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MULTIMEDIA AND MOTIVATION:
THE DESIGN AND DEVELOPMENT OF
A HYPERCARD STACK ON DINOSAURS

A Project

Presented To The

Faculty Of

California State University,

San Bernardino

In Partial Fulfillment

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Master Of Arts In

Education: Instructional Technology

By

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Abstract

This project examines Keller's Motivational Theory as it applies to multimedia in education. The four main categories of his ARCS theory; attention, relevance, confidence and satisfaction are discussed.

Research has shown that use of multimedia tools motivates students to attend to content for longer periods of time. Multimedia's non–linear capabilities allow students the freedom to follow their own paths of inquiry. Its interactive capabilities give students the opportunity to explore the same content from multiple perspectives; thus, making it more relevant to them, increasing their attention and bolstering confidence. All of these result in greater satisfaction with the instruction, and consequently, learning.

A multimedia stack, *Walk With Dinosaurs*, was designed to incorporate Keller's motivational strategies. Created for grades three through five, *Walk With Dinosaurs* also uses various types of media for highly motivational instructional delivery and evaluation.

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CHAPTER ONE

Introduction

Motivating students is of prime importance to educators. Finding the right motivation strategy for each student is a major challenge. Multimedia can be used to enhance presentations of material which can involve, stimulate and motivate students to participate and become active in their own learning.

Multimedia is motivating because it has a wider appeal. Educators throughout time have used a variety of teaching modalities to motivate, enlighten and inform students with diverse learning styles. The use of multimedia ensures a wider range of student participation. It provides still pictures, sound, animation and video. Multimedia motivates the visual learner with pictures and video. It motivates the auditory learner with sound and digitized speech. It motivates the kinesthetic learner by keeping them engaged in the program.

Another motivating element of multimedia is its interactive capabilities. The design of a good multimedia lesson is interactive, allowing the student to follow his own path of inquiry. T. Roberts (1993) in his article "What's all this stuff about Interactive" points out that teaching in general, no matter what the approach, is interactive. He cites *Webster's Ninth New Collegiate Dictionary* on CD-ROM defining **inter** as, " between, among" and **active** as, "characterized by action rather than contemplation or speculation" (p. 21). An interactive lesson, by Robert's definition, demands that students be active in their learning.

Multimedia motivates students because it is non-linear, in contrast to older more traditional media that are passive. Multimedia has been defined as an "information management tool that links text, graphics, sound, or other types of media in an associative way. In doing so, it allows users of a system to navigate through information in a nonlinear fashion" (Bielawski & Lewand, 1991, p. 41). Multimedia provides students with new ways of actively gathering ideas, manipulating data and formulating meaning. It allows them to pursue learning and develop ideas in non-traditional and non-linear ways which would be difficult or impossible using standard texts and materials. According to Lehrer (1990) "Text and pictures are organized sequentially with one topic following the other. This despite the fact that our minds remember and store information in a manner more akin to a spider web than a straight line" (p.478). The old paradigm of the teacher in front of the class lecturing to passive students is no longer valid.

Books are meant to be read from cover to cover. Information is presented in a sequential manner. The reader is not given the freedom to deviate from the author's plan of presentation. Interactive multimedia allows students to navigate a variety of paths through data. Students can branch out in many directions allowing them to follow their own thought processes, not those preconceived by the author.

Text, pictures, slide projectors and reel-to-reel movie projectors all have their place in the instruction of young children. However, use of technology in education must be continuously upgraded to more adequately meet the needs of students with the most effective, efficient and appealing method of instruction.

Technology today allows educators and students a much more sophisticated use of media. In a world where the average household has several televisions, a CD player, VCRs and Nintendo, basic text with pictures will neither captivate the interest of nor stimulate the thought processes of today's students. Multimedia is the newest information delivery system which utilizes many of the same visual and auditory stimuli to which students have become accustomed. With the addition of animation, sound and video clips multimedia becomes more motivating and engaging than traditional text books.

The motivational effects of multimedia were described in a report by Tierney (1994) where students initially viewed the computer as a tool for creating and editing text. Over the next two to three years, the students became more committed to the use of technology and had a wider view of possibilities for its use. Their goals for technology transcended the classroom. Approach to ideas became less linear. "The technology increased the likelihood of the students being able to pursue multiple lines of thought and entertain different perspective" (Tierney, 1994, p. 2).

A quality multimedia lesson involves more than just the tools for delivery. It also includes planning and curriculum design. The latest thrust in curriculum development is Integrated Thematic Instruction (ITI). The practice of integrating all subject areas under one central theme has become an important teaching method. Selecting one central topic on which to focus becomes a challenge. One of the most engaging themes is one that has been around for millions of years–dinosaurs!

For this project the program *Walk with Dinosaurs* was developed using Keller's Theory of Motivation. Walk *with Dinosaurs* is an interactive multimedia tool for presenting an integrated thematic unit. *Walk With Dinosaurs,* in combination with extension activities, allows an integrated approach to the teaching of language arts, science, math and history. As a HyperCard stack, it introduces students to factual information on dinosaurs in an appealing and motivating way.

Walk with Dinosaurs allows students to interact with the information by controlling the direction of inquiry. They choose links according to their own interest and understanding level. In this way, students can make connections that are logical to them in much the same way their brains work; non-linearly.

Walk with Dinosaurs offers choice, control and interaction through the use of a variety of technologies readily available to the classroom teacher. Using a minimum Macintosh system students can interact with the information in a nonlinear search. They are entertained by animation and can choose digitized pronunciations of difficult terminology. With additional hardware and software the program is enhanced with laser video clips and CD-ROM audio tracks which are already pre-programmed into the stack.

Keller's Motivation Theory is based on two theories of learning: cognitive and behavioral. It identifies four major categories of motivational variables that are relevant to individual effort and performance. These are attention, relevance, confidence and satisfaction. Keller's definition of these variables and the specific strategies which he prescribes to each will be provided. Examples of how each strategy was applied to the program *Walk with Dinosaurs* are included.

CHAPTER TWO

Review Of The Literature

This chapter includes a discussion of the motivational theory, as applied to a multimedia program and its potential effects on student progress. Terms related to multimedia are defined. A brief look at the history of multimedia is provided, as well as information on some of the features of a multimedia presentation. A discussion of the differences in communication between hypermedia and traditional print provides the background information for examining multimedia's place in education.

Motivational Theory And Instructional Design

With the emergence of wide scale use of computers in the classroom, educators will need to rely more on instructional theories and design strategies to produce effective educational software in a cost effective manner.

Goldfried (1990) observed that there is a growing concern among researchers. Educators, psychoanalysts and instructional designers feel that a more eclectic approach to theory based instruction is more practical. They also feel an eclectic approach would be more realistic in meeting the needs of a society of diverse cultures and ability levels. In the 80's, respected authorities in the field of applied psychology were debating the appropriateness of relying on one theory. They were seeing the limits of their preferred approach in practical situations. They are showing growing support for what Snelbecker (1983) calls "systematic eclecticism." Abraham Maslow once remarked "If you only have a hammer you treat everything like a nail" (Norcross, 1985, p. 757).

Snelbecker (1983) and Norcross (1985) state that a combination of theoretical understandings will best serve the largest number of students. One example of an eclectic approach is Keller's Motivational theory, the ARCS Model. According to Keller (1983), the motivational theory is not intended to stand alone. It is intended to supplement other instructional theories. It integrates prescriptions from a broad range of theoretical perspectives, including the social learning theory, environmental theories, humanistic theories, attitude, decision and attribution theories, cognitive evaluation theory, equity theory, cognitive dissonance theory, locus of control and learned helplessness.

Historically, instructional designers have benefit from the work of behavioral psychology and cognitive learning psychology. However they stressed *how* students learn and not *why* they learn.

Behavioral psychology gives the educator strategies for organizing instruction to allow for the effective use of feedback (Markle, 1969; Skinner, 1968). These approaches contributed to improvements in learning and, in a very qualified way, to motivation, given the student is already interested in the subject and is actively responding. Feedback then will help maintain and sometimes increase behavior. Similarly, cognitive psychology gave educators a better understanding of how to organize instruction to improve acquisition and retention. (Gagné, 1977; Merill, 1975; Reigeluth, 1979)

Keller proposes that instructional theory requires a broader perspective and a more explicit consideration of variables that designers and practitioners can consider. His theory of motivation, performance and instruction illustrates how motivational theory can be integrated with these other two major theories to address why students learn. He identifies major categories of motivational variables that are relevant to individual effort and performance. To understand motivational theory, an understanding of other theories such as behaviorism and cognitive theory is necessary. A brief analysis of these will help identify the aspects that lead to an eclectic theory such as the motivational theory. This will then be applied to interactive multimedia supported instruction.

While one of Keller's strategies for achieving satisfaction is positive consequences, the method of using positive feedback is most reflective of the behaviorist B.F. Skinner and his approach of using reinforcers to promote desirable changes in behavior. Behaviorist advocate that teachers provide objectives to measure expected outcome behavior. They expect students to achieve mastery of one level before allowing them to continue to the next. The focus is on the outcome but not on the process by which these students learn. They are more concerned with the student mastering teacher or state goals and do not encourage them to set their own goals, thus taking ownership in their own learning. The behaviorist theory still encourages the line of thinking that there is a right way and a wrong way to do things. This does not prepare students for the complex problem solving situations that arise in the world today. Students must be able to make associations and seek connections to a myriad of possibilities.

Cognitive theorist Bruner advocates that behavior depends on how we structure our knowledge. Students with different dominant learning styles respond better to instruction sequenced according to their needs. The cognitive theorist focuses more on how information is received, organized and retained. This more closely follows the line of thought today, that we must provide students with the ability to gather and manipulate data. It is no longer possible to teach them everything they will ever need to know.

> 90% of information and knowledge required in the year 2000 has yet to be invented; graduates in the year 2000 will have been exposed that year to more information than their grandparents were in a lifetime; the amount of information and knowledge in the world, according to John Naisbitt, doubles every 2.5 years. (Cannings, 1990, p. 571)

Modern cognitive research has also found that children are like natural scientists determined to make sense of their world.

> All children are quite capable of sophisticated thought processes from the beginning of their formal education. Indeed, they truly learn only when they are afforded the opportunity to actively incorporate what they are studying into their own experiences, concepts, and understandings of how the world works. (del Prado, 1992, p. 46)

Their views both contrast and complement each other. While Keller's theory addresses affective, cognitive and behavioral areas, his primary focus is to keep students involved in their own instruction. In order to keep students involved, he tries to find what motivates students to learn.

> Motivation, by definition, refers to the magnitude and direction of behavior. In other words, it refers to the choices people make as to what experiences or goals they will approach or avoid, and the degree of effort they will exert in that respect. As such motivation is influenced by myriad internal and external characteristics. (Reigeluth, 1983, p. 394)

Keller argues that motivation is the neglected "heart" of our understanding of how to design instruction (Keller 1979). He stresses that behavioral psychology and cognitive psychology give us an understanding of how people learn but almost no understanding of why people learn. Teachers deal with a larger base of knowledge and skills than a scientist who focuses on one particular area. Therefore, Keller strives to make his theory more analytical and inclusive to improve our decisions in practical problem solving. He proposes that his theory provides a structure to help us locate and remember the syntheses of the more traditional linear view of science and our discovery of basic truths. Keller describes motivational theory as "a highly integrative, multiperspectived approach," (Keller & Kopp, 1985, p. 289).

Keller's Motivational theory (ARCS Model) identifies four major categories of motivational variables that are relevant to individual effort and performance: Attention, Relevance, Confidence, Satisfaction.

He prescribes 12 individual motivational strategies which can be used in any combination, depending on the situation. They are:

Attention

A.1 Perceptual Arousal

A.2 Inquiry Arousal

A.3 Variability

Relevance

R.1 Familiarity

R.2 Goal Orientation

R.3 Motive Matching

Confidence

C.1 Expectancy for Success

C.2 Challenge Setting

C.3 Attribution Molding

Satisfaction

S.1 Natural Consequences

S.2 Positive Consequences

S.3 Equity

To best understand the use of this theory in the design of a multimedia presentation a more thorough description of these strategies is necessary. How they specifically apply to the program presented in this project will be addressed in Chapter 4 - Project Design. The following defines the above motivational strategies according to Keller & Kopp (1985)

Attention

Strategy A.1 Perceptual arousal - to gain and maintain student attention by the use of novel, surprising, incongruous, or uncertain events in instruction.

Strategy A.2 Inquiry arousal - to stimulate information-seeking behavior by posing, or having the learner generate, questions or a problem to solve.

Strategy A.3 Variability - Maintain student interest by varying the elements of instruction

Relevance

Strategy R.1 Familiarity - use of concrete language, and use examples and concepts that are related to the learner's experience and values.

Strategy R.2 Goal Orientation - provide statements or examples that present the objectives and utility of the instruction, and either present goals for accomplishment or have the learner define them.

Strategy R.3 Motive Matching - use teaching strategies that match the motive profiles of the students.

Confidence

Strategy C.1 Expectancy for Success - make learners aware of performance requirements and evaluative criteria.

Strategy C.2 Challenge Setting - provide multiple achievement levels that allow learners to set personal standards of accomplishment, and performance opportunities that allow them to experience success.

Strategy C.3 Attribution Molding - provide feedback that supports student ability and effort as the determinants of success.

Satisfaction

Strategy S.1 Natural Consequences - provide opportunities to use newly acquired knowledge or skill in a real or simulated setting.

Strategy S.2 Positive Consequences - provide feedback and reinforcements that will sustain the desired behavior.

Strategy S.3 Equity - maintain consistent standards and consequences for task accomplishment.

Multimedia: Terms & Definitions

The terms *hypertext*, *hypermedia* and *multimedia* could be confusing and are often used interchangeably. These three terms convey complex ideas and do not exhibit the same features each time they are applied.

Jacob Nielson (1990) gives his definition of the term hypertext as "nonsequential ... several different options are presented to the reader and the individual reader determines which of them to follow at the time of reading the text" (p. 1).

Bourne (1990) elaborates on the same idea stating, "hypertext allows the user-programmer to put together interactive information...to take text, graphics, sounds, video and animation and combine them into one program" (p. 166). Both definitions require freedom of movement through the information.

To ensure the flexibility implied in these definitions, Slatin (1991) provides a further definition. *"A hypertext (or Hyperdocument) is an assemblage of texts, images, and sounds–nodes–connected by electronic links so as to form a system whose existence is contingent upon the computer* "[italics in original] (p. 56).

These definitions leave little room for distinction between hypertext and hypermedia. Azarmsa (1991) states that "hypermedia is a term used to describe linked information presentations that could contain several types of media, such as text, graphics, audio, and video. Hypermedia may contain several layers of information, with each layer related to many others" (p. 165). Thus hypermedia and hypertext are two most frequently interchanged terms.

Multimedia refers to presentations using a wide range of technology. Multimedia takes students one step further than hypertext by combining text with graphics, audio, visuals and motion all into one learning system coordinated by a computer (Cannings 1990). This may include the addition of QuickTime video, laser video discs and CD ROM. These products become interactive when students choose how they will navigate through them and to what purpose they will use the information gathered. As Franklin and Kinnell (1990) suggest, "the difference between hypermedia and multimedia lies in the level of interactivity possible" (p. 6).

"Interactive multimedia is not simply an extension of the written word. It is a conceptual tool – an extension of the human mind" (Anderson & Veljkov, 1990, p. 69). Ambron and Hooper (1990) use the term *interactive multimedia* to reflect the increased flexibility of multimedia's environment. Interactive multimedia is:

> a collection of computer-centered technologies that give a user the capability to access and manipulate text, sounds, and images...Multimedia programs... will enable users to access not only libraries of text documents but also storehouses of music, sound effects, speech, still images, animations, and movies. In addition, multimedia users will be able to manipulate this lexicon of material and add their own material. (Ambron & Hooper, 1990, p. 11)

Hardware is evolving into an integrated environment where the various media can be used and controlled from a single unit. "Hypermedia is multimedia. However, whilst multimedia combine different sorts of audio-visual information, hypermedia integrate these within one computer based system" (Vanio-Larson, 1991, p. 235). As this integration increases in availability and power, the distinction between hypermedia and multimedia will gradually disappear.

A number of other terms associated with multimedia need to be considered prior to further reading. An *authoring system* is a software tool for designing hypermedia. One hypermedia authoring system is HyperCard. HyperCard is made up of a *stack* or *stacks*; Stacks are like a stack of index cards. Each *card* has information on it. These cards are then linked to one another using electronic links called *buttons*. Each card may contain one or more buttons (links) which are represented by *icons* (picture) that the user can chose to navigate through the stack. These connections form a web. The user can chose various pathways to navigate. Buttons may also link the user to preprogrammed audio or video clips as well as still pictures and animations. The program described in the program design will further explain and give examples of these terms. Again, HyperCard is just one example of a hypermedia program. It is the authoring program used for this project, thus it is the only one defined at this time.

<u>Brief History of Multimedia</u>

The first mention of multimedia can be attributed to Vannevar Bush's 1945 article, "As We May Think." Bush was Franklin Roosevelt's science advisor and as such, was involved with many of the nation's leading scientists. He visualized a device called the Memex which stored large amounts of information and was capable of making cross references and fast information retrieval. His description is prophetic of the desktop computer. The Memex, however, never came about.

The next notable contributor to the development of multimedia was Douglas Engelbart. Engelbart did important research and development for the Xerox Corporation. His paper, "A Conceptual Framework for the Augmentation of Man's Intellect" was presented in 1962. It led the way to an interactive, multimedia, hypertext system. He developed the mouse, windows, computer conferencing and electronic mail.

In the mid-1960s, Ted Nelson coined the term "hypertext," a form of non-sequential writing. He describes it in his book "*Computer Lib/Dream Machines*."

Hypertext became available to the general public in 1987 when Apple Computer introduced Hypercard. It was included with the purchase of any Macintosh computer. Hypercard is a tool for creating hypertext, which is described as "A gigantic knowledge navigation system" (Anderson & Veljkov, 1990, p. 69). Today hypertext is just one part of the growing technology platform known as Multimedia.

Multimedia in Education

The need for multimedia is emphasized by the fact that changes in our world are occurring at a phenomenal rate. The information age is upon us. Businesses want students who can communicate, problem solve, use a variety of strategies to access and analyze information and be able to work in a group. Cannings and D'Ignazio (1990) describe classrooms in nongraded schools, using technology as a tool for exploring and creating. They and others envision media work centers replacing libraries where children have access to library databases all over the world for research with these navigation tools.

Multimedia is gaining considerable recognition as an educational delivery system. According to Therese Mageau (1990) the newest multimedia platform for the 90's is videodisc and CD-ROM.

Multimedias' popularity stems from its method of delivery. Mageau (1990) states that "nonlinear, interactive software is a result of profound changes in the way we understand how children learn." As stated earlier, textbooks present material in an organized sequential manner with one topic following another. Research shows the brain however, remembers and stores information in a web-like fashion, comparing one idea to the next, building analogies and making connections (Lehrer, 1990, p. 478). Multimedia tools such as HyperCard stacks allow users to navigate easily through vast quantities of new information making such associations. It presents knowledge and information just as we do in our minds – nonsequentially, by association and context. According to Lehrer (1990). "HyperCard gives young people the chance to be information manipulators and disseminators, not only information gathers" (p. 478).

Multimedia is already being used in many schools. Programs such as *Vote 88* (ABC News), *In the Holy Land* (ABC News) and *National Gallery of Art* (Voyager Company) are already available. One state, Texas, has already chosen Optical Data's *Windows on Science* laserdisc series as its state adopted "textbook". Even adult education is making use of multimedia.

> In a comparison of interactive video versus classroom instruction with videotape, adult workers preferred the individualized, flexibility paced interactive video instruction. Subjects in this group scored significantly higher on performance tests and had a smaller standard deviation of scores than those receiving classroom instruction. (Bosco & Wagner, 1988, p. 354)

Multimedia will only become more sophisticated and yet more simple for learners of every age to use. A non-linear, interactive, multimedia program allows students to structure their own knowledge according to their learning style, choosing the links and pathways which they will take. While a non-linear, multimedia approach to the subject matter allows the learner to follow their own thought processes, it also helps the instructor to reach the auditory learner as well as the visual and kinesthetic learner.

Apple's Kristina Hooper (1991) sums it up when she states "Interactive multimedia technology finally allows us to match how we teach with how children learn" (p. 112)

Model Technology Schools such as Alhambra's MTS in California and Chiron Middle School in Minneapolis are already implementing such programs. Perlman (1991) defines restructuring as including rethinking the way teachers teach and children learn, as well as, changing the way schools are organized. He cites schools in New York, Michigan, California and Ohio which are providing multimedia tools to empower students in project oriented activities. Children's understanding of the material is no longer paper, pencil, reports and tests. They are cooperatively creating videos and HyperCard stacks that access various media.

Shanker (1990) tells us, "We need schools where kids can proceed at their own rate, where those who learn in different ways can find different ways of learning. We need a system in which kids can learn in relative privacy, either individually or in small groups" (p. A4). He reiterates what others have said, as far back as Socrates. Students learn by listening, writing, thinking, arguing, imagining, building, drawing, and experiencing. "This is where technology comes in. Multimedia offers each student interaction of their own choice. Exploratory learning offers increased freedom and motivation to students" (Oren, 1990, p. 127).

According to Anderson and Veljkov (1990), research shows that more of our students are visual learners than previously thought. Children today, through MTV and video games are exposed to presentations where the image changes every 2-3 seconds. They dare us to compare that to some classrooms where the image changes every 35-40 minutes. Is it any wonder teachers lose students' attention? They point out that it is "no longer necessary to show a 20 minute video or 16mm film to illustrate a concept that could be viewed in a 60 to 90 second video clip" (p. 69).

What research has found in the area of using multimedia as an educational delivery system and its impact on student achievement is discussed in the following section.

Research on Multimedia

Not a great deal of research on multimedia has been conducted. Thus, definite directions for, and recommendations from hypermedia research are limited. Research methods have followed the typical sequence of evaluation studies, media comparison and aptitude treatment interaction studies.

In 1990, researchers at Vanderbilt University conducted three studies to test the benefits of interactive video on student learning. Students were given the opportunity to explore the same content from multiple perspectives through interactive video. The results showed that this approach was more likely to produce knowledge that could be transferred to other situations. Recognition and writing skills also improved significantly, (Vanderbilt, 1990). Thompson, Simonson and Hargrave (1993) cite studies by Abrams and Streit (1986) and Anandam and Kelly (1981) that compare the effectiveness of interactive video to linear video. Their results indicated that the interactive video group made significant gains in achievement and its use had a greater impact on attitude. Both studies attribute higher achievement to the increased level of attentiveness required in an interactive program. This substantiates Keller (1983) who describes attention as the first major category in his motivational theory .

Viewers of a linear program were more able to tune out and less able to review and practice. Anandam and Kelly (1981) stated that interactive video "changes the student from passive observer to active participant" (p.1). Mageau (1990) also states that "research shows children learn better actively, nonlinearly, visually and cooperatively" (p.467).

Simonson (1990) discusses a meta-analysis conducted by James Kulik (1985). He summarized the results of 175 studies conducted by Kulik. A number of important findings regarding multimedia in education were found:

1. The interactive nature of a multimedia presentation encourages active involvement by the user.
2. Interaction with high quality sounds and images is unique to multimedia.
3. A fundamental finding among researchers is that multi-sensory presentations of material, particularly visual ones, are more effective.
4. Interlinking of conceptual materials provides the learner with the power to control the path of his own learning.

This relates to the Motivation Theory in many areas. Multimedia's interactive nature and it unique interaction of sounds and images contribute greatly to the first step in motivation, gaining and maintaining attention. Its interlinking of conceptual materials provides familiarity as well as establishing relevance and thus satisfaction. As the following research shows, just using the technology of computers in general can enhance the learning process. Add to that the capabilities of multimedia presentation and student satisfaction and confidence are greatly improved according to Keller (1985) and Kulik & Kulik (1987).

Kinnaman (1990) summarizes a paper presented by the University of Connecticut titled "A Review of Research Issues in the use of Computer Related Technologies for Instruction: An Agenda for Research," which examined research by Kulik and Kulik (1987), Niemiec and Walberg (1987) and Becker (1988). Their findings were:

- Students learn more in classrooms with computer assistance
- Students like instruction more with help from a computer
- Student attitudes do no change about the subject matter whether they use a computer or not
- Student gain in achievement is fairly consistent with CAI

In Apple's Classroom of Tomorrow (ACOT) research project, it was found that students with high computer access wrote more and better, their planning strategies were influenced by the flexibility of the computer and their perceptions of themselves changed into one of being more responsible for and more in control of their own learning.

Ambron & Hooper (1988) explain the results of using the computer as

> Fundamental to the entire field of cognition is the finding that unless people engage a task, they will not learn from it. William James pointed this out at the beginning of this century and research over the last twenty years has provided elaborations of this basic point.(p. 325)

This research supports Keller's Motivation Theory in the Relevance category.

Preliminary research in the area of multimedia and education indicates some promising directions. It appears that the interactivity available through multimedia and the motivational impact it has on the learning environment may positively influence student progress. Educators and researchers agree that multimedia provides interesting and motivating possibilities for the teaching/learning process. However, the extent to which it will influence student progress has yet to be determined.

The influence of multimedia, however, cannot be over looked. Having established the importance of the Motivation Theory for eclectic learning and the relationship between motivation and multimedia, the program *Walk with Dinosaurs* was designed. The project described will use information gathered from the related literature for design and development of an effective computer–based instructional program. Keller's strategies will be further explained. Examples of how each applies to the design and development of the program *Walk with Dinosaurs* will be provided in Chapter 4.

CHAPTER THREE

Statement of Goals and Objectives

Goals and Objectives of the Project

The goal of this master's project was to design and develop a computer-based instructional material that integrated multimedia and the motivational theory.

In order to design and develop this project the following objectives were also carried out:

- Define Multimedia
- Establish the significance of multimedia in education
- Analyze theories, specifically the Motivational theory and how it applies to multimedia

Goals and Objectives of the Stack

The goal of *Walk with Dinosaurs* is to help students become keen observers, productive researchers and effective communicators. The stack will provide teachers and students with a variety of activities to integrate all subject areas into one common theme-Dinosaurs.

With the strain of budget cuts in our educational institutions today, this program is designed to be cost effective and usable at a variety of hardware and software availability levels. Its interactive, multimedia approach is meant to meet the growing diversity in student populations through high motivation and multi-modality learning.

The objectives and goals provided here pertain primarily to the multimedia program provided for use on the computer.

Lesson Objectives:

After interacting with this program the student will be able to:

1. Identify numerous dinosaurs by name.
2. Successfully answer questions about specific dinosaur characteristics.
3. Complete a word scramble of new terms.
4. Correctly identify dinosaurs given picture clues.
5. Classify dinosaurs into meat-eaters and plant-eaters.
6. Demonstrate an understanding of the material by making inferences and connections between type of teeth, size of head and diet.
7. Have a clearer picture of their vast size in relation to man and each other.
8. Have a better understanding of timelines.
9. Use higher level thinking skills to propose possible reasons for extinction.

CHAPTER FOUR

Project Design

The theoretical basis for the design of this program was the Motivational Theory (Keller & Kopp, 1985) which integrates principles from the effective, cognitive and behavioral theories. *Walk with Dinosaurs* incorporates many of the strategies identified by Keller.

To gain and maintain what Keller calls perceptual arousal (A.1), novel and surprising events were used in both the animation at the beginning of the program and in the laser video clips chosen for viewing. According to Keller, variation of format contributes to sustaining of attention. The format for acquiring information varies between text, audio and video. The format for responding is varied between answering questions, completing a puzzle and doing a word scramble. The opening card uses animation to gain attention. (Gagné and Briggs, 1977)

To stimulate information seeking behavior (Inquiry Arousal A.2) a problem is posed. A dinosaur mystery puzzle requires the learner to search his memory for previously acquired information as he/she applies it to the solution of problems within the lesson. With each correct answer a new piece of the mystery puzzle is uncovered. The puzzle also provides an interesting variation in response format. This encourages fact–finding even after intrinsic desire dwindles.

As with any multimedia program *Walk with Dinosaurs* maintains student interest by varying the elements of instruction between sight, sound, text and motion. Graphics are used throughout. Video clips are readily available and pronunciations for Dinosaur names are provided through digitized speech (Variability A.3).

To establish the Relevance of the instruction familiar concrete language is used. Examples and concepts are related to the learner's experiences. The issue of extinction is addressed. This ties into the study of other endangered animals today and the students' role in the preservation of their environment, ecology and recycling. Included are concrete examples of relative size of these creatures by comparing them to objects students are familiar with such as, an elephant, house cat, humans and chickens. These illustrations also increase confidence by relating the abstract to concrete (Familiarity R.1).

Based on their experience of classroom instruction, Campbell and Hanlon (1990) state:

> It [interactive media] seems to inject a sense of immediacy and reality in a subject that is evident in the way students regard what they are studying. Rather than telling students that a subject is relevant or significant, we have a way of helping them to discover that for themselves. (p. 263)

Student confidence is enhanced with easy to moderately difficult activities which provide immediate feedback to support their ability and effort (Multiple achievement levels of Challenge Setting C.2). This is not always possible in a teacher directed lesson. Illustrations and pronunciations provide clarification.

Heinich (1989) states that we learn approximately 10 percent from listening but over 80 percent from what we see. Most importantly we remember approximately 20 percent of what we hear, but over 50 percent of what we see and hear.

The computer reduces the students' anxiety by allowing them to acquire information and exercise their knowledge with little risk of public failure and embarrassment. There are not ugly beeps or demeaning statements glaring across the screen, even if they make repeated mistakes. The correct answer is provided after two attempts or a suggestion is made that perhaps they should review the material again. This provides feedback that supports student ability and effort (Attribution Molding C.3). In a classroom with teacher directed lessons not only is it impossible for the student to go back and review what they missed the first time but it is also unlikely that they can risk making a wrong answer without some sort of public humiliation, whether it be from the teacher, other classmates or self-imposed. With the computer they can and will take risks which will provide greater opportunity for learning. It also gives them the opportunity to review or redo any part of the stack without any negative consequences. Each card also allows the learner to escape back to the beginning.

To create satisfaction, opportunities are provided to demonstrate and use their newly acquired knowledge in a variety of fun and interesting ways (Natural Consequences S.1). According to Keller, this makes it more relevant and in the long run improves retention of the subject matter. Positive reinforcement is used, as mentioned earlier, to provide comfort and satisfaction as well as guidance (Positive Consequences S.2).

To evaluate both the relevance of this theory and the success of this program the psychomotor, affective and cognitive areas were considered. Through observation and student surveys the duration of time on task and whether or not students found the program to be at least moderately interesting was evaluated. All students seemed to find the program of great interest. Students had a higher expectancy for success midway through the lesson than at the beginning, unlike teacher directed lessons where it seems that students' expectancy for success decreases as the lesson progresses (Keller, 1983b).

Placement and Use of the Program

"Design must take into account implementation needs whenever possible because innovative programs of instruction are usually very poorly implemented in existing institutions" (Reigeluth, 1983, p. 336). Changes are often not implemented because many substantial changes are required to implement the new method. Changes must be cost effective. *Walk With Dinosaurs* can be used with a minimum Mac system, making it usable in a typical one computer classroom. However, it can be enhanced with CD-ROM and/or videodisc if available.

Walk with Dinosaurs can best be used at a workstation by an individual, a pair of students or a small cooperative group. Students can work at their own pace.

Once the teacher has taught the basics of the Macintosh computer and HyperCard, the lessons can be self-directed by the students with a minimum of teacher assistance. If students are absent they can easily go through the lesson at a later date. Thus, no one misses the instruction and everyone has access to the same information. For slower students or those who need more repetition, they can go back and review as often as they like. The activities provided are meant to be fun and moderately challenging to help ensure student success and to prevent students from merely skimming or skipping over material. *Walk with Dinosaurs* can also be used for whole-class presentation by using a large monitor or LCD screen.

Summary of Student Evaluation and Teacher Observation

After an initial inservice on how to use the Macintosh computer , the 3rd grade students were asked to use the program individually or in groups of two as they finished their school work. The next day, one of the fourth grade classes tried the program. Both classes were observed for a short time in the afternoon. When they completed the program each student filled out a questionnaire (See Appendix A page). The results are as follows:

- Students named the graphic components and the game formats, including quizzes, as their favorite parts of the program.
- Students expressed no dissatisfaction with the program. Only one child expressed some difficulty with the reading level and several expressed a desire to have more time with the program.
- Only one child, the one who expressed having difficulty with the reading level said the program was hard to follow.

- •All students surveyed evaluated the program as interesting and several found it to be informative.
- •All students who responded to the survey said they enjoyed the program.
- •All but one said they found gathering the information more enjoyable than reading the information in a book.
- • All but one student felt they learned something.

The third grade class did not fill out the questionnaire but verbal reports were given to the researcher. The responses were very similar to those of the fourth grade class.

While observing the students it was noticed that they really enjoyed listening to the pronunciation of each dinosaur's name and they also enjoyed the verbal reinforcement of the word scramble. Unfortunately, the students had never worked on a Mac or with a mouse so they moved very slowly through the stack. Also because of time constraints each student had only 10 minutes or less with the program. The students seemed to enjoy it and all said they would like to have more time to use the program. Because of the low reading level of students at this school suggestions include using it in the future with fourth and fifth grades rather than the third grade.

While students were using the program they were very attentive to the task at hand. They worked hard to gather information so they could correctly respond to the quiz to get a chance at guessing the dinosaur. While these students rarely complained when told to put away their reading material, all were very verbal about not having to give up their turn at the computer. While part of the enthusiasm may have been due to the novelty of the computer itself, students expressed pleasure in being able to choose what they viewed or listened to next. It was also observed that no two students navigated through the material in the same sequence.

Some students listened to every pronunciation. Others appeared to be viewing the pictures first. Those who felt most comfortable with the computer itself tried out each of the buttons, showing particular interest in the ability to access the laser videodisc.

Since this beta testing was more for the sake of debugging the program, no real research was conducted to compare retention of information for those with and without program access. If time allowed it would be very interesting to compare two classes, one with the benefit of the multimedia delivery system and one with traditional text book information gathered in an independent or shared partner experience.

Limitations

If time and space allowed (such as producing this stack on a CD-ROM), a student clipboard would have been included for storing ideas and writing response activities. A student management system would be added so that teachers could monitor students progress. Again, if time and space permitted, an option for poor readers or Limited English Speaking students to have the text read to them would be provided. However, since this was not possible, teachers are encouraged to pair students with a good reader to ensure success.

Additional research and field testing would be necessary to evaluate the effectiveness of using this program on CD–ROM.

Design Process

The following phases were carried out for the design process:

- Front-end research
- Design
- Development
- Production
- Testing
- Distribution

A description of these phases is included in the following pages. The actual design sheets for this process are provided in Appendix A.

Front-end research looks at the purpose of the program. What is the target population? What previous experience and knowledge will they bring into the learning experience? What are the goals and objectives this program will seek to achieve? What hardware and software is available? What hardware and software are required? When each of these questions have been answered then the project designer can begin to look at the actual design of the proposed program.

This project was intended for use by third and fourth grade students in a self-contained English speaking classroom. It was designed for use individually or in pairs in a student directed center. It is a non–linear tutorial that introduces students to a variety of dinosaurs and the period in time in which they lived. This program includes a quiz, a word scramble and a hidden (guess the dinosaur) puzzle. It tests student knowledge in a game-like format. Students have the option of hearing the correct pronunciation of each dinosaur name, viewing a still picture of each and/or viewing video clips of some dinosaurs in action. Specific goals and objectives are spelled out in this phase of the design.

The design phase of the project must include the overall design, page layout, types of delivery and feedback. Basic format is decided upon as well as the instructional design. Will it be entertaining or informative? What theories will the design be based upon and what teaching strategies will be utilized?

This project uses a basic HyperCard format. The instructional design is primarily Level I Informative, but does allow for some Level II Interaction. Button placement is standard. Return, left and right arrows are used for primary navigation. Audio and video icons are included for additional information, but are not crucial to achieving the primary purpose of this stack. Navigation tools, except for the video icon (which is a card-specific button) appear at the top of each card.

The Period and Era cards are simple time – line layout. Period cards are arranged around the center for random choice. Graphics are used as buttons to encourage greater interaction. Children of this age are more likely to choose something they can actually see. "Name" buttons would all look alike and would be visually uninviting.

Individual information cards have a centered title with a graphic and wrap-around text (except for lengthy text passages which use scrolling fields). On the Main Menu the main function buttons are centered and larger. Game options and housekeeping buttons are grouped accordingly. Students interact with the stack in order of preference. They also have the choice of two activities which allow them to use previous and newly acquired information.

These activities are a question/answer quiz and a word scramble. The basic navigation buttons appear at the top of these cards as well. However, game function tools are located near the appropriate area for its function. The word scramble is provided to encourage familiarization with common dinosaur names. The quiz is provided in a game format. It tests knowledge while providing clues to a puzzle. Students are encouraged to correctly answer questions to earn puzzle pieces. Students are challenged to correctly identify the hidden creature with each new piece.

If more time were available to develop the program, a creative writing activity would be included to be completed after viewing the video. Here are two sample questions:

1. What is your theory of extinction? Using the information on fossils found, their location and position at time of death, give reasons for your theory.
2. After viewing the video, identify the meat–eater, the plant–eater and the period in which they lived.

A database template might also be included to be filled in by students using information gathered from the stack tutorial. This could be individualized and printed to be checked for accuracy or completed in a group setting.

The development phase is a log that lists the steps taken in developing the program and the time it took to complete each step. Also included are the problems incurred while developing the program.

The production phase is a tentative and actual production schedule. It includes Proposed and actual dates for project completion, beta testing, manual production and revisions.

The testing phase of the project includes actually testing the program out with a targeted audience, observing and evaluating performance. This testing allows the designer to judge first hand if the program is appropriate for the targeted user and if it performs the tasks it was intended to perform. In this case it was tested in both a third and a fourth grade classroom. Students were observed for time on task, perceived comfort with and interest in the program, ease of use and level of understanding. Students were also given the opportunity to respond to a questionnaire. A copy of the questionnaire and its' results is included in Appendix A.

The distribution phase gives a list of intended distribution procedures. How, when and to whom will the finished product be distributed.

The actual design sheets completed during the production and distribution of this project are included in Appendix A

A copy of the actual manual that accompanies this program is included in Appendix B.

APPENDIX A

PROJECT DESIGN SHEETS

Design Sheet

Phase: ● Front-end Research ○ Production
○ Design ○ Testing
○ Development ○ Distribution

The purpose of this stack is to introduce the user to various dinosaurs and the period in time in which they lived.

This program is intended for use by 3rd and 4th grade students in a self-contained English speaking classroom. It may be used by students in pairs or individually. "Dinosaurs" may also be presented to the class for large group discussion. Students may complete the program in a center when it is assigned. It may be viewed at a later date if a student is absent or needs remediation. Assuming students know basic Macintosh operation, this program is designed to be operated independently by students.

"Dinosaurs" is a non-linear tutorial. This program may be hooked up to a CD Rom player for audio. A laser video disc may also be used. However, it is not necessary for the operation of the program.

The program includes a quiz and a word scramble. It tests the student's knowledge of basic dinosaur facts and dinosaur names in a game format. Students are also given correct pronunciation of each of the dinosaurs names.

After completing this program the students will be able to:

1. Name the three Eras and where the Mesozoic Era occurs in relation to the other two.
2. Name at least two of the three periods of the Mesozoic Era.
3. Name at least eight dinosaurs and tell one distinguishing characteristic of each.
4. Classify at least eight dinosaurs into meat-eater or plant-eater categories.
5. Name one characteristic common to all meat-eaters and one characteristic common to all plant-eaters.
6. Correctly pronounce the names of at least eight dinosaurs.
7. Complete the quiz with 90% accuracy.

Design Sheet

Phase: ○ Front-end Research ● Design ○ Development ○ Production ○ Testing ○ Distribution

The overall design of this stack follows the basic HyperCard format. The instructional design is primarily Level I - Informative, but does allow for some Level II - Interaction. Button placement is standard. Return, left and right arrows are used for primary navigation. Audio and video icons are included for additional information, but are not crucial to achieving the primary purpose of this stack. Navigation tools, except for the video icon (which is a card-specific button) appear at the top of each card.

The Period and Era cards are simple time - line layout. Period cards are arranged around the center for random choice. Graphics are used as buttons to encourage greater interaction. I felt children of this age would be more likely to choose something they could actually see. "Name" buttons would all look alike and would be uninviting.

Individual information cards have a centered title with graphic and wraparound text (except for lengthy text passages which use scrolling fields). On the Main Menu the main function buttons are centered and larger. Game options and housekeeping buttons are grouped accordingly. The students interact with the stack in order of preference. They also have the choice of two activities which allow them to use previous and newly acquired information.

These activities are a question/answer quiz and a word scramble. The basic navigation buttons appear at the top of these cards as well. However, game function tools are located near the appropriate area for its function. The word scramble is provided to encourage familiarization with common dinosaur names. The quiz is provided in a game format. It tests their knowledge while providing clues to a puzzle. Students are encouraged to correctly answer questions to earn puzzle pieces. Students are challenged to correctly identify the hidden creature with each new piece.

If I had more time to develop the program, I would also include a creative writing activity to be completed after viewing the video. Here are two sample questions:

1. What is your theory of extinction? Using the information on fossils found, their location and position at time of death, give reasons for your theory.
2. After viewing the video, identify the meat-eater, the plant-eater and the period in which they lived.

I might also include a database template to be filled in by students using information gathered from the stack tutorial. This could be individualized and printed to be checked for accuracy or completed in a group setting.

Design Sheet

Phase: ○ Front-end Research ○ Production
○ Design ○ Testing
● Development ○ Distribution

4 hours – Logical design
4 hours – Design log
20 hours – Researching information
10 hours – Scanning images and editing in fat bits
12 hours – Inputting text
6 hours – reviewing video and audio material and installing resources
3 hours – Recording and editing voice notation
15 hours – Arranging layout of text and graphics
12 hours – Designing card flip animation
30 hours – Designing word scramble
30 hours – Designing quiz and puzzle
8 hours – Beta testing
4 hours – Final revision
20 hours – User's manual
178 hours total

Problems:

- Finding the right graphics
- Editing graphics
- Layout and design
- Smoothing out drag and card flip animation sequences
- Scripting for quiz and puzzle

Design Sheet

Phase: ○ Front-end Research ● Production
○ Design ○ Testing
○ Development ○ Distribution

Production schedule: 1/7/92 to 3/17/92

Finish date: 3/12/92

Beta Testing: 3/13/92

Second revision and manual production: 3/14/92 to 3/15/92

Second Beta Testing: 3/16/92

Final Beta version: 3/17/92

Design Sheet

Phase: ○ Front-end Research ○ Production
○ Design ● Testing
○ Development ○ Distribution

After an initial inservice on how to use the Macintosh computer, I took my personal Mac LC to school. On Friday, March 13, the 3rd grade students used the program individually or in groups of two as they finished their work. On Monday, March 16, I let one of the 4th grade classes try the program. Because I teach the morning Kindergarten class, I had time to observe both classes for a short time in the afternoon. When they had completed the program I asked each student to fill out the attached questionnaire. The results are as follows:

1. What did you like most about the program?
   the dinosaurs, the games, the word scramble, you learn, the quiz
2. What did you like least about the program?
   reading,need more time, stories too short, nothing, nothing
3. What problems did you have, if any?
   reading problems, no problems (4)
4. Was it easy to follow? yes (4), not really
5. Did you like the pictures? yes (5)
6. Were the directions easy to follow? yes (5)
7. Was the reading too hard, too easy, just right? just right (4) too hard(1)
8. Was the reading too long, too short, just right? just right (4) too short (1)
9. Was the reading interesting, boring, informative?
   (Circle as many as you wish) interesting (5) informative (2)
10. Did you learn anything? yes (3) no (1) one no answer
11. Did you enjoy it? yes (4) one no answer
12. Was it more fun than reading about Dinosaurs in a book? yes (3) no (1)
    one no answer

The third grade class did not fill out the questionnaire but their verbal reports to me were very similar to the fourth grade class.

While observing the students I noticed they really enjoyed listening to the pronunciation of each dinosaur and they enjoyed the verbal reinforcement on the word scramble. Unfortunately the students had never worked on a Mac or with a mouse so they moved very slowly through the stack. Also because of time restraints each student had 10 minutes or less. The students seemed to enjoy it and all said they would like to have more time to use the program. Because of the low reading level of students at this school I may use it with 4th & 5th grade rather than 3rd.

Design Sheet

Phase: ○ Front-end Research ○ Production
○ Design ○ Testing
○ Development ● Distribution

Copy and distribute to 3rd and 4th grade self-contained class-rooms with Macintosh computers.

APPENDIX B

PROGRAM MANUAL

Walk with Dinosaurs

version 1.0

User's Manual

developed by
Debbie Hirschman

Acknowledgements

Programmed by: Debbie Hirschman
Editorial Consultants:
Dr. Rowena S. Santiago & Gary St. Germain
Design and Layout by: Debbie Hirschman

Graphics used in this stack were scanned images from various books which are listed in the Bibliography in the User's Manual.

The movie icon and graphic on the Dinosaur information page are clip-art images from **Wet Paint's** *Classic Clip-Art* from the **Dubl-Click Collection**

The videodisk drivers and CD-ROM drivers in this stack are courtesy of the **Voyager Company**, 1351 Pacific Coast Highway, Santa Monica, CA 90401, Tel: (213) 451-1383

Stubborn Productions, Inc.
Highland, CA
92346

Table of Contents

Introduction

Welcome to Walk With Dinosaurs.

Walk With Dinosaurs is a tutorial that has been designed to introduce you to the amazing prehistoric world of creatures who lived millions of years ago - the DINOSAURS. This practical, easy-to-use program is a non-linear tutorial which allows the user to browse casually through the prehistoric periods of the Mezozoic Era. Or you may wish to study each dinosaur carefuly to learn their distinct features. When all of the information is mastered try your skill at the question/answer quiz - "Who am I?". With each correct answer you get another piece to the puzzle. Be the first in your class to correctly guess who the hidden creature is. Or you may want to see if you can unscramble the dinosaur names in the "Word Scramble".

Don't forget, as you browse through the information cards, to listen to the pronunciation of any dinosaur name you're unsure of. You may even view a short video clip of some of your favorite dinosaurs in action.

System Requirements

Minimum hardware requirements:

Mac SE, SE 30,LC or any Macintosh running a minimum of version 6.0.5 of System and associated Finder Files and HyperCard 2.0 or better.

A hard disk is strongly recommended. Using HyperCard and HyperCard applications on floppy disks whose capacity is 800K results in much disk swapping. Having HyperCard installed in the hard drive will allow the best performance.

Peripherals (Optional):

Pioneer 4200 LaserVideo disk player
Windows on Science - Earth Science Vol. Laserdisk

A Note to First Time Macintosh Users

This manual contains all the information you need to use **Walk With Dinosaurs.**

It assumes you have a basic knowledge of how to use the Macintosh (pull down menus, point & click, etc.). If you are not familiar with Macintosh commands refer to the Macintosh owner's manual. Before you begin, I suggest you read the "Installation Procedures" and the "Getting Started" sections. These sections contain important information on installing **Walk With Dinosaurs** and hooking up the peripherals. Once you have it up and running on your system, follow the "Walk-through" section for an excellent step-by-step tutorial lesson that will acquaint you with the basic features of **Walk With Dinosaurs.**

Installation Procedures

Using Walk With Dinosaurs with a single disk drive

If you don't have a hard disk and you want to use **Walk With Dinosaurs** on a single disk drive set up, follow these easy steps.

1. First make a copy of the **Walk With Dinosaurs** disk for your backup files. Refer to your Macintosh owner's manual for directions on copying disks.

2. Insert the HyperCard (2.0 or greater) start-up disk into your disk drive and turn on the computer.

3. Open HyperCard application. If unsure of how to do this refer to your HyperCard manual.

4. Pull down file menu and select "open".

5. Eject HyperCard disk.

6. Insert **Walk With Dinosaurs** disk.

7. Double click on **Walk With Dinosaurs** or click open.

8. Continue on as described in the "Walk-through".

Using Walk With Dinosaurs with two disk drives.

If you want to use **Walk With Dinosaurs** with two 800K disk drives, follow these easy steps.

1. First make a copy of the **Walk With Dinosaurs** disk for your backup files. Refer to you Macintosh owner's manual for directions on copying disks.

2. Insert your startup disk into the internal disk drive and turn on the computer.

3. Insert the **Walk With Dinosaurs** application disk into your external disk drive and double click on the disk icon to open it.

4. To open the program, use the mouse to double click on the disk icon to open it.

5. Continue as described in the "Walk-through."

Installing Walk With Dinosaurs on a hard disk

If you want to use **Walk With Dinosaurs** on a hard disk follow these easy steps.

1. Turn on your hard disk and computer.

2. Create a folder on your hard disk to contain the **Walk With Dinosaurs** application.

3. Insert the **Walk With Dinosaurs** disk into your disk drive. Drag the **Walk With Dinosaurs** application into the folder you created on your hard disk.

4.Eject the **Walk With Dinosaurs** disk from your disk drive and store it in a safe place.

5. To open the program, use the mouse to double click on the **Walk With Dinosaurs** icon.

6. Continue as described in the "Walk-through."

Connecting the LaserVideo Disk Player to Your Computer

This program supports the following LaserVideo Disk Players:

Pioneer LDV 6000	Phillips Player
Pioneer 4400	Sony Player
Hitachi	

Before making any connections, be sure your computer and LaserVideo Disk player are turned off to prevent damage to your equipment.

To connect the player, plug one end of the interface cable into the modem port of your computer and the other end into the interface connector port of the VideoDisk player. Be sure to have the correct cable for your particular system to avoid damage. See LaserVideo Disk player owner's manual. Plug in both power cords (computer & video disk player).

Getting Started

Reference section

Opening, Closing, Quitting

To open Walk With Dinosaurs

Simply select **Open** from the **File** menu. In the window that appears, choose the drive and folder that houses the file you want. Use the Mouse to click on and select the desired file from the list. Then click on **Open.**

To close Walk With Dinosaurs

Simply select **Close** from the **File** menu. This will take you back to the home card for HyperCard so that you may open another HyperCard application if you wish to do so.

To quit Walk With Dinosaurs

Simply select **Quit HyperCard** from the **File** menu. Or you may type ⌘ **Q** at any time during the program to quit the tutorial completely.

Using the Software

Teachers

Walk With Dinosaurs is designed to be a versatile tool for teachers. It wil enhance the teaching of the prehistoric period of the dinosaurs. You can invove the entire class in walking through the different periods. As students gain information, a class data base can be developed. You can also use **Walk With Dinosaurs** as a tutorial for individual students in a center. This set up works well for students who may miss the general class discussion or who may need remediation.

The information presented in this program may be used as a resource for reports, data bases or creative writing. Ask students to give their theory of extinction and support their theory using the information given in the stack. **Walk With Dinosaurs** will enhance the social studies curriculum in the areas of history and geography. It may also be used in conjunction with the science curriculum.

As a tutorial it will teach students to correctly name and identify distinquishing characteristics of various dinosaurs.

Students

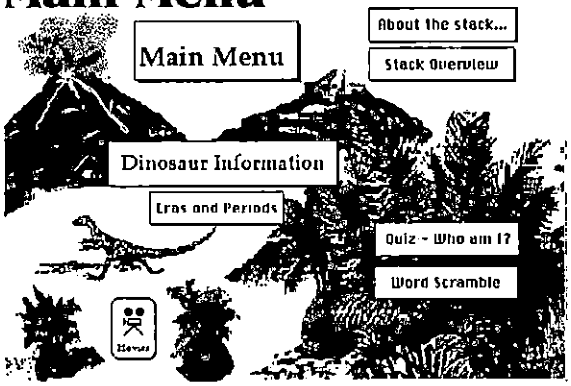
Students may use this program to randomly look at dinosaurs at their leisure for fun and information. Or students may view each dinosaur in sequential order and then complete the quiz. It is recommended that students work individually or in pairs to complete the information sections in a timely manner, particularly if you pair dependent and independent readers.

Walk - Through

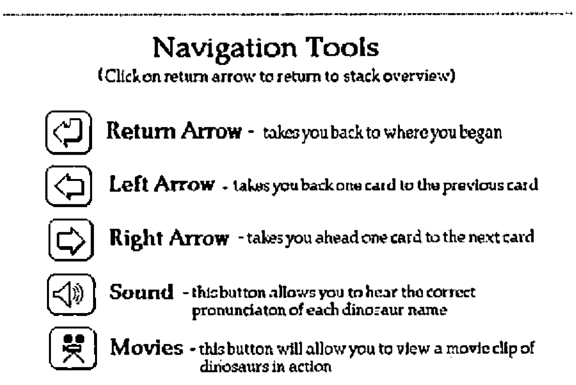
Teachers and students should take time to familiarize themselves with HyperCard concepts such as clicking on buttons, typing in fields, and navigation through the stack. Clicking on a button will make something happen (sound, video or movement to more information). Buttons in this stack are explained on the "Help" card. Other buttons appear as rectangular boxes and picture graphics. Click on any of these that you encounter in the program. The "walk-through" offers a step-by-step introduction to the program, but you may want to just start right into **Walk With Dinosaurs**. Its that easy to use.

Main Menu

Click on any button to go to different cards



About the stack–credits
Stack Overview–what the stack is about and **Help**
Eras & Periods–a timeline of geological history
Quiz–Question/answer game
Word Scramble–Unscramble dinosaur terms
Movies–Watch video clips

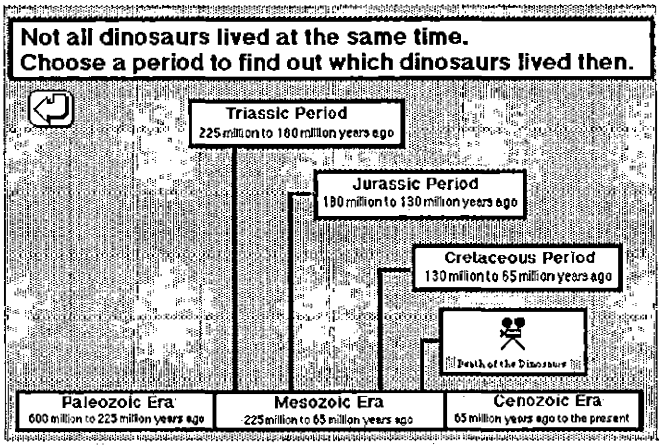


This **Help** card is accessed from the **Overview** card. It explains the navigation buttons used throughout the stack.

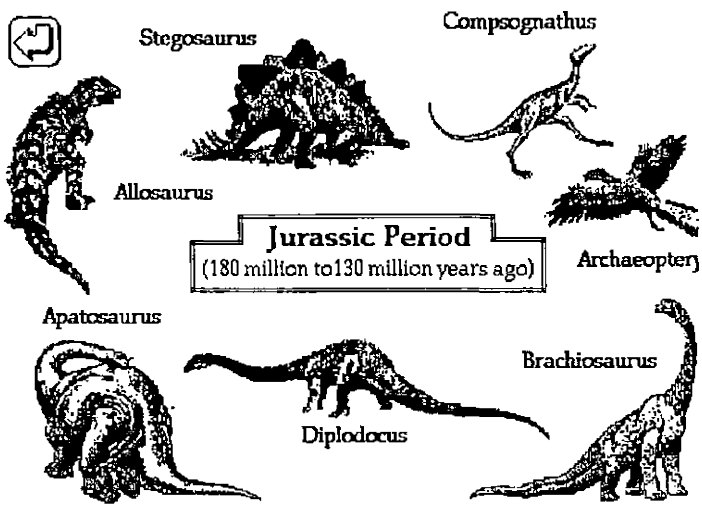
After clicking on the **Dinosaur Information** button, a scrolling field appears. The student may click on an unfamiliar word to see its definintion.

After clicking on the **Eras & Periods** button, the following card appears:

Click on the period of your choice

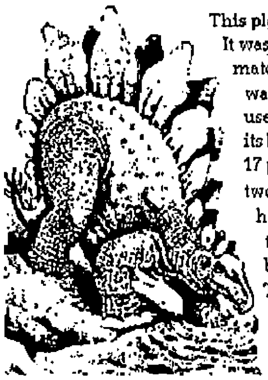


Click on the dinosaur



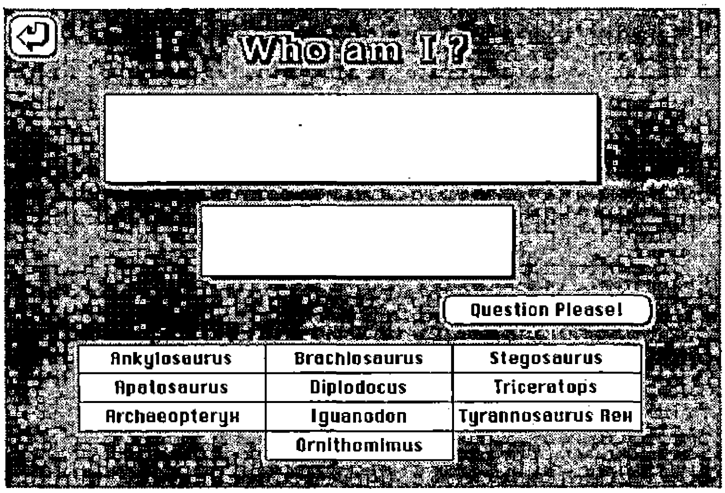
After viewing the information card the student may return to the **Periods** card and choose another dinosaur. Use left and right arrows to sequentially view all dinosaur information cards of that period.

Stegosaurus
(STEG-oh-SOR-us)



This plant eater would probably fit into your living room. It was about the size of an elephant. Its flat teeth were no match for those of the fierce meat eaters. Its protection was the large pointed boney plates on its back. Scientists used to believe that these plates ran in two rows down its back but in 1986 they found a skeleton that had only 17 plates running in a single row. They grew as big as two feet wide and two feet high. The plates may have helped control body temperture. They had big veins that could carry the warmed blood throughout its body. They also had sharp one-foot spikes on its tail. Thus it got its name Stegosaurus, meaning "covered lizard". Although it grew to about 20 feet long and weighed about 2 tons, its brain was the size of a walnut.

After viewing the **Dinosaur** cards, students may choose to try the **quiz** and **puzzle**.

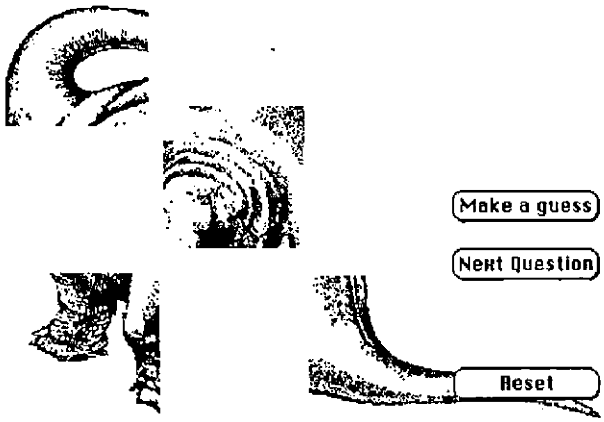


Quiz–"Who Am I?"

Start the quiz by clicking Question Please! To answer the question, click on the correct dinosaur name in the list provided.

If incorrect a "Try again" message will appear. Click "OK." If incorrect a second time, the question will disappear and you must click on Question Please!

If you answer correctly, you will go to the **Puzzle Card** where part of the puzzle will appear.



If you can guess who the puzzle is, click on Make a guess An answer box will appear. Type in your guess. Be careful to <u>spell correctly</u>.

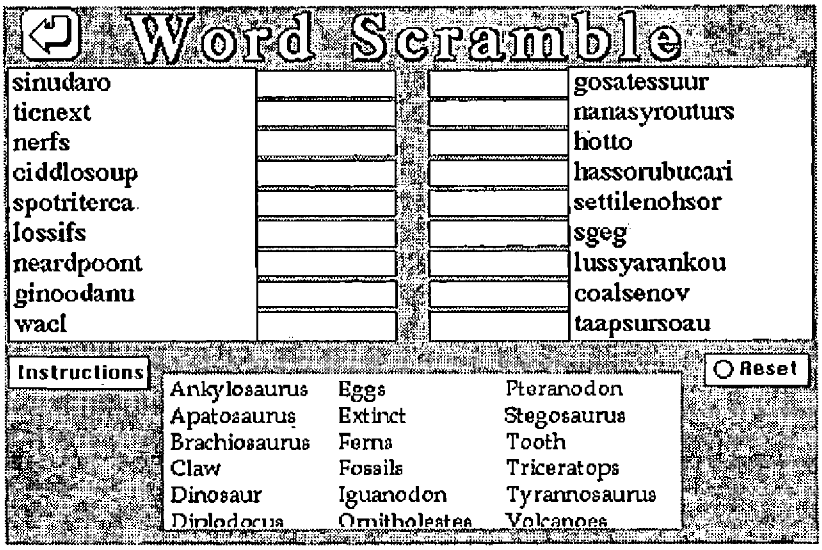
If you are incorrect, or you don't want to make a guess, click on Next Question

If you are correct, the entire puzzle will be shown to you. Click on Reset to get a new puzzle for the next user.

Word Scramble

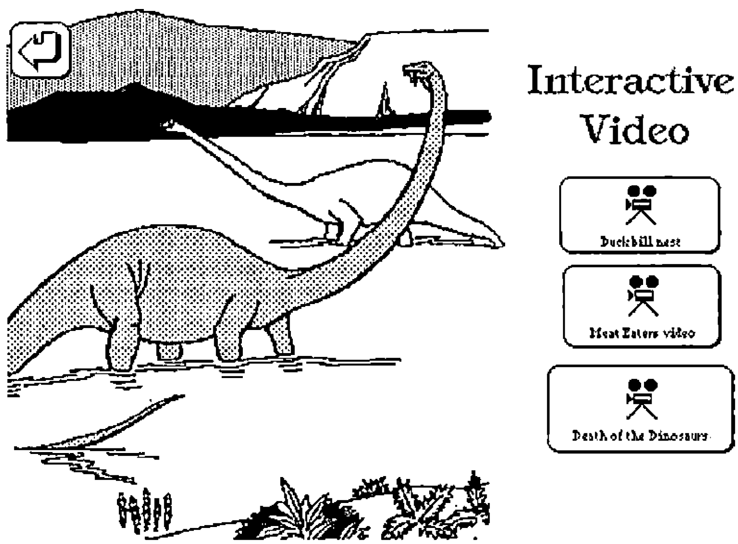
To unscramble the word, click in the box next to a scrambled word. Type in the correct word from the word list at the bottom of the card. Hit . If the answer is correct, the word will disappear from the word list. If the guess is wrong, the student may try again.

When the student is finished, click on Reset to restart the game.



Using Videodisc

If you are using this program with a videodisc player and the **Windows on Science–Earth Science** videodisc, the student may view one of three video clips by clicking on a video button. These buttons are grouped together on the video card or they may be found throughout the program on appropriate information cards.



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Video

Windows on Science LaserVideo disk

Clip-art

Joyce, Cliff and others, Classic Clip-Art., Wet Paint, Dubl-Click Software

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