton. R., and Turner, R. (2005). MUSEpad: Supporting information

accessibility through mobile location-based technology. *TechTrends,* 49(3), 76-82.

Ward, A., & Baker, P., (2005). Disabilities and impairments: Strategies for workplace

integration. *Behavioral Sciences & the Law, 23*(1), 143-160.

Williams, H. and Kingham, M. (2003). Infusion of technology into the curriculum. *Journal of

Instructional Psychology*, 30(3), 178-185.

Wormeli, R. (2005). Busting myths about differentiated instruction. *Principal Leadership

(Middle School Ed.)*, 5(7), 28-33.

WordNet. (n.d.) *A lexical database for the English language: s*. Retreived from

http://wordnet.princeton.edu/perl/webwn

WordReference. (2005). English Dictionary. Retrieved April 1, 2006, from

http://www.wordreference.com/definition

BIBLIOGRAPHY

Adaptive Environments. (2003). *Universal design.* Retrieved January 31, 2006, from

http://www.adaptiveenvironments.org/index.php?option=Content&Itemid=3

Amberton University. (n.d.) Glossary of library terms. Retrieved December 20, 2006 from

http://www.amberton.edu/VL_terms.htm

American Association of Museums (n.d.). *What is a museum?* Retrieved July 17, 2006, from

http://www.aam-us.org/aboutmuseums/whatis.cfm

American Association of Museums. (1992). *Excellence and equity: Education and the public*

dimension of museums. Washington, D.C: American Association of Museums.

American Association of Museums. (1998). *Everyone's welcome: The Americans with*

disabilities act and museums. Washington, D.C.: American Association of Museums.

American Association of Museums. (2002). *Museums and diversity: A national initiative to*

foster and sustain inclusive practices. Retrieved March 26, 2006, from http://www.aam-

us.org/museumresources/div/National-Statement-on-Diversity.cfm

American Association of Museums. (2005). *Accreditation program standards*. Retrieved March

4, 2007, from http://www.aam-

us.org/museumresources/accred/upload/Characteristics%20of%20an%20Accreditable%2

0Museum%201-1-05.pdf

Art Institute of Chicago. (2004). *Lesson plans*. Retrieved August 6, 2006 from

http://www.artic.edu/aic/students/trc/lessonplans.html

Association of Science Technology Centers. (2004). *Accessible Practices*. Retrieved March 26,

2006, from http://www.astc.org/resource/access/index.htm

Association for Supervision and Curriculum Development. (2006*). A lexicon of learning: What
educators mean when they say…* Retrieved April 1, 2006, from
http://www.ascd.org/portal/site/ascd/menuitem.4247f922ca8c9ecc8c2a9410d3108a0c/te
mplate.article?articleMgmtId=3f533f4062520010VgnVCM1000003d01a8c0RCRD

Australian Government: National Archives of Australia. (n.d). *Glossary.* Retrieved March 26,
2006, from http://www.naa.gov.au/recordkeeping/er/guidelines/14-glossary.html

Axup, J. (2002). *Usedesign.com: Usability*. Retrieved March 26, 2006, from
http://www.userdesign.com/usability.html

Baker, E., Wang, M. &Walberg, H. (1994). The effects of inclusion on learning. *Educational
Leadership*, 52, 33-36.

Baillargeon, T. (2006). Aftermath of freedom fighters lesson plan. Retrieved December 15, 2006
from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006a). Publishing history lesson plan. Retrieved December 15, 2006 from
http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006b). Folklore and oral history lesson plan. Retrieved December 15, 2006 from
http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006c). Negro leagues baseball lesson plan. Retrieved December 15, 2006 from
http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Barragree, C. (2006d). Blogging baseball lesson plan. Retrieved December 16, 2006 from
http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Berninger, V., Abbott, R., Abbot, S., Graham, S., & Richards, T. (2002). Connections between
language by hand and language by eye. *Journal of Learning Disabilities,* 35 (1), 39-56.

Borg, W., & Gall, M. (1989). *Educational research an introduction* (Fifth Edition ed.). White

    Plains, NY: Longman.

Boston Museum of Science. (2001a). *Content.* Retrieved January 23, 2006, from

    http://www.mos.org/exhibitdevelopment/access/content.html

Boston Museum of Science (2001b). *Field trip guide*. Retrieved August 6, 2006 from

    http://www.mos.org/doc/1353

Boston Museum of Science. (2001c). *Star Wars: Where science meets imagination:*

    Accessibility. Retrieved February 11, 2006, from http://www.mos.org/doc/1870

Boston Museum of Science. (2001d). *Universal design (accessibility).* Retrieved January 23,

    2006, from http://www.mos.org/exhibitdevelopment/access/index.html

Brooklyn Expedition. (n.d.). *Glossary*. Retrieved March 26, 2006, from

    http://www.brooklynexpedition.org/structures/glossary_latin.html

Carter, S. (2006). Access at witley court. *Museum Education Monitor,* June (8).

Center for Applied Special Technology. (2006). *What is universal design for learning?* Retrieved

    February 5, 2006, from http://www.cast.org/research/udl/

Center for Universal Design (1997). *The principles of universal design version 2.0.* Raleigh NC:

    North Carolina State University. Retrieved July 16, 2006, from

    http://www.design.ncsu.edu:8120/cud/about_ud/docs/English.pdf

Center for Universal Design (2006a). *About universal design.* Retrieved July 14, 2006, from

    http://www.design.ncsu.edu/cud/about_ud/about_ud.htm

Center for Universal Design (2006b). *Universal design in housing*. Retrieved July 14, 2006, from

    http://www.design.ncsu.edu/cud/about_ud/docs/UD_Housing.pdf

Chandler, E. (2006a). Buffalo soldiers lesson plan. Unpublished manuscript.

Chandler, E. (2006b). Women and negro baseball leagues lesson plan. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Cherniss, C. (1988). Observed supervisory behavior and teacher burnout in special education. *Exceptional Children*, 54(5), 449-455.

CITES. (2006). Glossary of acronyms and technical terms. Retrieved December 20, 2006 from http://www.cites.uiuc.edu/glossary/index.html

Cole, E., and Matthews, M. (1999). Cognitive prosthetics and telerehabilitation: Approaches for the rehabilitation of mild brain injuries. In J. Murner & T. M. Ettlin (Eds.), Distorsion & Leichte Traumatische Himverletzung Behandfungskonzepte (pp 111-120). Basel, Switzerland.

Cooley, E. & Yovanoff, P. (1996). Supporting professionals-at-risk: Evaluating interventions to reduce burnout and improve retention of special educators. *Exceptional Children,* 62(4), 336-356.

DataCore Technology, Inc. (2006). Glossary of terms. Retrieved December 19, 2006 from http://www.data-core.com/glossary-of-terms.htm

Dodge, B. (2001). FOCUS: Five rules for writing great WebQuests. *Learning & Leading with Technology,* 28 (8).

Doswell, R. (2006a). Colored world series lesson plan. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Doswell, R. (2006b). A brief history of the negro leagues. Retrieved December 15, 2006 from http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

DuFour, R., Eaker, R. and DuFour, R. (Eds.). (2005). *On Common Ground.* Bloomington, IN: Solution Tree.

Education Trust. (2004). The real value of teachers. Thinking K-16: A Publication of the

    Education Trust, 8(1). Retrieved July 15, 2006, from

    http://www2.edtrust.org/NR/rdonlyres/5704CBA6-CE12-46D0-A852-

    D2E2B4638885/0/Spring04.pdf

Edyburn, D. (2000). *Assistive technology and students with mild disabilities*. Focus on

    Exceptional Children, 32(9), 1-24.

Edyburn, D. (2001). Models, theories and frameworks: Contributions to understanding special

    education technology. *Special Education Technology Practice,* 3(2), 16-24.

Edyburn, D. (2003a) *Assistive technology for students with mild disabilities: From consideration*

    to outcome measurement. Presented at Closing The Gap, Minneapolis, MN.

Edyburn, D. (2003b). Learning from text. *Special Education Technology Practice*, 5 (2), 16-27.

Edyburn, D. (2004a). Cognitive rescaling strategies. *Closing The Gap*. Retrieved November, 23,

    2006, from

    http://www.paec.org/fdlrstech/SummerInstitute/fdlrs2004/Edyburn/PDFs/Cognitiverescal

    ing.pdf

Edyburn, D. (2004b). Rethinking assistive technology. *Special Education Technology Practice*,

    5(4), 16-23.

Edyburn, D. (2005). *A primer in universal design (UD) in education.* Retrieved March 11, 2006,

    from http://www.uwm.edu/~edyburn/ud.html

Edyburn, D. (2006). Cognitive prostheses for students with mild disabilities: Is this what

    assistive technology looks like? *Journal of Special Education Technology*, 21(4), 62-65.

Edburn, D. (2007). Re-examining the role of assistive technology in learning. *Closing the Gap*.

    25(5), 1-5.

Federal Register (1999). *34 CFR Parts 300 and 303: Assistance to States for the Education of Children With Disabilities and the Early Intervention Program for Infants and Toddlers With Disabilities; Final Regulations*. Department of Education, 64(48). Retrieved July 9, 2006 from http://www.kansped.org/ksde/laws/regs1.pdf

Forsten, C., Grant, J., & Hollas, B. (2002). *Differentiated instruction: Different strategies for different learners (1st ed.)*. Peterborough, NH: Crystal Springs Books.

Fullan, M. (2001) *The new meaning of educational change (3rd ed.)*. New York, NY: Teachers College Press:

Guisasola, J., Morentin, M., & Zuza, K. (2005). School visits to science museums and learning sciences: A complex relationship. *Physics Education,* 40(6), 544-549.

Goertz, M. (2001). A kappan special section on school reform – redefining government roles in an era of standards-based perform. Phi Delta Kappan, 83(1), 62-63.

Haycock, K. (1991). Reaching for the year 2000. *Childhood Education,* 67(5), 276-280.

Horn, L. & Caroll, C. (1997). *Confronting the odds: Students at risk and the pipeline to higher education.* National Center on Education Statistics. October 1997. Retrieved July 15, 2006, from http://nces.ed.gov/pubs98/98094.pdf

Howard, G., Ellis, H., & Rasmussen, K. (2004). From the arcade to the classroom: Capitalizing on students' sensory rich media preferences in disciplined-based learning. *College Student Journal.* 38(3), 431-441.

IDEA (2004). *Selected sections of individuals with disabilities education act H.R. 1350, SECTION 602: Definitions.* Retrieved July 9, 2006 from http://www.kansped.org/ksde/laws/idea04/602.doc

Indiana Department of Education. (2005). *Definition of terms*. Retrieved April 10, 2006 from

http://www.doe.state.in.us/asap/definitions.html

Institute of Museum and Library Services (IMLS). (1996). *True needs true partners: Museum*

and schools transforming education. Retrieved February 3, 2006, from

http://www.imls.gov/pdf/pubtntb.pdf

Institute of Museum and Library Services. (2002). *True needs true partners: Museums serving*

schools. Retrieved March 26, 2006, from http://www.imls.gov/pdf/m-ssurvey.pdf

Institute of Museum and Library Services. (2004). *Museums serving schools survey highlights*

[Electronic version]. Washington, DC: Institute of Museum and Library Services.

Jatala, S. & Seevers, R. (2006). Nature and use of curriculum in special education. *Academic*

Exchange Quarterly, 10(1), 192-197.

J. Paul Getty Museum, (n.d.) *Teacher programs and resources*. Retrieved August 7, 2006 from

http://www.getty.edu/education/for_teachers/building_lessons/

Kaff, M. (2004). Multitasking is multitaxing: Why special educators are leaving the field.

Preventing School Failure, 48(2), 10-18.

Kansas Education Statutes. (2004). *Chapter 72: Schools, article 9: Special education,*

definitions. Retrieved March 26, 2006, from http://www.ksde.org/cgi-

bin/searchstatutes?statute=72-962&rpttype=2&search=&maxres=10&andor=AND

Katz, J., Stecker, N.A., & Henderson, D. (1992). Introduction to central auditory processing. In J.

Katz, N.A. Stecker & D. Henderson (Eds.), *Central auditory processing: A Tran*

disciplinary view (pp. 3-8). St. Louis: Mosby Year Book, Inc.

Kay, R. (2006). Evaluating strategies used to incorporate technology into preservice education:
A review of the literature. *Journal of Research on Technology in Education.* 38 (4). 383-
408.

Kess, S. (1970). *Explanation of Tax reform act of 1969: P.L. 91-172.* Chicago, Chicago Review
Press.

Kierman, L. & Tomlinson, C. (1997). *Why Differentiate Instruction*? Alexandria, Va.:
Association for Supervision and Curriculum Development

Kudlick, C. (2005). *The local history museum, so near and yet so far.* The Public Historian, 2,
75-81. Retrieved March 26, 2006, from
http://caliber.ucpress.net/doi/abs/10.1525/tph.2005.27.2.75

Lawton-Henry, S. (2002). *Another ability: Accessibility primer for usability specialists.* Paper
presented at the Usability Professionals' Association Annual Conference, Orlando, FL.
Retrieved April 14, 2006 from http://www.uiaccess.com/upa2002a.html

Lefebure, H. (2002). Universal design: Toward a more inclusive curriculum. *Pacesetter, 7,*
Retrieved March 12, 2006, from http://www.ualr.edu/pace/publications/v7-ud.htm

Library of Congress. (n.d.). *HR1350.* Retrieved March 26, 2006, from http://thomas.loc.gov/cgi-
bin/query/F?c108:1:./temp/~c108ku8qRE:e16556

Mace, R. (1997). *What is universal design?* Retrieved January 24, 2006, from
http://www.design.ncsu.edu:8120/cud/newweb/about_ud/aboutud.htm

Majewski, J. (n.d.). *Smithsonian guideline to accessible exhibition design.* Retrieved January 23,
2006, from http://www.si.edu/opa/accessibility/exdesign/start.htm
http://web.mit.edu/campaign/styleguide/glossary.html

Mamlin, N. (1999). Despite best intentions: When inclusion fails. *Journal of Special Education.* 33(1), 36-49

Marron. (n.d.). Tiered lesson plan: Causes of the civil war. Retrieved November 26, 2006 from http://www.bsu.edu/web/jfmarron/tlpcauses.html

Massachusetts Institute of Technology (n.d.) *Style guide: Glossary*. Retrieved March 26, 2006, from http://web.mit.edu/campaign/styleguide/glossary.html

Mastropieri, M., Scruggs, T., Graetz, J., Norland, J., Gardizi, W. & McDuffie, K. (2005). Case studies in co-teaching in the content areas: Successes, failures and challenges. *Intervention in School and Clinic.* 40(5), 260-270.

McNeil, J. (1997). *Disabilities affect one fifth of all Americans.* Census Brief 97-5. Retrieved July 14, 2006, from http://www.census.gov/prod/3/97pubs/cenbr975.pdf

Mellard, D. (2005). *Linking early intervening services and responsiveness to intervention with specific learning disabilities determination.* Retreived July 16, 2006, from http://www.ccsso.org/content/pdfs/IDEA_NCLB2005Linking.ppt#256,1,Linking Early Intervening Services and Responsiveness to Intervention with Specific Learning Disabilities Determination

Melvin, B. & Dale, C. (2006) Persuasive writing: Instructional unit resource guide. Unpublished manuscript.

Meyer, A., & Rose, D. (1998). Learning to read in the computer age. Cambridge, MA. Brookline Books

Micro2000. (2004). *Glossary*. Retrieved March 26, 2006, from http://www.micro2000uk.co.uk/hardware_glossary.htm

Miller, D. (2006). Resources. In FAM Process Guide, Appendix U. Kansas First Learning

   Alliance. Retrieved July 16, 2006, from

   http://www.kansped.org/ksde/fam/notebook/AppendixU.doc

Mott, L. (2006a). Research tool for time warp activity. Retrieved December 15, 2006 from

   http://coe.k-state.edu/nlbemuseum/resource/lessonplans.html

Mott. L. (2006b). The dirty laundry of segregation. Unpublished manuscript.

Nagle, K., Yunker, C., & Malmgren, K. (2006). Students with disabilities and accountability

   reform: Challenges identified at the state and local levels. *Journal of Disability Policy

   Studies,* 17(1), 28-40.

National Multiple Sclerosis Society. (2004). *Glossary*. Retrieved March 26, 2006, from

   http://www.nationalmssociety.org/I%20-%20N.asp

Nordlund, M. (2003). *Differentiated instruction: Meeting the educational needs of all students in

   your classroom*. Lanham, MD: Scarecrow Press.

Nebraska Department of Education. (n.d.). Glossary. Retrieved December 19, 2006 from

   http://www.nde.state.ne.us/READ/FRAMEWORK/glossary/general_u-z.html

Negro Leagues Baseball Museum. (n.d.). Retrieved March 29, 2006, from www.nlbm.com

North Central Regional Educational Laboratory. (2004). *Glossary of education terms and

   acronyms.* Retrieved February 17, 2006, from

   http://www.ncrel.org/sdrs/areas/misc/glossary.htm

Nunley, K. (2003). Layered curriculum brings teachers to tiers. *Education Digest* 69(1), 31-37.

   Retrieved November 30, 2006 from

   http://proquest.umi.com.er.lib.ksu.edu/pqdlink?Ver=1&Exp=11-29-

   2011&FMT=7&DID=424927581&RQT=309&clientId=48067

Office of Special Education Programs. (2006). *Individuals with disabilities education*

    improvement act (IDEIA). Retrieved July 14, 2006, from

    http://frwebgate.access.gpo.gov/cgi-

    bin/getdoc.cgi?dbname=108_cong_public_laws&docid=f:publ446.108

Orkwis, R. (1999). *What is curriculum access?* The ERIC Clearinghouse on Disabilities and

    Gifted Education. Retrieved March 26, 2006, from http://ericec.org/digests/e586.html

Peterson, W. (1998). Public policy affecting universal design. *Assistive Technology: The Official*

    Journal of RESNA, 10(1), 13-20.

Peirce, R., & Adams, C. (2004). Tiered lessons: One way to differentiate mathematics

    instruction. *Gifted Child Today,* 27(2), 58-67.

Pilgrim, D. (1992) *The accessible museum: Model programs of accessibility for disabled and*

    older people. Washington, D.C.: The American Association of Museums.

Pisha, B., & Coyne, P. (2001). Smart from the start: The promise of universal design for learning

    Remedial and Special Education. 22(4). 197-210.

Pisha, B., & Stahl, S. (2005). The promise of new learning environments for students with

    disabilities. *Intervention in School & Clinic, 41*(2), 67-75.

Positive Behavior Intervention and Supports. (n.d.) Retrieved July 14, 2006, from

    http://www.pbis.org/main.htm

Prestia, K. (2004). Incorporate sensory activities into the classroom. *Intervention in School and*

    Clinic, 39(3), 172-175.

Punya, M., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework

    for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

Rehabtool. (2004). What's assistive technology? Retrieved December 19, 2006 from

http://www.rehabtool.com/at.html#Speech%20and%20Augmentative%20Communicatio

n%20Aids

Robinson, S. (2005). Universal design for learning. Retrieved November 26, 2006 from

http://www.specialconnections.ku.edu/cgi-

bin/cgiwrap/specconn/main.php?cat=instruction&section=main&subsection=udl/main

Roe, C. et al. (1997). *The principles of universal design, version 2.* Retrieved January 27, 2006,

from http://www.design.ncsu.edu:8120/cud/newweb/about_ud/udprinciples.htm

Rose, D., and Meyer, A. (1998). *Learning to read in the digital age*. Brookline Books. Digital

version. Retrieved October 1, 2006, from

http://www.cast.org/teachingeverystudent/ideas/tes/

Rose, D., & Meyer, A. (2002). Teaching every student in the digital age: Universal design for

learning. [Electronic version] Association for Supervision and Curriculum Development.

Danvers, MA.

Ross, D., Stafford, L., Church-Pupke, P., & Bondy, E. (2006). Practicing collaboration: What we

learn from a cohort that functions well. *Teacher Education and Special Education,* 29(1),

32-43.

Sayler, M. (1993). *Glossary: Terms encountered in gifted education.* Retrieved February 17,

2006, from http://www.coe.unt.edu/gifted/Resources/GLOSSARY.htm

Sindelar, P., Shearer, D., Yendol-Hoppey, D. & Leibert, T. (2006). The sustainability of

inclusive school reform. *Exceptional Children,* 72(3), 317-331.

Schumm, J.S., Vaughn, S., & Harris, J. (1997). Pyramid power for collaborative planning.

Teaching Exceptional Children, 29(6), 62-66

Smith, S.W. (1990). Individualized education programs of students with behavioral disorders and learning disabilities. *The Journal of Special Education.* 24, 85-100.

Smithsonian Center for Education and Museum Studies. (2006). *Smithsonian education* Retrieved August 6, 2006 from

http://www.smithsonianeducation.org/educators/index.html

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannottie, N., & Angeles, J. (2000) *Teachers' tools for the 21st century: A report on teachers' use of technology* (Statistical Analysis Report NCES 2000-102). Washington, DC: National Center for Education Statistics. Retrieved July 21, 2006, from

http://nces.ed.gov/surveys/frss/publications/2000102/

Strizek, G., Pittsonberger, J., Riordan, K., Lyter, D., & Orlofsky, G. (2006). *Characteristics of schools, districts, teachers, principals, and school libraries in the United States, 2003-04 Schools and staffing survey.* National Center for Education Statistics. Retrieved July 14, 2006, from http://nces.ed.gov/pubs2006/2006313.pdf

System for Adult Basic Education Support. (n.d.). *Glossary of useful terms.* Retrieved

April 14, 2006, from http://www.sabes.org/assessment/glossary.htm

Tokar, S. (2003a). Keeping all visitors in mind: Universal design at the museum of science. [Electronic version]. *Exhibitionist, Spring*, 31-34.

Tokar, S. (2003b). *Universal design: An optimal approach to the development of hands-on exhibits in science museums*. Retrieved January 12, 2006, from

http://www.stevetokar.com/images/pdf_files/Tokar_UD_thesis.pdf

Tomlinson, C. A. (1995). How to Differentiate Instruction in Mixed Ability Classrooms, Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (1999). *The differentiated classroom: Responding to the needs of all learners.* Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. (2000a). Differentiation of instruction in the Elementary grades: ERIC digest. *ERIC Clearinghouse on Elementary and Early Childhood Education*

Tomlinson, C. (2000b). Reconcilable differences? Standards-based teaching and differentiation. *Educational Leadership, 58(1), 6-11.*

Tomlinson, C. (2006c). An alternative to ability grouping. *Principal Leadership (Middle School Edition)*, 6(8), 31-32.

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction and understanding by design: Connecting content and kids*. Alexandria, VA: Association for Supervision and Curriculum Development.

United States Department of Education. (2003a). *Overview: Fact sheet on the major provisions of the conference report to H.R. 1, the no child left behind act.* Retrieved February 16, 2006, from http://www.ed.gov/nclb/landing.jhtml

United States Department of Education (2003b). *25th annual report to congress on the implementation of the individuals with disabilities education act* Volume (1). Retrieved July 15, 2006, from http://www.ed.gov/about/reports/annual/osep/2003/25th-vol-1.doc

United States Department of Education. (2004a). *Digest of education statistics: s.* Retrieved July 17, 2006, from http://nces.ed.gov/programs/digest/d04/definitions.asp#p

United States Department of Education. (2004b). *Public law 108-446*. Retrieved April 14, 4006, from http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_public_laws&docid=f:publ446.108

United States Department of Education. (2005a). *History of IDEA*. Retrieved March 26, 2006, from http://www.ed.gov/policy/speced/leg/idea/history30.html

United States Department of Education. (2005b). *HR1350*. Retrieved March 26, 2006, from http://thomas.loc.gov/cgi-bin/query/F?c108:1:./temp/~c108ZmhWRe:e16556

United States Department of Justice. (n.d.). *Title III highlights.* Retrieved February 10, 2006, from http://www.usdoj.gov/crt/ada/t3hilght.htm

United States Department of Justice. (2003). *ADA standards for accessible design: Title III regulations.* Retrieved February 5, 2006, from http://www.ada.gov/stdspdf.htm

United States Department of Justice. (2005). *ADA references and technical materials.* Retrieved February 12, 2006, from http://www.usdoj.gov/crt/ada/publicat.htm#Anchor-ADA-44867

United States National Library of Medicine. (2006). Medical encyclopedia. Retrieved November 19, 2006, from http://www.nlm.nih.gov/medlineplus/ency/article/002286.htm

Van Garderen, D., & Whittaker, C. (2006). Planning differentiated, multicultural instruction for secondary inclusive classrooms. *Teaching Exceptional Children, 38*(3), 12-20.

VanSciver, J. (2005). Motherhood, apple pie, and differentiated instruction. *Phi Delta Kappan*, 86(7), 534.

Vaugn, S., Gersten, R. & Chard, D. (2000) The underlying message in LD research: Findings from research syntheses. *Exceptional Child,* 67(1), 99-114.

Waite, T., Kirlkey, J., Pendleton. R., and Turner, R. (2005). MUSEpad: Supporting information accessibility through mobile location-based technology. *TechTrends,* 49(3), 76-82.

Ward, A., & Baker, P., (2005). Disabilities and impairments: Strategies for workplace integration. *Behavioral Sciences & the Law, 23*(1), 143-160.

Williams, H. and Kingham, M. (2003). Infusion of technology into the curriculum. *Journal of Instructional Psychology*, 30(3), 178-185.

Wormeli, R. (2005). Busting myths about differentiated instruction. *Principal Leadership (Middle School Ed.)*, 5(7), 28-33.

WordNet. (n.d.) *A lexical database for the English language: s*. Retreived from http://wordnet.princeton.edu/perl/webwn

WordReference. (2005). English Dictionary. Retrieved April 1, 2006, from http://www.wordreference.com/definition

Zabel, R., & Zable, M. (2001). Revisiting burnout among special education teachers: Do age, experience and preparation still matter? *Teacher Education and Special Education,* 24, 128-139.

APPENDICES

Appendix A: Main Field Test Nominations

The next step in the research and development process will be the main field test. The purpose of the main field test will be to obtain additional information on the usability and usefulness of the handbook. This field test will be conducted with educators from schools and museum staff who, previously or currently have an understanding of curriculum development and a desire to increase the accessibility of the curriculum materials they create. Main field test participants will meet at least two of the following three of the following criteria:
Be a practicing museum or school educator, museum curator, or museum, curriculum professional, in the United States;
Have the potential for using the handbook in their museum, school district, school, or classroom.
Have a willingness to partner with a museum or school to increase the accessibility of curriculum materials offered by a museum.

If you are aware of a person who would be a good potential field test participant, please provide the following information:

1.   Name: _____
Title: _____
Organization: _____
Phone: _____

2.   Name: _____
Title: _____
Organization: _____
Phone: _____

3.   Name: _____
Title: _____
Organization: _____
Phone: _____
Please return this form to me in the self-addressed envelope, or email it to: aelliott@ksu.edu.

Thank you very much,

Ann L. Elliott   Dr. Gerald Bailey
1626 SW Withdean Road   Professor of Education and Leadership
Topeka, KS 66611   303 Bluemont Hall
(785) 354-4048   Kansas State University
aelliott@ksu.edu   Manhattan, KS 66506
(785) 532-5847

                                                          jbailey@ksu.edu

Appendix B: Preliminary Field Test Letter of Instruction

January XX, 2007

Dear Preliminary Field Test Leader,

Thank you for agreeing to participate in the review of *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. You have been selected as a reviewer because you hold credentials as a leader in the fields of museum education, curriculum design, accessibility, universal design for learning or differentiated instruction. This process is part of the requirements to complete a Doctor of Education degree at Kansas State University, and this review process is essential to the research and development methodology model I am using. I appreciate your constructive criticism of the handbook. Should you have any questions or concerns regarding the process, or need further information please contact my major professor Dr. Gerald D. Bailey or me. Our contact information is enclosed for your convenience.

Instructions for completing the review process:
1. Review the enclosed green questionnaire to become familiar with the general areas and questions for which you will be providing feedback.
2. Read the guide.
3. Complete the green questionnaire. I will email you a copy of the questionnaire so that you may return it via email if you wish.
4. Return the questionnaire by January 24, 2007, in the enclosed stamped envelope or email the questionnaire to my email address: aelliott@ksu.edu
5. The Handbook does not need to be returned to me. It is yours to keep.

The next step in the research and development process will be a field test. This field test will be conducted with educators from schools and museum staff who, previously or currently have an understanding of curriculum development and a desire to increase the accessibility of the curriculum materials they create. I have enclosed a form to be used if you would like to suggest potential field testers for the handbook.

Additionally, I would like to recognize the important contribution you have made to the project by including your name in the credits section of the handbook. Please find enclosed a form to indicate if this would be permissible to you, and to provide me with accurate information for that purpose. I truly value and appreciate your assistance with this project. Thank you very much.

Sincerely,

Ann L. Elliott   Dr. Gerald Bailey
1626 SW Withdean Road   Professor of Education and Leadership
Topeka, KS 66611   303 Bluemont Hall
(785) 354-4048   Kansas State University
aelliott@ksu.edu   Manhattan, KS 66506
                                                          (785) 532-5847
                                                          jbailey@ksu.edu

Enclosures:
- *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*
- preliminary field test questionnaire (green)
- self-addressed, stamped envelope
- nomination form (yellow)
- recognition form (blue)

Appendix C: Preliminary Field Test Questionnaire

Preliminary Field Test Questionnaire
Developing Accessible Museum Curriculum:
A Handbook for Museum Professionals and Educators

The preliminary field test questionnaire is designed to collect feedback from recognized experts regarding the draft of the handbook. If you need additional space for comments, please attach additional sheets as necessary. The responses to this questionnaire will be kept confidential (they will not be identified by individual reviewer).

Reviewer Name: _____ Date: _____

Please respond to questions 1-10 using the following 5-point scale.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Part One: Format of the Handbook

1. The organization makes information easy to find.　　1 2 3 4 5
    Comments?

2. The text is readable.　　1 2 3 4 5
    Comments?

3. The grammar and writing are appropriate.　　1 2 3 4 5
    Comments?

4. The models, figures and tables are useful.　　1 2 3 4 5
    Comments?

5. What suggestions do you have to improve the readability the handbook?

6. What suggestions do you have to improve the organization and usability of the handbook?

Part Two: Content of the Handbook

7. The content represents an accurate interpretation   1 2 3 4 5
   of the research and literature on the subjects of
   accessibility, universal design and
   differentiated instruction.
   Comments?

8. The content is useful to museum professionals   1 2 3 4 5
   and educators who design museum curriculum
   that is accessible to diverse groups of patrons.
   Comments?

9. The handbook is a comprehensive representation   1 2 3 4 5
   of the content area.
   Comments?

10. The glossary, references, models, figures and   1 2 3 4 5
    tables contain information that supplements the
    concepts being presented.
    Comments?

11. The examples demonstrate the content in a   1 2 3 4 5
    manner that is helpful.
    Comments?

12. Are there any specific content areas in which the handbook needs revision (universal
    design, universal design for learning, differentiated instruction, accessibility, museum
    education, etc.)?

13. What information should be added to the handbook?

14. What are the strengths of the handbook?

15. What are the weaknesses of the handbook?

Part Three: Specific Feedback on the Handbook

Please use this section to make specific comments on particular pages or sections of the handbook.

Page #   Comments

Appendix D: Main Field Test Letter of Instruction

February XX, 2007

Dear Main Field Test User,

Thank you for agreeing to participate in the review of *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*. You have been selected as a reviewer because you hold credentials as a leader in the fields of museum education, curriculum design, universal design for learning and/or differentiated instruction. This process is part of the requirements to complete a Doctor of Education degree at Kansas State University, and this review process is essential to the research and development methodology model I am using. I appreciate your constructive criticism of the handbook. Should you have any questions or concerns regarding the process, or need further information please contact my major professor Dr. Gerald D. Bailey or me. Our contact information is enclosed for your convenience.

Instructions for completing the review process:
1. Review the enclosed questionnaire to become familiar with the general areas and questions for which you will be providing feedback.
2. Complete the questionnaire.
3. Return the questionnaire by **March 2**, in the enclosed stamped envelope or email the questionnaire to my email address: aanndee@juno.com
2. The Handbook does not need to be returned to me. It is yours to keep. If you would like a copy after revision are complete, please indicate on the questionnaire and I'll be happy to provide one.

I would like to recognize the important contribution you have made to the project by including your name in the credits section of the handbook. Please find enclosed a form to indicate if this would be permissible to you, and to provide me with accurate information for that purpose.

I truly value and appreciate your assistance with this project. Thank you very much.

Sincerely,

Ann L. Elliott   Dr. Gerald Bailey
1626 SW Withdean Road   Professor of Education and Leadership
Topeka, KS 66611   303 Bluemont Hall
(785) 354-4048   Kansas State University
aanndee@juno.com   Manhattan, KS 66506
                                                        (785) 532-5847
                                                        jbailey@ksu.edu
enclosures:
- *Developing Accessible Museum Curriculum: A Handbook for Museum Professionals and Educators*
- main field test questionnaire
- self-addressed, stamped envelope
- recognition form

Appendix E: Main Field Test Questionnaire

Main Field Test Questionnaire
Developing Accessible Museum Curriculum:
A Handbook for Museum Professionals and Educators

The main field test questionnaire is designed to collect feedback from recognized experts regarding the draft of the handbook. If you need additional space for comments, please attach additional sheets as necessary. The responses to this questionnaire will be kept confidential (they will not be identified by individual reviewer).

Reviewer Name: _____ Date: _____

Please respond to questions 1-10 using the following 5-point scale.

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Part One: Format of the Handbook

1. The organization makes information easy to find.   1 2 3 4 5
    Comments?

2. The text is readable.   1 2 3 4 5
    Comments?

3. The models, figures and tables are useful.   1 2 3 4 5
    Comments?

4. What suggestions do you have to make the handbook more usable?

Part Two: Content of the Handbook

5. The content is useful to museum professionals   1 2 3 4 5
   and educators who design museum curriculum
   that is accessible to diverse groups of patrons.
   Comments?

6. The handbook is a comprehensive representation   1 2 3 4 5
   of the content area.
   Comments?

7. The glossary, references, models, figures and   1 2 3 4 5
   tables contain information that supplements the
   concepts being presented.
   Comments?

8. The examples demonstrate the content in a   1 2 3 4 5
   manner that is helpful.
   Comments?

9. What parts of the content of the hand book would be most useful to museum
   professionals and educators who wish to design accessible curriculum materials?

10. What parts of the content of the handbook would be least useful?

11. What are the strengths of the handbook?

12. What are the weaknesses of the handbook?

13. What information should be added to the handbook?

Part Three: Specific Feedback on the Handbook
Please use this section to make specific comments on particular pages or sections of the handbook.

Page #   Comments