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The effectiveness of traditional instructional methods in an online learning environment

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THE EFFECTIVENESS OF TRADITIONAL INSTRUCTIONAL METHODS IN AN ONLINE LEARNING ENVIRONMENT

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ABSTRACT

The Effectiveness of Traditional Instructional Methods in an Online Learning Environment

by

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For more than a century, the most predominant form of instruction in higher education has been classroom-based and instructor-led. Today, this traditional approach to learning is being challenged by new technologies such as multimedia, telecommunications, and the Internet. It has been suggested that the effectiveness of traditional pedagogical methods in alternative learning environments may be resolved through the creation of a new domain for educational interaction referred to as online education (Harasim, 1990).

There has been much research focused on the advantages of teaching university courses online (Davis, Odell, Abbitt, Amos, 1999; Hiltz,1994; Harasim, 1990). However, there is little research that has focused on the effectiveness of traditional instructional methods when used in an online learning environment. This study examined the effectiveness of traditional classroom teaching methods used in an online learning environment.

Academic outcomes of preservice education students who received online instruction were compared with preservice education students who received traditional teacher-based instruction. In this quasi-experimental, mixed model study, all students participated in both traditional (control) and online (experimental) interventions. Three different traditional methods of instructional delivery were compared: (a) lecture, (b) guided instruction, and (c) collaborative discussion. Interventions were created in which the intact traditional instruction was delivered through an online learning environment created specifically for this study.

The results of this study show that overall, there were no significant differences between experimental and control groups. That is, student performance was the same whether instruction was delivered in a traditional classroom or through an online learning environment. Traditional instructional methods, such as those used in this study, produce similar academic outcomes when delivered through online learning environments.

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Finally, to all the members of my family, thank you for your patience. I am done now.

CHAPTER 1

INTRODUCTION

Many transformations have occurred in instructional delivery over the years, yet instructional methods have, for the most part, remained the same. For more than a century, the most predominant form of instruction in higher education has been classroom based and instructor led. Drawing upon traditional methods has been the mainstay of most college and university instructors (Pregent, 1994). This traditional approach to learning is being challenged by new technologies such as computer-based multimedia, telecommunications, and new learning environments like the Internet (Hazari & Schnorr, 1999; Relan & Gillani, 1997). Today, colleges and universities have a variety of technologies from which to choose to facilitate instructional delivery. These technologies are making it possible to deliver instruction outside of the traditional classroom environment through the use of *online learning environments*.

Foremost among these technologies is the Internet. Internet-based instruction can be accomplished through the use of Internet web browsers and web pages, electronic mail (email), and streaming video and audio transmission. The World Lecture Hall, an Internet web site, lists hundreds of web sites at colleges and universities across the nation currently using Internet technologies to distribute instruction. Other technologies such as two-way Interactive Television (ITV) and videotape are available as well.

There are also a number of software products that can be utilized to facilitate the development of instruction for use in online learning environments. They include programs like PowerPoint® (Microsoft, 1997) that allow instructors to create presentations and then distribute them over the Internet, and Authorware® (MacroMedia, 1998), a program that instructors can use to create sophisticated interactive software products as well as web-based instruction. These programs, along with web-authoring programs, make it possible to distribute instruction through online learning environments.

It is not unusual for adopters of new technologies to explore there use in a way that mimics current traditional practices. For instance, it would not be unusual for an instructor to begin using online learning environments by incorporating traditional methods of instruction into the new technology. This is certainly not an unacceptable way in which to understand new technologies, instead, it is the basis by which instructors develop an informed understanding of the way in which something will work. As a result, acceptance of new technologies like the Internet, as a way to distribute instruction, may require a significant amount of time before they are widely accepted. As Papert (1980) described it, "it took years before designers of automobiles accepted the idea that what they were designing were cars, and not horseless carriages" (pg. 36).

For the most part, current examples of educational technology integration into online learning environments appear to be a mix of old instructional methods with new educational technologies. What is not clear at this time is whether traditional methods of instruction are suitable for use with new educational technologies or whether new instructional methods are required.

Significance of the Study

Newer technologies, like the Internet are being widely used to facilitate instruction through new delivery mechanisms such as web-based instruction (Khan, 1997), web-based performance support systems (Dunlap, 1999), and virtual classrooms (Hiltz, 1986). These online learning environments are providing opportunities for faculty to design, manage, and deliver innovative instruction (Gillette, 1996). The rapid development and integration of these technologies into online learning environments is fueling a debate within higher education institutions as to whether traditional instruction can continue to support the needs of tomorrow's learners. What is being questioned is the ability of traditional classroom-based instruction to provide on-demand instruction, robust learning environments, authentic experiences, and just-in-time learning experiences to a population of students who, because of time or geographic constraints, are unable to attend local colleges and universities (Perkins, 1996; Relan & Gillani, 1997; Romiszowski, 1998).

Rapid technological advances occurring over the past few years have made it possible for a variety of traditional courses to be offered through online learning environments. Faculty, students, and institutions of higher education across the country have established many examples of online learning environments. In many instances, these online learning environments consist of Internet web pages that offer access to instructional materials, resources, and communications systems such as chat rooms and threaded discussion areas. In other instances, the online learning environments take on the attributes or virtual appearance of actual classrooms or institutions such as Virtual-U (Harasim, Calvert, & Groeneboer, 1997). In a virtual environment, the

user interface is more visually oriented as compared with text-based hierarchical designs more commonly used. In most cases, however, the instruction that is included in these online learning environments is based on traditional classroom methods of instruction regardless of the design of the interface. Research concerning the effectiveness of these technologies and online learning environments is just beginning to be explored in the educational literature (Davis, et al., 1999; Liao, 1998; Zhao, 1998).

Online Learning

Online courses are generally available to learners anywhere and anytime through technologies such as the Internet, satellite, and broadcast video. Throughout the world, it is now possible to receive instruction without traveling to and from a classroom or institution, without meeting a teacher face-to-face, and often with considerably less financial investment. Through the use of the Internet, faculty have access to the world in terms of the people who can be reached and the resources that can be gathered. Online learning environments can serve as a vehicle for students to take courses at more than one institution at a time (Blumenstyk, 1996). For instance, a student attending Stanford University could take an online course at Harvard University without having to travel between the two institutions. In certain instances, learning online allows students to pursue a sequence of coursework in more than one area of study. These changes represent a shift away from the traditional university model of education and toward a more open and flexible model in which the student gains significantly more control over their learning experiences (Relan & Gillani, 1997). In general, online learning environments

have substantial potential for moving instruction away from a text-based classroom model (Hill, 1997).

The key to understanding the effectiveness of online instruction is to better understand its relationship to traditional instruction. Thach and Murphy (1995) observed that traditional teaching methods may not work in distance education settings, suggesting that different teaching methods may be required in online learning environments. Further, traditional instruction has sometimes been considered a major cause of a dysfunctional and even obsolete educational system (Reigeluth, 1994), suggesting that not all traditional instruction may be effective instruction. On the other hand, Relan and Gillani (1997), assert that the existing repertoire of effective traditional teaching methods can be vastly improved through the use of the Internet for instructional delivery. For example, lectures presented in a traditional classroom can take on a new dimension in an online learning environment. Online lectures can be interactive, linking learners with a unlimited number of resources. They can also provide a wide range of graphics and illustrations and can take place without the constraints of time and location imposed by more traditional settings.

Need for Understanding

There are many concerns associated with online learning that point to a need for developing a broader understanding of this type of instructional environment. One concern is, with widespread use of computer technology at work, at home, and in schools, there is a real need to prepare students and workers for human-to-machine interaction (Everett & Ahern, 1994), and to increase comfort levels of users as they work with the tools of technology.

Another concern is that by shifting course content to the Internet, instructors will lose autonomy in the classroom (Keating & Hargitai, 1999). Concerns about the relationship and interplay between professor and student, often seen as an essential part of the learning process, might be lost in the shifting of traditional content and teaching methods to an online learning environment (Sadowsky, 1998).

Not long ago, television and radio were thought to present exciting possibilities for extending the reach of the traditional classroom. While television and video are used in distance education delivery systems today, often to enhance the traditional learning environment, they have not had widespread impact; nor have they significantly altered the way instruction is delivered. In fact, as Papert (1994) observed, if an educator from the year 1899 were to enter a classroom today, it is highly likely that he/she would observe little difference in the way education operates. By contrast, a medical professional from the same time would see vast differences in the way the medical profession operates. The differences lie in the way in which technology has affected change in the medical profession.

Today, new communications technologies are once again influencing the way educators, educational institutions, and even businesses develop learning environments and instruction. The long-term effect that technology will have on education is not clear. However, understanding when and how to effectively use new communications technologies as modes of distribution for academic courses and related educational resources in education is of real significance (Blumenstyk, 1996).

Many institutions of higher education have felt the effects brought about by new trends in educational technology and course delivery. Colleges and universities share concerns about limited resources such as classroom space, that are causing them to rethink the way instruction is currently being delivered (Lively, 1995). The influence of online learning environments has caused some educational institutions to seek new ways in which the teacher and learner can communicate more effectively. Online instruction has been shown to be influential in determining successful learning outcomes (Hedberg, Brown, & Arrighi, 1997) resulting in some institutions requiring faculty to use these technologies (Keating & Hargitai, 1999) to reach a larger population of learners.

Online Courses

The number of educational institutions offering complete college degree programs online is increasing every day. For instance, Pepperdine University in California offers a Doctoral Degree in Educational Technology, Pennsylvania State University offers a certification program in educational technology integration, the Online Campus of the New York Institute of Technology offers a bachelors degree in science, the University of Phoenix offers a wide variety of computer-based courses leading to degrees in business and management, and the University of California at Los Angeles offers programs that teach teachers how to develop online instruction. While these and other institutions are looking to the Internet as a vehicle for delivering entire curriculums, some leading to advanced degrees, others are waiting for more empirical evidence that online learning is an effective mode of delivery with comparable academic outcomes.

There are dozens of industries that have been created in recent years whose sole purpose is to provide the necessary tools, expertise, and complete online environments for use in distributing education over the Internet. Companies like eCollege and software products such as TopClass (Web-based Training Systems, 1998) for example, provide institutions with a framework for educational content delivery and course management. These frameworks range from eCollege's total educational package in which all aspects of design, instruction and delivery are handled by the company in concert with the hosting university and faculty, to TopClass's format where the faculty produce the online content and the company provides the online delivery mechanism.

With industries, institutions, and faculty beginning to explore the world of online teaching and learning, it is imperative that research be conducted into the methods of instruction and delivery that are employed in online learning environments. An investigation into the effectiveness of transferring traditional instructional methods to an online learning environment would contribute to the body of research that currently supports online learning.

The professional literature is full of articles defining online instruction (Harasim, Hiltz, Teles, & Turoff, 1995), and describing the uses of online instruction in educational settings (Alexander, 1996; Blumenstyk, 1996). These articles often center on (a) the use of the web as a publishing media (Schank & Cleary, 1994), (b) the use of online distribution technologies (Blackhurst, Hales, & Lahm, 1997), and the use of the web for knowledge acquisition and problem solving (Dodge, 1997) to name a few. There is little empirical evidence, however, supporting the use of traditional instructional methods in

online learning environments, or analyzing which aspects of traditional instruction are best suited to online instruction.

Online learning environments may have the potential to change the way instruction is delivered, therefore it is essential that both the potential and the limitations of this delivery media be fully understood. Using traditional instructional methods in online learning environments may have implications for the way we teach and the way we learn today and in the future. If it is possible to communicate concepts in a manner that includes a variety of delivery methods (Paulson, 1997), it is possible that greater numbers of students in a learning environment will be able to comprehend and retain the knowledge being presented.

Research Questions

As use of new communications technologies and online learning environments becomes more widespread, questions concerning the effectiveness of traditional pedagogical methods in online learning environments need to be addressed (Ahern & Repman, 1994). This study addressed the following overarching question: To what extent are traditional instructional methods effective in a technology-enhanced online learning environment? More specifically, three questions were considered:

1. Are lectures, when presented in an online learning environment, as effective as lectures presented in a traditional classroom environment?

2. Is guided instruction, when presented in an online learning environment, as effective as guided instruction presented in a traditional classroom environment?
3. Is collaborative discussion, when carried out in an online learning environment, as effective as collaborative discussion in a traditional classroom environment?

Summary

A desire to bring higher education to a population of learners who are geographically dispersed has caused many colleges and universities to consider alternative means for the distribution of instruction. Widespread adoption of new technologies and new distribution models has resulted in the creation of online learning environments.

Online learning environments are serving as the method of choice for the distribution of instruction over the Internet. The majority of online learning environments today are constructed using traditional instructional methods even though it has not been established that traditional methods of instruction are as effective in an online learning environment.

If the effectiveness of traditional instructional methods, as used in an online learning environment is to be fully understood, it will require careful investigation. This study investigated the effectiveness of traditional instructional methods as used in an online learning environment.

CHAPTER 2

A REVIEW OF THE LITERATURE

This review examined the extant literature most relevant to this study. The focus of this review is on those aspects of the literature that are related to online learning environments and selected traditional instructional methods, (a) lecture, (b) collaborative discussion, and (c) guided instruction. Research into each of these areas helped to establish a theoretical foundation for this study.

Today, millions of people around the world use the Internet to access information, correspond, conduct business, and further their education. The blending of technology and education especially, is beginning to provide new and different ways in which to experience learning (Laurillard, 1993). Over the past decade research into the effectiveness of technology in education has been positive, often demonstrating that educational technology can be effective in a variety of learning environments. Much of this research has examined the effectiveness and overall efficiency of the computer as an educational tool (Bangert-Drowns, Kulik, & Kulik, 1985).

However, in the past few years new technologies as well as new and innovative uses of these technologies in educational settings have prompted a need for additional research. An example of a recent application of new technology in education is online learning environments (Harasim, 1990).

Despite their apparent widespread use by colleges and universities, little research evidence exists to support claims for the effectiveness of technological innovations such as online learning environments (Reeves & Reeves, 1997). This study investigated the effectiveness of one important component of online learning environments, the role of traditional instructional methods in an online learning environment.

Online Learning Environments

Online learning environments are interpreted broadly as any form of instructional delivery in which the Internet is included as a tool (Relan & Gillani, 1997). Technology-based distance education, web-based instruction, and distributed learning are all examples of online learning environments. According to Harasim (1990), online education is a new domain of learning that combines distance education with the practice of face-to-face instruction utilizing computer-mediated communication. Originally, distance education meant corresponding through the mail to receive instruction. Today, online learning environments are an evolutionary step beyond traditional distance education, moving away from a correspondence-based system to one that includes interactivity and media distribution capabilities.

Online learning environments fall at the end of Cuban's (1986) traditional classroom instruction model which stretches from teacher-centered to student-centered curriculum. In a teacher-centered (traditional) curriculum, the teacher is the knowledge expert and instructs students through lecture, demonstration, or by delegating assignments to be completed. In this design, teacher talk exceeds student talk, instruction is delivered to the whole class

(sometimes group or individual instruction occurs), and all is done within a set framework dictating time, length of class, and location of class (Relan & Gillani, 1997). By comparison, in a student-centered curriculum, students exercise a substantial degree of responsibility for what is taught and how it is learned. In this paradigm there is a shift of control and interaction in which student talk is equal or greater than teacher talk, more instruction occurs in smaller groups or individually, and students are actively involved in selecting what is to be learned. Student-centered instruction is often viewed as being more favorable than traditional instruction because it uses computer technology in more collaborative instances, allowing for teachers to facilitate the instruction rather than impart it (U.S. Congress, 1995).

An early consideration of online learning environments came in *The Network Nation* (Hiltz & Turoff, 1978). In this book, the authors present a picture of connectivity foreshadowed by Marshall McCluhan and Vanavar Bush, but not fully realized until much later with the creation of the telecommunications technologies and the Internet. Online learning environments bring another dimension to distance learning by offering multiple media capabilities and a flexible, more interactive level of communication (Crossman, 1997).

Recent Advances in Technology

Today's online learning environments offer a greater amount of flexibility and access to resources possible only through recent advances in technology. Currently, entire courses are taught using online learning environments with students never having to attend classes in the traditional sense on campus. Telecommunications technologies like the Internet make it possible for students to engage in interactive online communication and research.

A trend towards expanding educational opportunities to a population of learners unable to attend courses in person has many institutions of higher education seeking affordable and flexible student-centered online learning environments (Duchastel, 1996). Technologies that can augment traditional instructor-led teaching and make it more effective and efficient through the use of multimedia, email, collaboration, and simulation are becoming prevalent in higher education (Oblinger & Maruyama, 1996). Many institutions and educators have effectively integrated communications technologies such as email, listservs, and Internet access into their educational environments to support a variety of courses and teaching functions. The effectiveness and efficiency of these new online technologies, as well as their ability to deliver instruction, is still being considered.

One driving force behind online learning environments has always been the growth and availability of technology. What has been questioned over time is the ability of technology to meld with educational methodology in a way that maintains the same quality of education as well as unlimited and unrestrained access to educational resources resulting in increased participation and understanding by learners (Oppenheimer, 1997).

Instructional Delivery

What most models of online learning do not account for is the method of instructional delivery. It has been assumed for some time that traditional methods transfer to online learning environments, as evidenced by the increase in online-based educational systems being used in higher education today. Open to question is the role that traditional methods of instruction play in online learning environments. Can the use of existing instructional methods in

online learning environments be easily facilitated using reliable network infrastructures with access provided by computers and accessed by learners from any place, at any time (Thach & Murphy, 1995)? While there is not a large number of studies related to the effectiveness of online learning environments, there are several significant studies that have examined different aspects of online learning environments.

Virtual Classrooms

Research into the effectiveness of online learning environments such as virtual classroom environments (Harasim et al., 1995), mixed-mode (online and traditional) instructional models (Davis, et al., 1999; Harasim, 1993; Hiltz, 1994; Willis & Dickerson, 1997), and teacher experiences with online curricula (Fowler & Wheeler, 1995) has been positive. For Example, in the Virtual Classroom, Hiltz (1986), examined the effectiveness of combining traditional and experimental (online) methods. In the virtual classroom, students experienced a mixed-mode educational environment in which some of the coursework and communication was presented online and some of the coursework and communication was conducted in a traditional setting. The findings of that study included student reports that they had greater access to educational experiences and that this access was more convenient than in traditional classrooms. Additional findings included: (a) an overall increase in student participation; (b) an improved ability to apply the material of the course in new contexts and express independent ideas relating to the material; (c) improved access to the professor; (d) an improved ability to make connections between diverse ideas and information; and (e) improved attitudes toward the use of computers. This study demonstrated the effectiveness of an early

design of an online learning environment and reported no statistically significant differences between students who received instruction in the virtual classroom and those receiving traditional instruction (Hiltz, 1986). These findings support the continued use and exploration of online learning environments. While Hiltz's early work demonstrated that mixed-mode online learning environments were effective, it did not address pedagogy. The effectiveness of traditional educational pedagogies and instructional strategies when used in an online learning environment have not yet been determined.

A more recent study (Davis et al., 1999), compared an online course with its traditional counterpart and with a mixed-mode (online and traditional) course. Their study used preservice students enrolled in an introductory course in educational technology. The researchers reported that the online course was equally as effective as a traditional course and a course using both traditional and online instructional methods. While this study showed that there are conditions under which an online learning environment is effective, it did not address pedagogy.

Davis, et al., (1999) examined online learning methods that were modeled after traditional learning methods. Their study did not use an "intact" model, but modified their traditional instructional model to suit their online instructional needs.

Online education may be able to overcome many of the problems associated with traditional instruction. Traditional instruction is often viewed as an instructional environment which, among other characteristics, encourages passive learning, ignores the individualized needs of students, and under-serves the development of problem solving and other higher-order intellectual

skills (Hannam & Briggs, 1982). Another example of a problem associated with traditional instruction is the constraints of time and place that restrict access to instruction in traditional settings. Online learning environments contain features that support communication between the instructor and the student who are separated by a geographical distance. Communication is two way, interactive, and uses technology to facilitate the learning process (Garrison, 1989).

Instructional Methods

The methods of traditional instruction have been around for centuries and include models such as the lecture, guided instruction, and discussion models or seminar. Instruction can be defined as a method of interaction designed to increase learners' knowledge or skills. Dick and Carey (1990) identified seven common elements that define effective instruction. Effective instruction should (a) motivate the learner, (b) specify what is to be learned, (c) prompt the learner to recall and apply previous knowledge, (d) provide new information, (e) offer guidance and feedback, (f) test comprehension, and (g) supply enrichment or remediation. Effective online instruction has the potential to meet these criteria and provide additional enhancements to the instruction that only can be accomplished using technology. The use of online technologies, when their use provides new opportunities for students to learn to visualize, to understand, and to see complex relationships in ways that are not possible using other media, may lead to improved learning environments (Alexander,1996).

A recent phenomenon in education has been the growth of the number of teaching methods, mostly as a result of the rapid development of knowledge in educational psychology since the early 20th century (Pregent, 1994). A teaching method is a particular way to organize pedagogical activities that are consciously implemented according to certain rules, sometimes by the professor, sometimes by the student (Pregent, 1994). Research on teaching methods has not been able to prove the supremacy of any particular method. As Clark (1983) pointed out, educational gains are attributable to instructional methods, not the choice of media for online delivery of instruction. Therefore, it is imperative that the relationship between proven traditional methods of instruction and online learning environments be fully understood. Educators need to understand if traditional instructional methods transfer to new technologies or if new instructional methods are required. The first step in determining if traditional instructional methods are effective when incorporated into new technologies is to directly study them, as this study does.

Lecture

The lecture model been criticized for its inability to provide significant interaction among faculty and students (Johnstone & Su, 1994). If the goal of education is learning rather than knowing, interactive online learning environments offer opportunities for more individual investigation than do whole class lectures.

According to Johnstone and Su (1994), the common assumption that lecturing is an efficient way of transmitting information accurately is incorrect. In their study of chemistry lectures, students recorded about 90 percent of the blackboard information; they assumed that the blackboard information was

sufficient. However, some parts of lectures went almost entirely unrecorded. Demonstrations, examples of applications, detailed sequences of logical arguments, and the meanings of technical terms and symbols were not recorded. Because lecture notes form the primary source of study material for students, the conclusion was that for two-thirds of the students, lectures were an inefficient medium: "At best, lectures are overviews or outlines of what has to be learned rather than learning experiences in themselves" (p. 78).

Collaborative Discussion

Dissatisfaction with the efficiency of the lecture paradigm has lead many to advocate a different educational model. Greater interaction between student and faculty, student to student, and student to information is directly related to improved learning (Fletcher, 1989). In a collaborative classroom, the instructor's role is different from that in the traditional classroom. The instructor still determines what is to be learned and sets standards for students to meet, but the instructor's role is no longer just to present the information. Instead, students work in teams to negotiate the process, actively share information, ideas, and problem solving, and jointly achieve the outcomes (Oblinger & Maruyama, 1996). This form of learning is a more social method than the traditional lecture method.

Collaborative learning can be either synchronous (i.e., at the same time) or asynchronous (i.e., at different times) and can occur in a classroom or in dispersed locations. The process of creating, analyzing, and evaluating in collaboration with others strengthens socialization skills, increases cross-cultural awareness and appreciation, and increases general interest, focus, and synthesis efforts (Ellsworth, 1994). If the goal of collaborative learning is

the involvement of students in active discussion, then using technology in an online learning environment may present new opportunities and mechanisms for discussion online.

In this study, a comparison between traditional communication in the classroom (collaborative discussion or seminar) is made using online discussion technologies (telecommunications). Online discussion can offer new and enhanced avenues for teaching and learning by breaking down time and location barriers, enabling students to access information in a self-paced exploratory fashion, reinforcing learning, and allowing for and encouraging self-directed learning (Oblinger & Maruyama, 1996). Online discussion can involve a large range of activities such as email, electronic discussion lists, real-time chat, and computer conferencing and can include all the permutations of teacher-student, teacher-teacher, and student-student interactions as well (Ellsworth, 1994).

There is much research expounding the benefits of online communications in education. Research into the social aspects of online communication systems such as chat rooms, threaded discussions, and email (Harasim, 1993; Heflich, 1996) for example, have demonstrated that telecommunications as a medium for conversation and discussion is effective in most educational settings. These studies report findings that include (a) increased student participation, (b) more involvement by the student in the discussion(s), and (c) increased awareness of the instructional content (Riel, 1994). Overall, the effectiveness of online communication provides a foundation from which to begin an evaluation of the effectiveness of traditional instructional methods such as lectures and collaborative discussions.

Results from collaborative discussion studies show improvements over the traditional classroom discussion models (Harasim, 1993).

Some of those improvements follow:

1. Online discussions are distinguished by active peer-to-peer discussion and exchange.
2. Messaging is fairly evenly distributed among students. Online interaction displays fewer extremes such as dominant input by a few individuals and little or no participation by anyone else in class.
3. There are increased opportunities for access offered by the asynchronous, place-independent environment.
4. Online collaborative communication provides learners with time to formulate ideas and contribute responses. Students report that asynchronicity enables them to participate more actively and effectively.
5. Group interaction motivates students and exposes them to a diverse range of perspectives. Students read input from all other students, rather than only the ideas of the instructor and a few students.
6. Students report that they work harder and produce higher quality work online; one reason given was that their work is visible to their peers.

Effective online learning environments should be capable of providing quality interaction with students through individualized instruction, customized course material, and a personalized dialogue with learners (Jones & Okey,

1997; Pennell 1996). With recent telecommunications technologies, it is possible to create, evaluate, and maintain individualized learning environments electronically (Blackhurst, Hales, & Lahm, 1997).

There are a number of benefits to using online technology to facilitate communication and discussion by students. Text-based messaging, for instance, removes the limitations that gender, age, race, physical appearance, and socioeconomic status impose on students in discussion groups. It further overcomes the barriers that space, time, and location impose upon us (Harasim, 1993). Another benefit is the use of online technology to facilitate communication which has led to the emergence of virtual electronic communities (Rheingold, 1993). Delivery of education through an online, collaborative environment may alter the relationship between the instructor, the students, and the course content in that the many-to-many asynchronous nature of the medium democratizes access and encourages student input (Jaeger, 1991).

Guided Instruction

Guided instruction often involves a direct, hands-on, approach to learning. Sometimes this method of instruction is based on pre-existing "models" and sometimes it is based on "trial and error." Even when personal and group training is available, and paper documentation is well written, or online help is provided, most users prefer to learn by trial and error (Hilitz & Kerr, 1986). In fact, as Horton (1990) points out, people learn by trial and error more than by following instructions. Successful instruction, though, is often achieved through the combination of two or three techniques (Horton, 1990).

These techniques can range from demonstration, individualized tutorials, to modeling by example.

When delivering guided instruction through online learning environments, the delivery method shifts from instructor-led to one that requires online documentation (help files) that tutor the student in the same way the instructor might in a traditional classroom. Typically, online and paper documents contain three types of information: content, format, and organization (Horton, 1990). Content refers to the word and pictures that are the subject of the document. Format controls how the content is displayed and includes typography, layout, and color. Organization specifies the order in which topics are presented and the relationship among them. All three information types were carefully considered in the development both the traditional and online guided instruction modules.

In order to understand the effects of using tutorials outside of the traditional classroom, Sasser (1991), conducted a study that examined the effects of using computer tutorials as homework assignments on the Mathematics Achievement of Elementary Education Majors. The results of this study provided evidence that students who receive appropriately chosen computer software tutorials as homework assignments attain higher achievement results than do those students who receive the traditional paper-and-pencil exercises as homework assignments.

Impact of Online Learning

The impact of online learning on the learner is a major issue. A complaint often voiced by learners in online and distance learning

environments is that they feel isolated and disconnected (Noblitt, 1995). Developing strategies that empower the learner, encouraging both cooperative and independent work as well as interaction, can be used to overcome this limitation (Davie & Wells, 1991; Hill, 1997; Schrum, 1997). Information overload is one often related to pedagogy and online instruction. Working in an environment that is filled with multiple media can lead to feelings of being overwhelmed (Hill, 1997). Ways to assist the learner in overcoming a feeling of being lost should be incorporated into online instruction.

Another issue related to successful online instruction is timing. In traditional instruction environments, timing is a controlled element. Online environments, in addition to being multilevel (hyperlinks), are also multi-speed (Romiszowski, 1998). That is, learners have the capability of accessing materials over time, and as such, they can also engage in activities over time. This can lead to feelings of a lack of overall cohesiveness, presenting a considerable challenge for establishing themes for interaction and discussion (Harris, 1994).

Internet technology makes it possible to provide individualized instructional sequences along with the ability to communicate interactively. In the past five years many new technologies have been developed that provide mechanisms enabling all manner of course material to be presented and delivered over the Internet. Text, animation, 3-D representation, audio, and video are all possible on the Internet today. Standard web-based technologies such as the web pages, common gateway interface programs (scripts), and compact disc recording technologies selected for this study, allow an instructor to provide individualized instruction for any student. It is possible, therefore, that

traditional instructional methods may require some accommodation in order to take advantage of the new capabilities that technology-enhanced online learning environments can offer.

Summary

If educators are to succeed with technology, they will need to have a path that allows for easy migration from what they are comfortable with in their classrooms to new media, technologies, and ways to communicate and interact. The computer is a symbol of a new way of life for many educators. It can make many faculty anxious, representing a disconnected feeling that many educators experience between their background and training and the current technology demands placed on them by educational institutions (Noblitt, 1995). Hodas (1993) referred to this anxiety by instructors toward technology as a resistance to the revisioning of the values and purposes of education itself.

Riel (1994) was one of the first to note that online technology in the classroom forces teachers to change their practice. The reason many educators do not use technology in the curriculum is that they perceive its use as change, change they may not be prepared to make. These perceptions beg the question that if change were made easier and more relevant to traditional instruction, would the result be that more educators would pursue online instruction? There is widespread agreement that the use of online technology in education and the ways to deliver it most effectively are unavoidable (Harasim et al., 1995; Khan, 1997).

Implicit in online learning environments are multiple access points and learning opportunities supported by a common technological infrastructure like

the Internet. The technologies behind an online learning environment enable two key capabilities: content distribution and collaborative computing. Content distribution allows a student or faculty member to access instructional resources from anywhere via the network, on or off campus (Willis & Dickerson, 1997). Possible scenarios include a student interacting with a multimedia self-study module, a faculty member updating a Web page for the next class, or a student reviewing an online syllabus. Collaborative computing allows multiple individuals to work together on a group project, either synchronously or asynchronously, from independent locations (Bonk & Reynolds, 1997). Possible scenarios include three students working on a document from separate locations at independent times or a faculty member and student sharing a common whiteboard on their respective computers during an office hours videoconference.

Much of the research with online technology has been done from the perspective of a text-based medium. However, the astounding growth of the world wide web (WWW) as a repository of information means that online research may uncover resources that contain audio and video as well as text.

Several trends in educational technology are contributing to an ever-increasing focus on online learning. There is a gradual shift toward a more student-centered approach in education and a more individualized approach to learning in all its forms (Zandvliet & Farragher, 1997). The use of computer-assisted learning has made a major contribution to education. The great flexibility and data handling capabilities of computers allow computer-assisted learning to adjust to the needs of the individual student (Zandvliet & Farragher, 1997). Of all the technologies available, perhaps the Internet holds the greatest

potential for promoting interaction with and engagement of the learner (Shotsberger, 1996).

According to Green (1995) and Gilbert (1996), the real benefits of Internet technology will be in the area of content, curriculum, and pedagogy. For the most part, traditional learning is usually a structured, individual activity, in which time, place, topics, and activities are fixed, and the instructor determines the place of the lesson (Norman, 1993). On the other hand, online learning environments provide structure within a flexible environment; one in which time, place, topics and activities are dynamic and the instructor provides guidance and support. While these two concepts appear very different, the possibility exists that traditional instruction as we have come to know it may very well be as effective in online learning environments as in traditional classrooms.

Research is just now beginning to show that online learning is effective. Further examination of the effectiveness of traditional methods of instruction in an online learning environment is the next step in developing an understanding of the total online learning experience.

CHAPTER 3

METHODOLOGY

The integration of communications technologies such as the World Wide Web into the educational environment has been steadily increasing over the past few years (Khan, 1997). While these technologies have proven to be effective at delivering large amounts of information to millions of learners, it is still not clear if this form of instructional delivery is as effective as traditional instruction. Teaching over the Internet at a distance is still in its infancy and in need of empirical investigation. Many questions remain as to the efficacy of online course delivery.

The focus of this study was to determine if selected traditional classroom instructional methods remained effective when transferred to an online learning environment. An online learning environment was created specifically for this study in order to provide instruction to students outside of the traditional classroom environment using current communications technologies such as computers and the Internet.

This study compared the academic outcomes of preservice education students. Each student received both traditional (control) and online (experimental) instruction. In this study, traditional instruction was used in an online learning environment in order to determine if this type of instruction remained effective and would result in similar academic outcomes.

Three methods of traditional instructional delivery used in higher education were identified (Pregent, 1994) and selected for comparison: (a) lecture, (b) guided instruction, and (c) collaborative discussion. These methods were representative of methods used widely within higher education.

Setting

This study was conducted at a state-supported western university and included preservice, undergraduate education students enrolled in two concurrent offerings of a survey of computer use in education course. This course (see Appendix A) offered an overview of computer-based technology and integrated software applications used in K-12 education and utilized a hands-on teaching environment in which students learned about current educational technologies through using them. The two sections of this course offered a one-to-one student computer ratio and were held in an education computer lab over a period of approximately fifteen weeks beginning in the spring semester of 1999. Research approval for this study was granted through the office of sponsored programs at the university.

Students

Sixty undergraduate preservice education students who were preregistered in two different sections of a survey of computer use in education course were selected to participate in this study. At the beginning of the course, an informed consent form (see Appendix B) was distributed to all students outlining the study and providing each student the opportunity to elect to participate or not participate in the study by their signature. The study was explained in detail to all students so that they could make an informed decision

as to whether they would elect to participate. Two students elected not to participate and 58 students elected to participate in this study. While students were given the opportunity to withdraw from the study at any time during the semester, none withdrew.

This population was selected based on the following characteristics:

1. Preservice teachers are required to use and understand current telecommunications and information (Internet) technologies as a component of their degree program.
2. Multiple sections of this course were offered during the Spring 1999 semester.

Of the 58 students in this study, 42 (72%) were female and 16 (28%) were male. Within this population, 30 students (25 female and 5 male) indicated a preference for elementary education and 28 students (17 female and 11 male) indicated a preference for secondary education. The average age of all students was 25. The youngest student was age 19 and the oldest student was age 53.

Demographic information was collected at the beginning of the semester. Students were asked to rate their level of computer experience and respond to questions designed to determine the level of understanding, access, and availability of computer technology they had at the time (see Appendix C).

Experimental setting: The digitalclassroom

The *digitalclassroom* was the name assigned to the online learning environment that was created for this study to deliver instructional content for online interventions over the Internet. The digitalclassroom was comprised of

several technologies and web-based software programs (see Appendix D) designed to deliver instruction and course content over the Internet. In this *virtual* classroom the students did not need to be present, as in a traditional classroom environment, in order to access and receive instruction.

This interactive web-site was available on the Internet and included a series of web pages which contained the syllabus, the course outline, help files, course instruction, and access to an online discussion forum. The digitalclassroom files resided on a server that maintained a full-time connection to the Internet so that access to the digitalclassroom could be made at anytime from any computer capable of accessing the Internet by students and instructors.

In addition to providing a virtual learning environment for students, the digitalclassroom provided management tools and data collection mechanisms that were used to assess different levels of usage and frequency of use of students. These tools were only available to the researcher who owns the domain thedigitalclassroom.com.

Control setting: Traditional classroom

The traditional teacher-based classroom environment for this study was a Macintosh computer lab with 30 student computer stations and one teacher computer station. The classroom had a white board and several projection devices for viewing the instructor's computer screen. Each of the computers in this lab were similarly equipped with educational software and hardware (i.e., zip drives for data storage and scanners for digitizing graphics). Each was networked into the university local area network (LAN) and wide area network (WAN) systems to provide Internet access. During the semester this classroom

was shared by several instructors and classes within the college of education and was available to students as an open lab when classes were not being conducted.

Instructors

The two selected sections of the survey of computer use in education course were assigned to two instructors with prior experience teaching this course. One of the assigned instructors was the researcher for this study and the other instructor was from the educational technology faculty within the college of education. For this study the instructors used a team-teaching approach for the two sections.

The design of the team teaching assignments was determined in advance of the study by the instructors and at the same time as the course outline of instruction was determined for these classes. Both sections of this course were scheduled by the university to meet two days a week on Tuesday and Thursday. In order to provided consistent access to both sections by the instructors, each instructor selected one day in which he would meet with all students enrolled in both sections (see Table 1). This permitted consistent administration of interventions on one day, and the administration of coursework not directly pertaining to this study on the other day. This afforded the researcher the opportunity to provide a controlled environment on Tuesdays for the experimental and control groups, as well as control for unwanted effects between groups that might have presented a problem if the interventions were presented on different days of the week. All data pertaining to this study were collected on Tuesday. No data were collected, with the exception of occasional

pretest and posttest administrations, on Thursday. This team teaching arrangement helped to maintain a high degree of fidelity to the instructional delivery.

Table 1

Instruction Matrix

Course	Tuesday Class	Thursday Class
Section 001 - AM	Experimental/Control	No Data Collected
Section 002 - PM	Experimental/Control	No Data Collected

Research Questions

The over-arching question of this study was: To what extent are traditional instructional methods transferable to a technology-enhanced online learning environment? Relevant questions that were addressed included:

1. Are lectures presented in an online learning environment as effective as lectures presented in a traditional classroom environment?
2. Is guided instruction presented in an online learning environment as effective as guided instruction presented in a traditional classroom environment?
3. Is collaborative discussion in an online learning environment as effective as collaborative discussion in a traditional classroom environment?

The three instructional methods selected for this study, (a) lecture, (b)

guided instruction, and (c) collaborative discussion, were chosen based on classifications of instruction by Pregent (1994). This study examined the effects of these three traditional teacher-based instructional methods on student academic outcomes when delivered through an online learning environment.

Procedures

Preparation

The first step in designing or redesigning traditional instructional methods for this study was to fully evaluate and understand current teacher-based instructional methods and content of the selected instructional methods that were to be redesigned for delivery over the Internet. This evaluation included the identification of existing instructional material to be used for the interventions, and determining a suitable digital format for presenting the redesigned instructional material. To accomplish this, it was necessary to fully evaluate instructional methods that are currently being used in computer survey courses. This evaluation included: (a) examining current syllabi, (b) observing traditional classroom instruction, and (c) collaborating with the second instructor in the design of the course and the instruction to be included in the course.

Once the course content had been determined based on previous offerings of this course, each of the three selected traditional instructional methods were developed and redesigned into a technology-enhanced online format for use in the digitalclassroom. The content of each of the three methods was identical for both the experimental (online instruction) and the control groups (traditional instruction). Any differences between online

instruction and traditional instruction were limited to the technology enhancements and redesign that were used to create the content that was distributed over the Internet via the digitalclassroom.

Since this study involved two instructors teaching two courses over two days a week, it was necessary to plan for control of instructional content between experimental and control groups. This was accomplished by establishing guidelines for student-teacher communication ahead of time. All communication regarding the interventions would be directed by the second instructor back to the researcher who controlled the interventions. Communication between students and instructors regarding those modules of instruction that were not a part of this study could be fielded by either instructor or redirected to the other instructor if needed. Communication could be facilitated through email of through face-to-face interaction with the instructor.

Pilot Study - Fall 1998

Course planning and preparation are important activities within the context of online learning (Schrum, 1997). A formative evaluation of the digitalclassroom online learning environment was conducted to determine its suitability to deliver instruction accurately and without interruption or down time. The components that were evaluated included: (a) student and instructor ability to access content and instruction, (b) message conferencing ability, and (c) administrative reporting and diagnostic features. Using students from a Fall 1998 semester offering of the same course, a test of the digitalclassroom's ability to (a) present course information, (b) manage conferencing, and (c) provide instruction to students was evaluated. During the pilot study, traditional

instructional material selected for use in this study were collected or created and redesigned into digital formats appropriate for distribution over the Internet.

The results of the pilot study formative evaluation increased the dependability by providing a series of feedback loops through which several areas were identified as possible risks. These risk areas were identified as (a) the reliability of the host server connection, (b) the timing of instructional content delivery to students through the digitalclassroom, (c) the accuracy of the posted instruction, and (d) timely responses to email from students. These risk areas were monitored and or adjusted to help ensure a risk-free environment for this study.

Study - spring semester 1999

In order for this study to be successful it was necessary to provide training in the use of computers to access the Internet and the digitalclassroom for retrieval of course information, content, and instruction. Two hours of training was provided to all students during the second class meeting. During this training, students learned how to (a) successfully access the digitalclassroom online learning environment, (b) select a password and login, (c) access coursework, (d) turn in assignments, and (e) communicate with instructors and other students.

Student academic outcomes were examined by means of test scores for each instructional module. All students received instruction over a 15-week period which included both online interventions as well as traditional interventions. Each online intervention replicated the equivalent traditional teacher-based instruction module. During this study, students received two different lecture interventions, two different guided instruction interventions, and

two different collaborative discussion interventions. One was in a traditional format of instruction and one was online through the digitalclassroom.

Students, while receiving online instruction, did not need to attend classes on campus. Instead, they could use any computer that had Internet access, from any location, at any time, to receive instruction and participate in the course. The instructor also could connect to the digitalclassroom using a computer to provide assistance or clarify instruction for students online. All communication and interaction associated with the online intervention took place online using email and discussion group formats.

During the online interventions, students could only interact with one instructor (researcher) via email or through online discussion areas. During their traditional course instruction, students were able to communicate with either instructor face-to-face or via email. Both instructors worked closely to assure that communication between control and experimental students did not confound the study. Questions and concerns that were directly associated with the study were immediately referred to the researcher who promptly responded to them.

Procedure

The digitalclassroom looks and feels like a regular web-based environment complete with text, graphics, and hypertext links. By following a prescribed sequence of events, students were able to complete assigned readings, coursework, and other assignments as instructed. This gave every student more control and flexibility over their online learning experience (Keegan, 1988).

To begin receiving instruction via the digitalclassroom, a student first would connect to the Internet and the digitalclassroom using a computer. If students did not have access at a location off campus, they could arrange times in which they could access the digitalclassroom from one of the university computer labs. Once access had been achieved, the student would see the home page (see Figure 1) for the digitalclassroom.

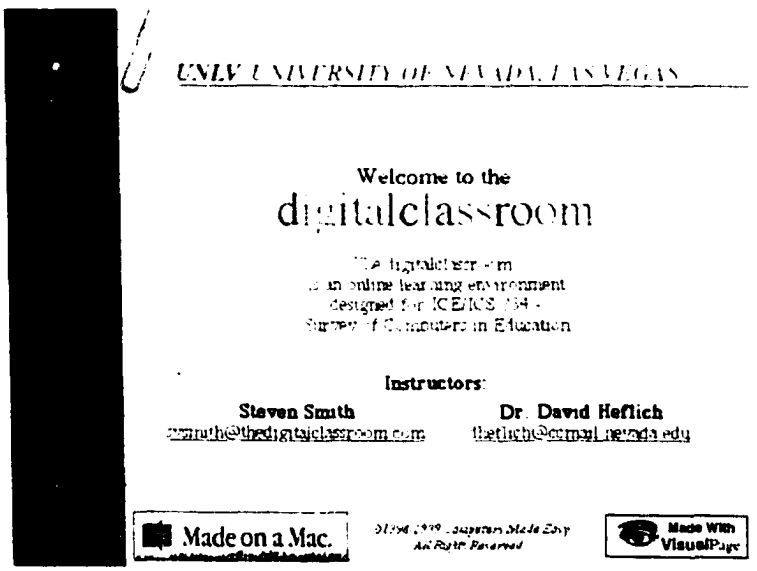


Figure 1 - Home page from the digitalclassroom.

Once logged into the digitalclassroom, the student could select from the options available on the home page. From these selections a student could choose (a) the course syllabus, (b) the course outline, (c) a tips section, (d) coursework section, (e) the online discussion forum (see Figure 2), (f) an online instruction schedule, (g) the instructor notes (see Figure 3), (h) any course handouts, (i) an option to email instructors, or (j), an option to logout of the digitalclassroom. When a student selected the coursework link, they were

presented with a new web page that contained the current assignment and all previous assignments (see Figure 4). From here the students could begin to complete any assignments that were required for the intervention on which they were working.

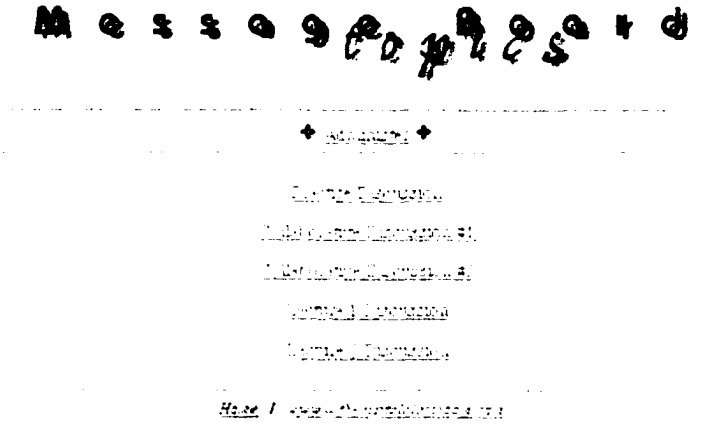
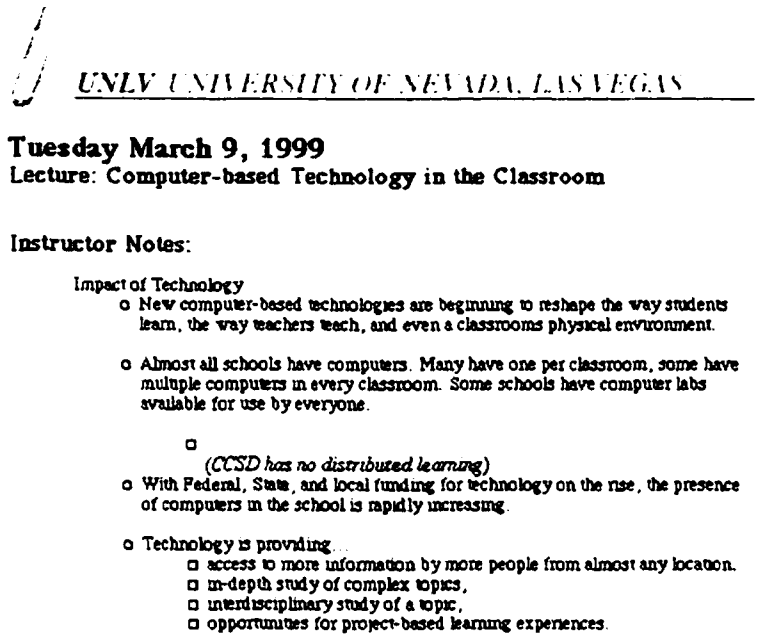


Figure 2 - Discussion Forum page from the digitalclassroom



UNLV UNIVERSITY OF NEVADA, LAS VEGAS

Tuesday March 9, 1999
Lecture: Computer-based Technology in the Classroom

Instructor Notes:

Impact of Technology
- New computer-based technologies are beginning to reshape the way students learn, the way teachers teach, and even a classrooms physical environment.
- Almost all schools have computers. Many have one per classroom, some have multiple computers in every classroom. Some schools have computer labs available for use by everyone.
  - *(CCSD has no distributed learning)*
- With Federal, State, and local funding for technology on the rise, the presence of computers in the school is rapidly increasing.
- Technology is providing...
  - access to more information by more people from almost any location.
  - in-depth study of complex topics,
  - interdisciplinary study of a topic,
  - opportunities for project-based learning experiences.

Figure 3 - Instructor notes web page from the digitalclassroom

Collaborative Discussion #1:
Time period February 2-9, 1999

A collaborative discussion is a forum for the discussion of a topic, article, or idea. A collaborative discussion is the same as a group discussion.

An advanced organizer will be administered on February 2, 1999 in class.

Please consult your Instruction Schedule to determine whether you are to receive face-to-face or online instruction for this assignment. Please follow all instructions carefully. If you encounter problems, or have a question, contact the instructors immediately.

Face-to-Face Instruction	Online Instruction
For this assignment, you are to read the article "The Learning Connection: Schools in the Information Age" by Conte, et al. 1997. This article will be distributed to you on February 2, 1999 in class.	For this assignment, you are to read the article "The Learning Connection: Schools in the Information Age" by Conte, et al. 1997. You can access this article online by going to the Discussion Forum and reading the instructions.
When you come to class next week, you should have read the entire article and be sufficiently familiar with it to participate in an open discussion.	When you have finished reading the article, you should return to the Discussion Forum and contribute to the open discussion being held online. Feel free to contribute as often as you like.

Grading of this assignment will be based on your performance on the Quiz following the discussion (Thursday February 11, 1999), as well as on your level of participation in the discussion itself.

This assignment is worth 50 points.
This assignment cannot be made up.

Home *ICG 334x Spring 1999 - Computers Made Easy ©1998-1999*

Figure 4 - Coursework web page from the digitalclassroom

Interventions

The instructional design focus for each intervention was based on three criteria: (a) the method's potential for presentation via the Internet, (b) the method's primary interaction needs, and (c) the method's means of evaluation. For each of the three selected traditional teaching methods, a comparable digital format was created using existing commercial and web-based software and technologies generally available to university faculty.

Lecture Interventions

There were two lectures written for this study. Each lecture was written by the researcher and covered content suitable (i.e., not a "how to" session) for the lecture method. Each lecture was presented to all students in either an online or traditional format. Each student received one online lecture intervention and one traditional lecture intervention in this study. Lectures were comprised of a computer-based slide show created using PowerPoint® (Microsoft, 1997) presentation software and accompanied by a text presentation. In the traditional setting the text was presented orally and in the online setting the text was presented visually.

Lectures were first presented in a traditional format to the students receiving the traditional intervention. The lecture was delivered in the computer lab under traditional conditions:

1. Students were not allowed access to their computers.
2. Students could take notes if they chose.
3. The instructor presented content along with a visual aid in the form of a computer-based slide show.
4. The instructor worked from an outline that had been word processed.

The traditional presentation of the lecture was audio recorded by the researcher so that the text could be transcribed later for distribution as online instruction. Following the lecture presentation, students were given class time to ask questions. The traditional lecture took the entire class period of approximately one hour.

The online version of each lecture was created by transcribing the audio-taped traditional lecture. The transcribed text was then converted to hypertext markup language (HTML). HTML is a text markup language which allows pages of text to be displayed by web browsers on the Internet. The computer-based slide show presentation was also converted for display on the Internet by converting each slide into a graphic. The slides and text were combined into web pages that corresponded to the pacing used in the traditional presentation. Students accessing the digitalclassroom and viewing the lecture in this format were able to read the lecture text and view a corresponding slide (see Figure 5). Students were able to view the lecture at any time and as many times as needed over a period of one week. In addition they were able to retrieve additional information, commentary, or definitions of terms through hypertext links embedded in the lecture text.

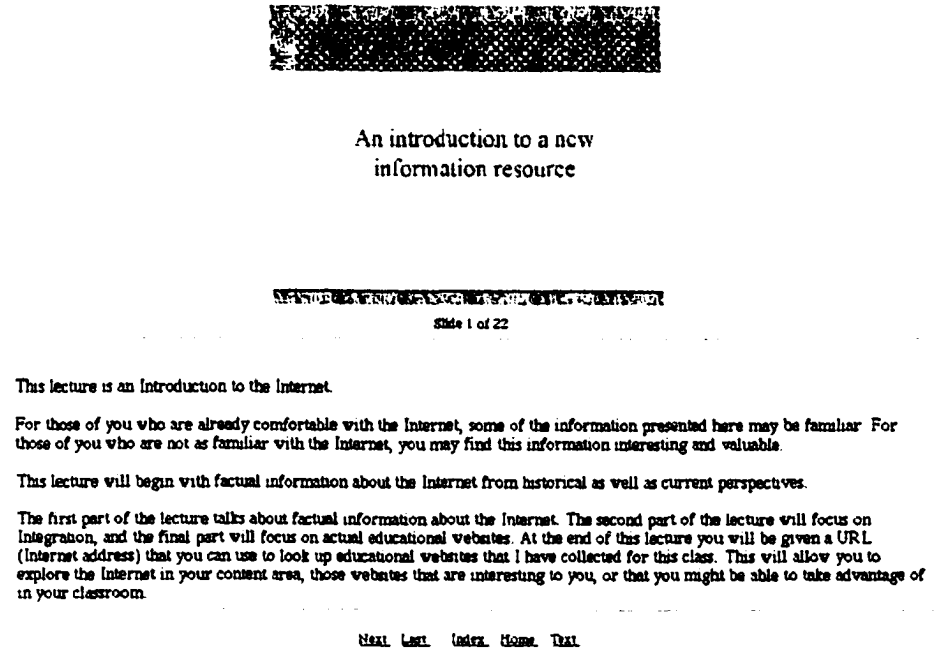


Figure 5 - Online Lecture web page from the digitalclassroom

Students receiving the online intervention did not receive face-to-face instruction for the same module (e.g., a student would receive one traditional lecture and one online lecture). Online instruction was delivered outside of the traditional structured classroom using the digitalclassroom online learning environment. Students logged into the digitalclassroom, accessed the coursework page, and followed simple instructions which led them to the lecture.

As with the traditional intervention, students were given the opportunity to ask questions following the presentation of the lecture. For the online intervention this was accomplished by using the online discussion forum devoted to this intervention. Students were provided a hypertext link to this forum where they could ask questions, respond to questions posed by others,

or simply read the comments other students had made. If a student had questions about any aspect of the intervention they could email fellow classmates or the researcher for assistance.

All students were administered a pretest which also served as an advanced organizer before instruction and a posttest, or quiz, following instruction. Each test contained a set of multiple choice questions ranging from 15 to 20 points and covering the instruction contained in the lectures. Student performance on the pretest and posttest was used to determine if the online intervention was as effective as the traditional classroom instruction. All tests were administered within a traditional classroom setting with instructor supervision.

Guided Instruction Interventions

There were two guided instruction interventions written for this course. Each guided instruction intervention was written by the researcher and covered content suitable for this method. Each guided instruction intervention was presented to all students. Each student received one online guided instruction intervention and one traditional guided instruction intervention. Guided instruction interventions were created using several software packages. The entire intervention for the experimental group (online) was put on individual CD-ROMs and distributed to students.

The guided instruction interventions were based on existing teaching methods in which the teaching emphasis was hands-on and tutorial in nature. This method is common in courses taught in a computer lab environment in which students learn how to use software programs. These interventions took students through carefully-sequenced instruction on how to use an integrated

software program to create a product that would enhance instruction in the classroom. The software program selected to accomplish this was ClarisWorks (Claris, 1997). ClarisWorks was selected for two reasons: (a) because of its popularity and widespread use in the local school district, and (b) because a complete demonstration version of the software was available for free distribution to students.

The control groups received traditional instruction. The traditional instruction consisted of a lecture/demonstration by the instructor using a projection device to display the instructors computer screen for all to see. In this type of instruction the instructor is able to take students step-by-step through the process by which a product is created. Using ClarisWorks, the instructor provided a carefully sequenced set of steps that lead to the creation of one of two products, a newsletter or a slide show. In addition to the guided instruction that students received, each was given a printed tutorial (see Appendix E) that outlined the steps presented in class. This allowed students to return to the instruction at a later date for remedial work.

Because the guided instruction interventions were tutorial by design, it was necessary to locate a suitable method by which to provide the tutorial instructions to the student outside of the classroom. In the traditional classroom, teacher lecture/demonstration was the primary method of instruction. In this situation a teacher would be able to explain as well as demonstrate visually to the class how to use the program. For the online version of these interventions, a program was required that would replicate this environment in the digitalclassroom. The program selected to accomplish this

was AppleGuide® (Apple Computer, 1992) and GuideMaker® (Apple Computer, 1992).

AppleGuide and GuideMaker are software programs that are used widely by software and computer manufacturers to distribute help files, how-to files, and tutorials with their software products. GuideMaker was used to create the intervention files and AppleGuide was used to display the files within the accompanying software program. AppleGuide displayed instructions, tutorials, and other information directly on the computer screen for the user to see. The display was unique in that is remained floating over the workspace allowing the user to continue working uninterrupted in the program.

The content from the traditional intervention was used to create the online version of instruction for this intervention. This type of instructional delivery required that the instruction be carefully sequenced. Therefore, a task analysis was completed working from the handouts used for the traditional instruction. Since AppleGuide displays content in a small window which only allows a small amount of text, it was necessary to break the instruction up into smaller units.

The next step in the design of the online portion of the guided instruction intervention was to compile the guide files into an AppleGuide using GuideMaker. The resulting AppleGuide was then placed inside the ClarisWorks application folder so that it would appear in the help menu built into the ClarisWorks application. The ClarisWorks application with the AppleGuide and a text file with instructions were transferred to CD-ROMs. A total of 32 CD-ROMs were "burned" for this study. The CD-ROMs included the two guided instruction interventions: newsletter tutorial and slide show tutorial.

Using AppleGuide, the student would work through the instruction in the same way he/she would in an traditional classroom with an instructor. The first three screens that the user saw are displayed below (see Figures 6-8). In this intervention, AppleGuide replaced the instructor by providing the same content in the same way the instructor might in a traditional classroom.

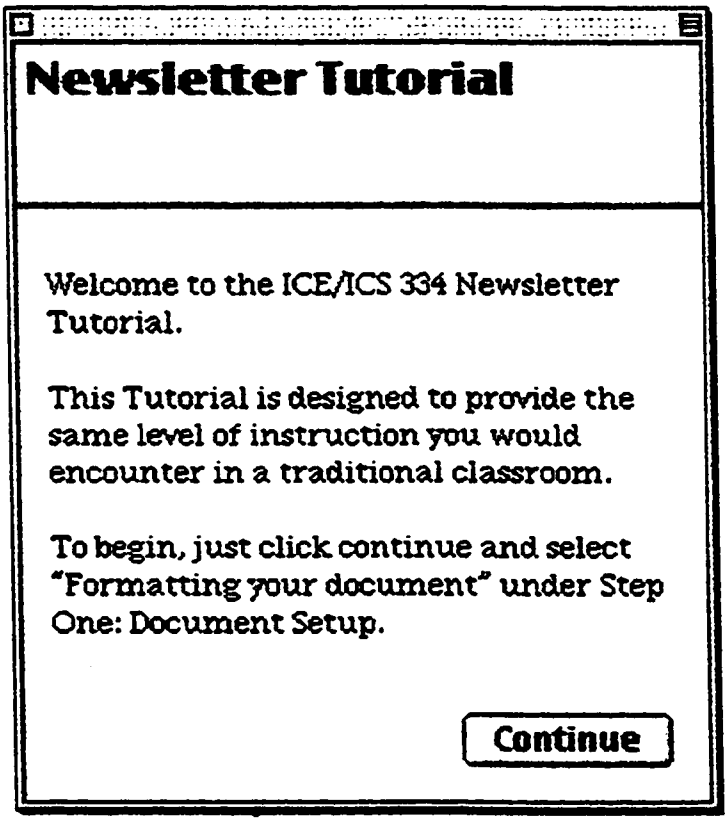


Figure 6 - AppleGuide initial screen

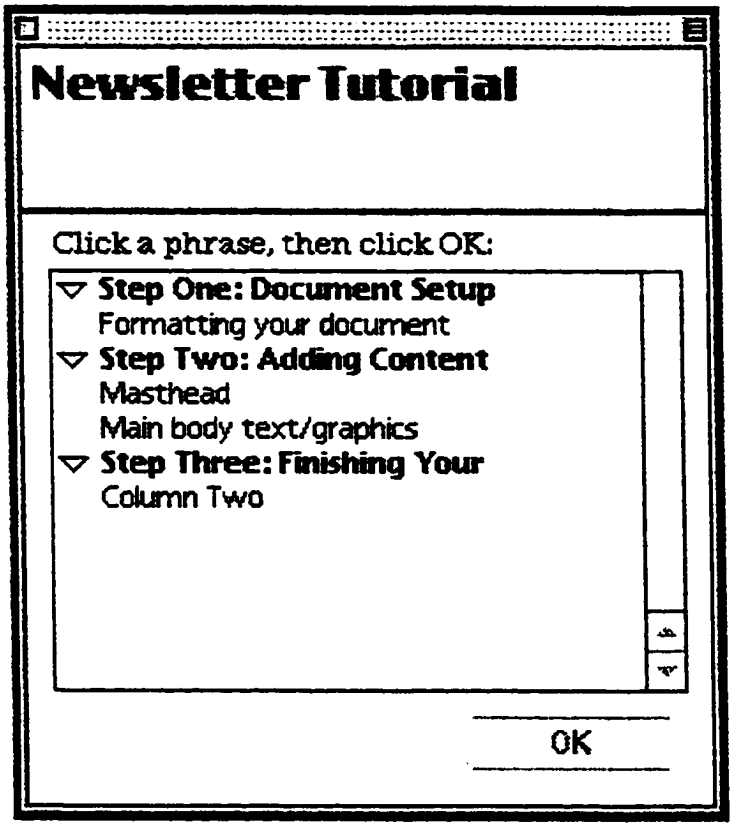


Figure 7 - AppleGuide content screen.

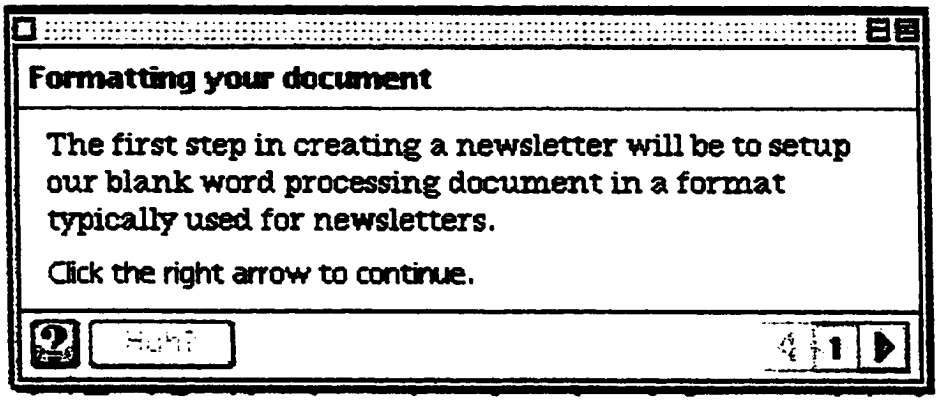


Figure 8 - AppleGuide instruction screen number one

AppleGuide files required the presence of a parent program for which they were designed to accompany. ClarisWorks was the parent program, therefore, it was necessary to create and distribute a CD-ROM to students which contained ClarisWorks and the AppleGuide files to be used. The student could then use the CD-ROM in any Macintosh computer in conjunction with the digitalclassroom to complete the intervention.

The CD-ROMs were distributed to the students in the experimental group. The students were instructed to access the digitalclassroom to receive their initial instruction. The instruction located in the digitalclassroom was divided into three stages (see Figure 9). The first stage included an introduction to the module and outlined what was expected of each student. The second stage provided instructions for using the CD-ROM to complete the tutorial portion of the instruction. Stage three provided follow up instructions as well as an assignment that each student created using the knowledge acquired from the instruction.

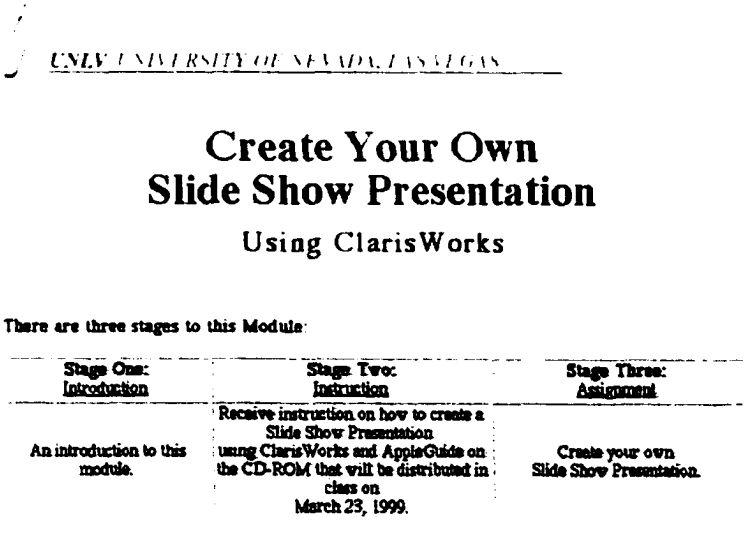


Figure 9 - Stages web page from the digitalclassroom

For this intervention students were required to have access to a Macintosh computer with a CD-ROM drive to view the software and AppleGuide files as well as to complete instruction. It was necessary for the student to plan lab time if access to a Macintosh computer with a CD-ROM was not available.

Students were administered a pretest and a posttest, each with a set of questions that covered content that was expected to be acquired by the students as they learned to use ClarisWorks. Student performance on the pretests and posttests was used to determine if aspects of traditional classroom instruction were effectively transferred to an online learning environment. All tests were administered in the the traditional classroom under researcher supervision.

Collaborative Discussion Interventions

The collaborative discussion interventions were essentially a discussion forum much like that of a traditional seminar. These interventions took advantage of the digitalclassroom's ability to manage a threaded discussion thereby establishing an online discussion arena that replicated a more traditional face-to-face environment, but in a text format. The students and the researcher were able to contribute to any previous message or add new messages to the conversation within the discussion area. The collaborative discussion interventions included discussions on topical issues or timely articles that were introduced by the researcher.

The control group for this intervention received an article on a relevant topic one week prior to the scheduled intervention. During this time students were instructed to read the article and be prepared to discuss the article at the

next class session. At the next class session an open discussion was encouraged about the article and the issues brought forth in the article.

For the collaborative discussion module, a threaded communication system was created using a common gateway interface (CGI) program which ran on the host server. This program made it possible to view messages created by students participating in the virtual discussion forum and permitted the student/instructor to easily follow a thread of thought within the body of a discussion (see Figure 10). This format was selected for use in the digitalclassroom because it was easy to use and provided useful and helpful information such as the name of the contributor, the date of the contribution, and the number or order of the contribution to the discussion.

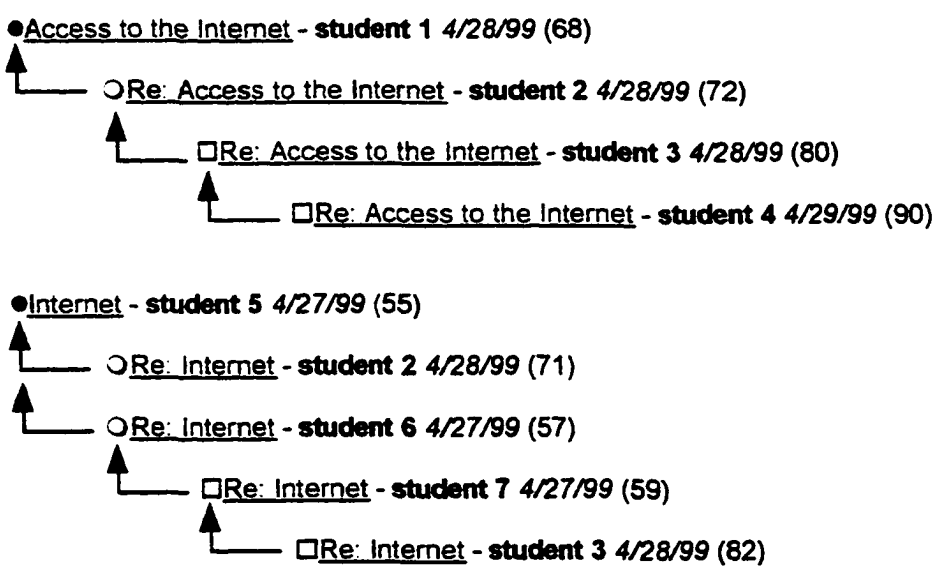


Figure 10 - Threaded discussion from the digitalclassroom

For the experimental group, students were instructed to access the digitalclassroom for instruction. Once they had logged into the digitalclassroom, they could access an article on a relevant topic. Students had one week in which to read the article. They were then instructed to return to the digitalclassroom and to access the discussion forum. In the discussion forum, students could participate in an online, ongoing conversation about the issues brought forth in the article. Discussion was permitted at any time over a period of one week and students could contribute as much as they wanted to the conversation at any time during the week.

Students were administered a pretest and a posttest, each with a set of questions covering information students were expected to acquire. Student performance on the pretests and posttests were used to determine if aspects of traditional classroom instruction were effectively transferred to an online learning environment. All tests were administered in the traditional classroom under researcher supervision.

Instrumentation

Computer ability survey

Prior to the beginning of instruction and again at the completion of the study, all students were given a survey to determine the extent of their computer awareness and their perceived control using computers. Data collected from the surveys were compared to determine if the students' perceptions of their level of computer awareness or perceived control had changed significantly.

In order to assess computer awareness and perceived control using technology, a measurement instrument was located. A review of the literature

revealed several such instruments (i.e., Panero, Lane, & Napier, 1997; Smith & Necessary, 1996). The assessment chosen for use in this study is the computer ability survey designed by Robin Kay (1993). The computer ability survey selected was a multi-component measure of ability to use computers. Two of the original three subscales developed by Kay were used in this study: computer awareness and perceived control (see Appendix F). The remaining subscale, programming skills, was not required for this study as programming was outside the scope of the course.

Pretests and Posttests

All pretests and posttests administered were exactly the same for all students. These assessments were used to determine if instruction presented online through the digitalclassroom was as effective as instruction presented in the traditional classroom.

Data Collection

A reliability check of all instruction used in the interventions was conducted. Reliability verifications were made by a neutral observer to ensure that all instruction was presented equally between the experimental and control groups. In the case of the lecture intervention, an audio recording of the traditional lecture was transcribed by an independent observer. In the case of the guided instruction intervention, all instruction was outlined and reviewed for consistency by an independent observer. This verification was necessary to ensure that all students received the same information necessary to complete the instruction.

Data from each of the three intervention pretests and posttests were collected and initially scored by the researcher. A follow up scoring of the tests was performed by an independent observer. Data were then entered in a computer-generated spreadsheet for later analysis (see Appendix G). All statistical analyses of the data were conducted using Statistical Package for Social Sciences (SPSS, 1999).

Data from the computer ability survey was collected at the beginning of the course and at the end of the course. Demographic information was collected at the beginning of the course only.

Student information was collected from the digitalclassroom as well. The data collected included student postings to the discussion forum and student emails with responses by the instructors.

Data Analysis

Pretest and posttest data collected in this study were analyzed using a repeated-measures analysis of variance (ANOVA) and *t* tests. The independent variables in this study were the methods of instructional delivery, (online instruction and traditional instruction) and time (pretest versus posttest). The dependent variable in this study was test scores. Data collected from the computer ability survey was analyzed using the sign test.

CHAPTER 4

RESULTS

This study investigated the effectiveness of traditional instructional methods in an online learning environment. It was designed to determine if selected traditional instructional methods could be used successfully to instruct students within an online learning environment. In this quasi-experimental, repeated-measures design, all students received both control and experimental conditions and treatments. Data were collected in three forms: (1) pretests and posttests over the period of one semester, (2) a computer ability survey administered at the beginning of the semester and again at the end of the semester, and (3) electronically tracked submissions collected from the digitalclassroom over the period of one semester.

Students completed a total of six pretests and six posttests covering three traditional instructional methods: (a) lecture, (b) guided instruction, and (c) collaborative discussion. Each of the pretests was administered prior to instruction and each of the posttests was administered following instruction. In all cases, the time between the pretest and the posttest was a minimum of seven days. All tests were collected immediately after completion and were not returned to students. Students were given grades as part of the class for all posttests.

In addition to the pretests and posttests, a computer ability survey was administered once at the beginning of the course (pre-instruction) and again at the end of the course (post-instruction). The survey was designed to assess student's perceptions of their computer awareness as well as their perceived control over the use of computers. The data collected from the digitalclassroom which included emails, threaded communications and dates and times of submissions, were used to assess student participation.

Demographic Data

Students were asked at the beginning of the course to respond to a set of questions regarding their experience using computers (see Appendix C). Of the 58 students participating in this study, 41 (71%), indicated they owned a personal computer at home while only 17 (29%) indicated they did not own a computer.

Access to the Internet from home was available in 32 (62%) of the students homes while 21 (36%) of the students indicated they had no access to the Internet from home. One student (2%) did not respond to this question. When students were asked about their knowledge of computers, the majority of students (52%), indicated that they believed they were knowledgeable about computers (see Table 2).

Table 2

Student-reported level of knowledge about computers

No Knowledge	Little Knowledge	Knowledgeable	Very Knowledgeable	Extra Knowledgeable
2%	27%	52%	14%	5%

The majority of students reported that they spent on average two to three hours a week using computers (see Table 3). And finally, when asked to report the number of years experience using computers, 26 (45%) of the students in this study reported that they had greater than five years experience using computers (see Table 4).

Table 3

Weekly computer usage (average)

less than one hour	one hour	two to three hours	four to five hours	more than five hours
9%	19%	38%	12%	22%

Table 4

Experience using computers

less than one year	one year	two to three years	four to five years	more than five years
5%	7%	22%	21%	45%

For this study, the average age of the students was 25. There were a total of 42 (72%) females and 16 (28%) males. Thirty of the students indicated a preference for elementary education and 28 indicated a preference for secondary education. Overall, these data indicated that students enrolled in these courses had a moderate amount of experience working with computer technology.

Test Scores

The quantitative data analyzed in this study included pretests and posttests for six interventions (see Appendix H). The order in which the interventions were administered (see Table 5) was randomly determined by the flip of a coin prior to the beginning of the study. All students (n=58) were assigned both to one online (experimental) and to one traditional (control) intervention for each of the three identified instructional methods: (a) collaborative discussion, (b) lecture, and (c) guided instruction.

Table 5

Intervention Schedule

Number	Intervention	AM Class	PM Class
1	Collaborative Discussion 1	Traditional	Online
2	Collaborative Discussion 2	Online	Traditional
3	Guided Instruction 1	Traditional	Online
4	Lecture 1	Traditional	Online
5	Guided Instruction 2	Online	Traditional
6	Lecture 2	Online	Traditional

Data from pretests and posttests were analyzed by means of a 2 x 2 repeated-measures Analysis of Variance (ANOVA) to help answer the three research questions of this study. Additionally, data from electronically tracked submissions were also used to address the research questions. The three research questions for this study were:

1. Are lectures, when presented in an online learning environment, as effective as lectures presented in a traditional classroom environment?
2. Is guided instruction, when presented in an online learning environment, as effective as guided instruction presented in a traditional classroom environment?
3. Is collaborative discussion, when carried out in an online learning environment, as effective as collaborative discussion in a traditional classroom environment?

The dependent variable for this study was test scores. The two independent variables for this study were method (online or traditional) and time (pretest versus posttest). The pretests and posttests were designed to measure a student's knowledge of the subject matter included in an instructional intervention. The researcher initially scored all of the pretests and posttests administered in this study and entered the data into a spreadsheet (see Appendix G). In order to ensure these instruments were scored accurately, an independent observer was used to re-score each test and validate the accuracy of all test scores entered into the spreadsheet.

Intervention One

The first intervention was the first of the two Collaborative Discussion modules (CD1). Of the 58 students participating in this study, three were not included in any of the first intervention analyses due to missing pretest scores. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before the onset of instruction. The *t* test, [$t_{(53)} = -2.23$, $p<.05$] (see Table 6), was significant indicating differences in pretest scores between the traditional and online groups. The traditional group outperformed the online group by an average of 1.03 points (see Table 7).

A repeated-measures ANOVA was conducted on the pretest and posttest data from this intervention. The analysis yielded a significant interaction between time (pretest versus posttest) and method (traditional versus online), [$F(1,53) = 5.19$, $p<.05$] (see Table 8). To determine precisely which group means were significantly different from other group means, it was necessary to carry out a post hoc test of statistical significance. A

Tukey/Kraemer post hoc follow up test revealed no significant differences between all pair-wise comparisons of the means. The significant interaction observed in this case indicates that one mean, or a linear combination of means, is significantly different from another mean or linear combination of means. While it is evident that some linear combination of means is significantly different from another, they are not relevant to this study as there were no *a priori* hypotheses to account for these results.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded a significant difference between groups, [$t_{(56)} = 3.70$, $p<.001$] (see Table 9). The traditional group outperformed the online group by and average of 2.68 points. The main effect for time (pretest versus posttest) was also significant, [$F(1,53) = 101.99$, $p<.001$] (see Table 10). Posttest scores exceeded pretest scores by an average of 4.35 points.

Table 6

Main Effect for Traditional versus Online Pretest

Intervention	DF	*t*	*p*
Collaborative Discussion 1	53	2.23	<.05
Collaborative Discussion 2	56	1.27	>.05
Guided Instruction 1	50	<1	>.05
Guided Instruction 2	52	2.22	<.05
Lecture 1	54	<1	>.05
Lecture 2	46	3.12	<.05

Table 7

Summary of Means and Standard Deviations

		TRADITIONAL				ONLINE			
		PRE		POST		PRE		POST	
	n	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CD1	55	6.29	1.72	11.47	2.94	5.26	1.70	8.79	2.54
CD2	58	6.93	3.09	15.46	2.63	6.1	1.71	15	2.61
GI1	51	11.97	2.88	16.45	2.23	12.39	2.23	15.54	1.97
GI2	54	11.16	2.48	15.33	2.08	9.79	2.04	15.38	1.84
L1	55	10.32	2.36	12.10	1.76	10	1.92	11.93	1.94
L2	48	8.74	1.91	12.96	1.7	6.88	2.19	11.66	2.42

Table 8

Interaction between Time (Pretest versus Posttest) and Method (Traditional versus Online)

Intervention	DF	*F*	*p*
Collaborative Discussion 1	53	5.19	<.05
Collaborative Discussion 2	56	<1	>.05
Guided Instruction 1	49	1.21	>.05
Guided Instruction 2	52	3.77	>.05
Lecture 1	53	<1	>.05
Lecture 2	46	<1	>.05

Table 9

Main Effect for Traditional versus Online Posttest

Intervention	DF	*t*	*p*
Collaborative Discussion 1	56	3.70	<.001
Collaborative Discussion 2	56	<1	>.05
Guided Instruction 1	55	1.63	>.05
Guided Instruction 2	54	<1	>.05
Lecture 1	54	<1	>.05
Lecture 2	54	2.32	<.05

Table 10

Main Effect for Time: Pretest versus Posttest

Intervention	DF	*F*	*p*
Collaborative Discussion 1	53	101.99	<.001
Collaborative Discussion 2	56	450.20	<.001
Guided Instruction 1	49	81.47	<.001
Guided Instruction 2	52	200.87	<.001
Lecture 1	53	33.71	<.001
Lecture 2	46	165.46	<.001

Intervention Two

The second intervention was Collaborative Discussion 2 (CD2). Complete data was available from all students in this intervention. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before the onset of instruction. The *t* test, [$t_{(56)} = -1.27$, $p>.05$] (see Table 6), was not significant, indicating no differences in pretest performance between the traditional and online groups.

A repeated measures ANOVA was conducted on the pretest and posttest data from this intervention. The interaction between method (traditional versus online) and time (pretest versus posttest) was not significant, [$F(1,56) <1$, $p>.05$] (see Table 8). There were no significant differences in academic outcomes between methods of instructional delivery at pretest or posttest. That is, students receiving online instruction performed as well as students receiving traditional instruction at both pretest and posttest.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded no significant differences between groups, [$t_{(56)} <1$, $p>.05$] (see Table 9). The traditional and online groups performed equally at posttest. The main effect for time (pretest versus posttest) was significant, [$F(1,56) = 450.2$, $p<.001$] (see Table 10). Posttest scores exceeded pretest scores by an average of 8.71 points.

Intervention Three

The third intervention was the first of the two Guided Instruction modules (GI1). Of the 58 students participating in this study, seven were not included in

any of the third intervention analyses due to missing pretest scores. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before the onset of instruction. The *t* test, [$t_{(50)} < 1$, $p > .05$] (see Table 6), was not significant, indicating no differences in pretest performance between the traditional and online groups.

A repeated measures ANOVA was conducted on the pretest and posttest data from this intervention. The interaction between method (traditional versus online) and time (pretest versus posttest) was not significant, [$F(1,49) = 1.21$, $p > .05$] (see Table 8). There were no significant differences in academic outcomes between methods of instructional delivery at pretest or posttest. That is, students receiving online instruction performed as well as students receiving traditional instruction at both pretest and posttest.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded no significant differences between groups, [$t_{(55)} = 1.63$, $p > .05$] (see Table 9). The traditional and online groups performed equally at posttest. The main effect for time (pretest versus posttest) was significant, [$F(1,49) = 81.47$, $p < .001$] (see Table 10). Posttest scores exceeded pretest scores by an average of 3.82 points.

Intervention Four

The fourth intervention was Guided Instruction 2 (GI2). Of the 58 students participating in this study, four were not included in any of the fourth intervention analyses due to missing pretest scores. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before

the onset of instruction. The *t* test, [$t_{(52)}$ = -2.22, p<.05] (see Table 6), was significant indicating differences in pretest scores between the traditional and online groups. The traditional group outperformed the online group by an average of 1.37 points (see Table 7).

A repeated measures ANOVA was conducted on the pretest and posttest data from this intervention. The interaction between method (traditional versus online) and time (pretest versus posttest) was not significant, [F(1,52) =3.77, <.05] (see Table 8). There were no significant differences in academic outcomes between methods of instructional delivery at pretest or posttest. That is, students receiving online instruction performed as well as students receiving traditional instruction at both pretest and posttest.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded no significant differences between groups, [$t_{(54)}$ >1, p>.05] (see Table 9). The traditional and online groups performed equally at posttest. The main effect for time (pretest versus posttest) was significant, [F(1,52) = 200.87, p<.001] (see Table 10). Posttest scores exceeded pretest scores by an average of 4.88 points.

Intervention Five

The fifth intervention was the first of the two Lecture modules (L1). Of the 58 students participating in this study, three were not included in any of the fifth intervention analyses due to missing pretest scores. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before the onset of instruction. The *t* test, [$t_{(54)}$ = <1, p>.05] (see

Table 6), was not significant, indicating no differences in pretest performance between the traditional and online groups.

A repeated measures ANOVA was conducted on the pretest and posttest data from this intervention. The interaction between method (traditional versus online) and time (pretest versus posttest) was not significant, [$F(1,53) < 1$, $p < .05$] (see Table 8). There were no significant differences in academic outcomes between methods of instructional delivery at pretest or posttest. That is, students receiving online instruction performed as well as students receiving traditional instruction at both pretest and posttest.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded no significant differences between groups, [$t_{(54)} > 1$, $p > .05$] (see Table 9). The traditional and online groups performed equally at posttest. The main effect for time (pretest versus posttest) was significant, [$F(1,53) = 33.71$, $p < .001$] (see Table 10). Posttest scores exceeded pretest scores by an average of 1.86 points.

Intervention Six

The sixth intervention was Lecture 2 (L2). Of the 58 students participating in this study, 10 were not included in any of the sixth intervention analyses due to missing pretest scores. A *t* test was conducted on traditional versus online pretest scores in order to determine group equivalence before the onset of instruction. The *t* test, [$t_{(46)} = 3.12$, $p < .05$] (see Table 6), was significant indicating differences in pretest scores between the traditional and online

groups. The traditional group outperformed the online group by an average of 1.86 points (see Table 7).

A repeated measures ANOVA was conducted on the pretest and posttest data from this intervention. The interaction between method (traditional versus online) and time (pretest versus posttest) was not significant, [$F(1,46) < 1$, $p < .05$] (see Table 8). There were no significant differences in academic outcomes between methods of instructional delivery at pretest or posttest. That is, students receiving online instruction performed as well as students receiving traditional instruction at both pretest and posttest.

The analysis of the main effect for method (traditional versus online) on posttest scores yielded significant differences between groups, [$t_{(54)} = 2.32$, $p < .05$] (see Table 9). The traditional group outperformed the online group by an average of 1.3 points (see Table 7). The main effect for time (pretest versus posttest) was significant, [$F(1,46) = 165.46$, $p < .001$] (see Table 10). Posttest scores exceeded pretest scores by an average of 4.5 points.

Computer Ability Survey

The computer ability survey was analyzed using a sign test. The sign test is a binomial test useful for testing whether one variable in a pair (X, Y) tends to be larger than the other variable in the pair. There were two sections to the computer ability survey. The first section was a measure of the student's perceived computer awareness and the second section was a measure of a student's perceived control over the use of computers. The survey was designed using a Likert scale ranging from 1-7 with 1 representing a high

degree and 7 representing a low degree. The two sections were considered separately for this study.

Of the 58 students participating in this study, two were not included in this analysis due to missing data. In the computer awareness section (questions 1-10), 50 of the 56 students (89%) indicated significant improvement, two of the 56 students (4%) indicated no change, and four of the 56 students (7%) indicated no significant improvement over the semester. This was significant, $Z = 6.12$, $p < .001$.

For the perceived control section (questions 11-17), 36 of the 56 students (64%) indicated significant improvement, six of the 56 students (11%) indicated no change, and 14 of the 56 students (25%) indicated no significant improvement over the semester. This was significant, $Z = 2.97$, $p < .01$.

The results of the sign test performed on the computer ability survey indicate that students overall showed significant improvement over the course of the semester in terms of their awareness of computers and their perceived control over the use of computers.

Electronic Submissions

Electronic submissions were collected from the digitalclassroom (online) and the traditional classroom throughout this study. Data regarding student participation in each of the interventions was collected by the researcher. A tally sheet was used during each traditional intervention and online intervention to note participation.

CHAPTER 5

DISCUSSION

While instructional methods have, for the most part, remained the same over the last several decades, there are new technologies that are taking instructional delivery in new directions. Online learning environments, distributed learning, and distance education are all having an effect on the way instructional content is delivered to learners. While drawing upon traditional methods has been the mainstay of most college and university instructors, understanding the effectiveness of these methods as they might be used in new technology-enhanced online learning environments would ensure a smooth transition by faculty looking to include technology-based learning in their courses. Research concerning the effectiveness of these methods and technologies is just beginning.

This study investigated the effectiveness of selected traditional instructional methods used in an online learning environment with students enrolled in two sections of a survey of computer use in education course. The three methods studied were (a) lecture, (b) guided instruction, and (c) collaborative discussion. Each of these methods were developed into traditional and online interventions. This study served as a continuation of past research by investigating the effectiveness of these methods when used in an online learning environment. Student academic achievement data, electronic

submissions to the digitalclassroom, as well as students' attitudes towards technology made up the data set for this study.

Demographics

All of the students who participated in this study were preservice elementary and secondary education majors. There were 60 students enrolled in the two sections used in this study. Of these, 58 students volunteered to participate. The two students who elected not to participate did not give a reason. The average age of the students was 25 and they ranged in age from 19 to 53. This population was well balanced between elementary (52%) and secondary (48%) education majors with the majority of students being female (72%) and elementary education majors (43%). A significant number of students in this study reported that they owned a computer (71%) and had access to the Internet from home (62%) which suggests that they might be more comfortable working in an online learning environment than individuals with less technology in their homes. The majority of the students who participated in this study reported having more than five years experience using computers. Also, they reported routinely working two to three hours a week on a computer and considered themselves knowledgeable about computers. This level of experience may have played a role in their overall performance in the course as well as aiding them in the successful use of technology while receiving online instruction.

Interventions

In this study all students participated in both control and experimental situations. With three traditional instructional methods being investigated, each student in this study received six interventions in all; three in a control group and three in an experimental group. That is to say, each student received traditional (control) and online (experimental) instruction for each of the three selected methods. For each intervention, both a pretest and a posttest covering the content of the instruction were administered. There were two sections of the same course used in this study. One section met in the morning and is referred to as the AM class (n=30). The second section met in the afternoon and is referred to as the PM class (n=28).

Collaborative Discussion Interventions

For the two collaborative discussion interventions the effectiveness of a traditional collaborative discussion method used in an online learning environment was investigated. This set of interventions addressed research question 1 for this study: Is collaborative discussion, when used in an online learning environment, as effective as collaborative discussion in a traditional classroom environment? An analysis of the data supports the conclusion that collaborative discussions, when used in an online learning environment are as effective as collaborative discussions in a traditional classroom environment.

Pretest and Posttest. For each intervention, a pretest (see Appendix I) was used to establish a knowledge baseline for students prior to receiving the intervention. A posttest was used to determine if students had acquired more knowledge than at the time of the pretest which would suggest that learning had occurred.

In the first of the two interventions, the AM class received traditional (control) instruction in a traditional classroom environment and the PM class received online (experimental) instruction in an online environment. To gain additional insight into the effectiveness of the collaborative discussion instructional method as it was used in an online environment, this intervention was repeated. The second intervention was presented to both online and traditional groups in the same way only the instructional content changed. For the second intervention, the administering of interventions to the two student groups was reversed. The PM class received traditional instruction (control) in a traditional classroom environment and the AM class received online (experimental) instruction in an online environment.

The instructional content was the same for both groups within each intervention. Students were asked to read and discuss an article related to technology integration in education. The effectiveness of this instruction was measured through pretest and posttest questions based on the content of the articles.

In the first Collaborative Instruction intervention, significant differences were observed between the traditional (control) and online (experimental) groups. The traditional group performed slightly better on average than the online group on the pretest, possibly indicating that they had more prior knowledge. The traditional group also performed slightly better on average than the online group on the posttest. These results were not replicated in the second intervention.

When viewed in relation to the overall performance by both groups on both tests, for both interventions, the small difference indicated appeared more

practically significant than statistically significant in this study. That is, since these results were not replicated in the second intervention and are not consistent throughout the study, and, that overall students in both groups had higher posttest scores, learning did occur for both groups indicating that online instruction was as effective as traditional instruction. It is possible that the slight differences in test scores observed were due to the fact that students were just beginning to understand the two learning environments as well as the expectations for each. Since the effects were only seen in the first of the two interventions, it is likely that this effect was due to the newness of the educational experiences and not due to significant differences between methods of instruction. The results of these two interventions demonstrate the effectiveness of traditional collaborative discussion in an online learning environment.

Student Participation. For both interventions there were notable differences between the control and experimental groups in terms of the number of students who participated in the discussions. During each traditional (control) intervention there were students who chose not to participate in the discussion. It is not unusual for some students to not actively participate in the conversation and was an expected outcome. As it turned out, the online participation was different. All of the students participated in the discussions in both of the online discussion interventions. By contrast, in the AM class traditional intervention, 77% of the students participated in the discussion and in the PM class, 82% of the students participated in the discussion.

This was very interesting in that students who did not participate in the traditional discussion did participate in the online discussion. In other words, student behaviors changed depending on the intervention. A student was more likely to participate in the online intervention than in the traditional intervention. The increased level of student participation observed by both groups as they participated in the online instruction is consistent with the findings of other researchers (Hiltz, 1986; Jaeger, 1991; Riel, 1994).

One explanation for this behavior may be that students associated participation in the online discussion with having an effect on their grade in the class. Yet another explanation could be that the students felt that since their name was attached to each email message they posted to the discussion forum online, they needed to contribute, so as not to be singled out later for not having contributed. The structure of the online discussion may also have had an effect. Since students could contribute to the forum over a period of one week, at any time of day, they were able to consider their responses and contributions to the forum. Harasim (1990), also found that student participation and involvement in online discussions was as a result of increased opportunity and access providing more time for students to formulate ideas and contribute responses.

By contrast, the traditional (control) group did not have the same level of access over time as did the online group. The traditional group was limited to the time and location constraints imposed by the traditional classroom environment. Opportunities to contribute came and went quickly in the traditional setting and many students may not have felt as though they had enough time to consider their contributions. Also, in face-to-face settings,

dominant personalities can affect participation in many ways. Often, one or more students will control the conversation to the extent that many of the other students do not get an opportunity to participate. In the online learning environment, a dominant personality can still exist, but may be less likely to interfere with less dominant personalities, thereby allowing for a more equal and balanced participation (Harasim, 1990). The level of involvement observed in this intervention is similar to that found in research related to online communication (Jaeger, 1991; Riel, 1994).

The implications are that student increased productivity may be a result if instruction is delivered online. Perhaps a more thorough understanding of the nature of online learning would reveal that students are more at ease and willing to participate when the social implications of the traditional classroom are non-existent. Of the many benefits that technology can bring to online learning, the ability to participate in a semi-anonymous fashion and contribute at a time that is convenient to the user appear to be significant in this study.

Guided Instruction Interventions

For the two guided instruction interventions, the effectiveness of a traditional guided instruction method used in an online learning environment was investigated. This set of interventions addressed research question 2 for this study: Is guided instruction, when used in an online learning environment, as effective as guided instruction in a traditional classroom environment? An analysis of the data supported the conclusion that guided instruction, when used in an online learning environment was as effective as guided instruction in a traditional classroom environment.

Pretest and Posttest. For each intervention, a pretest (see Appendix I) was used to establish a knowledge baseline for students prior to receiving the intervention. A posttest was used to determine if students had more knowledge than at the time of the pretest indicating that learning had occurred.

A significant difference in test scores between the pretest and posttest was observed indicating that students had improved performance on the posttest. There were no significant differences found between the control and experimental groups that would suggest that one method of instructional delivery was superior to the other. Both groups showed similar academic improvement.

In the first of these interventions, the AM class received traditional (control) instruction in a traditional classroom environment and the PM class received online (experimental) instruction in an online environment. To gain additional insight into the effectiveness of the guided instruction method as it was used in an online environment, this intervention was repeated. The second intervention was presented to both online and traditional groups in the same way only the instructional content was changed. For the second intervention, the administering of interventions to the two student groups was reversed. The PM class received traditional instruction (control) in a traditional classroom environment and the AM class received online (experimental) instruction in an online environment.

The instructional content was the same for both groups within each intervention. The instruction for these interventions consisted of tutorials and demonstrations in which students would learn to use a software program to create a product. The effectiveness of this instruction was measured through

pretest and posttest questions drawn from the content of the instruction. Results of the pretests and posttests indicated that student performance improved from the pretest to the posttest.

There were no significant differences observed between students receiving instruction traditionally or through the online learning environment. Both control and experimental groups performed the same in both interventions. It would appear from these results that the use of online learning environments for guided instruction was valid compared to traditional guided instruction.

An interesting observation about using the CD-ROM with AppleGuide instruction was that students requested the CD after the instruction period so that they could use it to create other products and assignments. Students used portions of the instruction contained on the CD as a refresher or reminder of how certain procedures were accomplished. Students in the traditional (control) group who did not have the CD may very well have done the same by relying on class notes, a peer coach, or a lab assistant for help instead.

Lecture Interventions

For the two lecture interventions, the effectiveness of a traditional lecture method used in an online learning environment was investigated. This set of interventions addressed research question 3 for this study: Are lectures, when presented in an online learning environment, as effective as lectures presented in a traditional classroom environment? An analysis of the data supported the conclusion that lectures, when presented in an online learning environment were as effective as lectures presented in a traditional classroom environment.

Pretest and Posttest. For each intervention, a pretest (see Appendix I) was used to establish a knowledge baseline for students prior to receiving the intervention. A posttest was used to determine if students had more knowledge than at the time of the pretest indicating that learning had occurred.

In the first of these interventions, the PM class received traditional (control) instruction in a traditional classroom environment and the AM class received online (experimental) instruction in an online environment. To gain additional insight into the effectiveness of the lecture method as it was used in an online environment, this intervention was repeated. The second intervention was presented to both online and traditional groups in the same way only the instructional content was changed. For the second intervention, the administering of interventions to the two student groups was reversed. The AM class received traditional instruction (control) in a traditional classroom environment and the PM class received online (experimental) instruction in an online environment.

The instructional content was the same for both groups within each intervention. The instruction for these interventions was a lecture in class or online on a topic relevant to the course. The effectiveness of this instruction was measured through pretest and posttest questions based on the content of the lecture. Results of the pretests and posttests indicated that student performance improved from the pretest to the posttest.

As was observed in the first Collaborative Instruction intervention, significant differences were observed between the traditional (control) and online (experimental) groups in the second Lecture intervention. The traditional group performed slightly better on average than the online group on the pretest,

possibly indicating that they had more prior knowledge. The traditional group also performed slightly better on average than the online group on the posttest. These results of the first Lecture intervention were different. In the first intervention, both groups performed similarly.

When viewed in relation to the overall performance by both groups, on both tests, for both interventions, the small difference indicated appeared more practically significant than statistically significant in this study. That is, since these results were not replicated and are not consistent throughout the study, and, that overall students in both groups had higher posttest scores, learning did occur for both groups indicating that online instruction was as effective as traditional instruction. The significant differences found between the control and experimental groups do not suggest that one method of instructional delivery was superior to the other. Both groups showed similar academic improvement. It would appear from these results that the use of online learning environments for lecture instruction was valid compared to traditional lecture instruction.

The results of this investigation into the lecture method were positive. Analysis of these data indicate that students performed as well in the online learning environment as they did in the traditional classroom environment suggesting that lectures are an effective instructional method when used in an online learning environment.

Summary

Pretest performance in all interventions was not the same. In three interventions, the traditional group performed slightly better than the online group. In two of these three interventions, Guided Instruction 2 and Lecture 2,

which were administered back-to-back at the end of the semester, the students were from the same group (i.e., PM class). For the first intervention, the students in the traditional group were in the AM class. These differences were small and were considered to be practically significant and not statistically significant to this study. Posttest performance was significantly different in two interventions. In both cases the differences were small and were considered to practically significant and not statistically significant to this study. Finally, academic improvement as measured by performance comparisons between pretests and posttests indicated that in every intervention, student performance increased significantly.

Considering all interventions in this study, it is clear that learning occurred as a result of instruction (method) in every case. There were no clear indications that one method of instruction was superior to the other. It is the finding of this study that the use of traditional instructional methods, (such as those used in this study), in an online learning environment are as effective as as equivalent traditional methods used in a traditional environment. This finding is consistent findings by Hiltz (1986), and Davis, et al. (1999).

Computer Ability Survey

The results of the computer ability survey suggest that students' beliefs about their level of computer awareness and their perceptions of the level of control they have using computers increased significantly over the period of a semester. This finding was expected and was consistent with the findings of Hiltz (1986) as well. It is interesting, when looking at the entire group of students in this study, that regardless of prior experience levels, there was a

significant growth pattern observed over a relatively short period of time. This is even more striking considering that this course was an introductory level course.

In this study, a larger than expected number of students had access to computers outside of the school setting and had access to the Internet at home. These findings suggest, as would be expected, that students felt more comfortable with the technology as they learned to use computers and the online learning environment designed for this study.

Conclusion

The findings of this study have shown that selected traditional methods of instruction translate effectively into online learning environments as long as particular instructional design issues, such as those used in this study, are followed. That is to say, that it is possible that not all instances of a lecture, a guided instruction, or a collaborative discussion will work effectively in an online learning environment, particularly if the instruction is weak.

Knowing that existing instructional methods may be successfully used to deliver instruction though online learning environments is significant. With this information, faculty, administration, and institutions of higher education can continue, or begin, to develop online learning environments that take advantage of traditional instructional methods with confidence. Faculty should be able to use their existing traditional instructional methods both in the traditional classroom as well as in an online environment. They do not have to learn new instructional methods in order to use online learning environments to distribute instruction. This barrier, that once may have prevented faculty and institutions

from exploring the use of online learning environments can now be seen as more transitory than real.

As technology continues to progress and adapt to the needs of educators, it is likely to become easier to use. Faculty now have one fewer reason for not exploring online learning environments and the benefits this technology can offer. As for student academic outcomes, the results are clear. Academically, students performed equally as well under both conditions. As Clark (1983) reported, the choice of media may not influence learning. Instead, educational gains are most likely attributable to the instructional methods.

Face-to-face instruction has advantages over online instruction in terms of interpersonal contact, social contact, and non-verbal communication. However, in this study, communication advantages appeared not in the traditional setting, but in the online setting. Students, when using the online learning environment were more likely to participate in the discussion than when in the traditional setting. The implications here are that online discussion may provide the student with some level of control or comfort that results in increased levels of participation. Traditional settings, on the other hand, may still contain some stigma that prevents students from communicating outside of the classroom. Either way, the benefits of increased participation and increased levels of communication outweigh any advantages traditional environments have to offer.

The benefits of online learning environments over those of the traditional classroom environment include the ability to archive, print, or review later any online conversation. This ability to work with the data after the class has ended is a powerful benefit. Faculty can gain insight into the conversation over time.

Students can reflect on their responses before posting them to the discussion. Content and language filters available with online technologies can help to prevent misuse of the communications system.

The success of online learning environments ultimately rests with a faculty member's ability to convert existing teaching styles, taking into consideration the needs and expectations of multiple, often diverse, audiences. Today, there is a greater acceptance and integration of online learning environments into college and university teaching. The obstacles that once separated traditional education from online education are disappearing. The reasons for not using technology to enhance teaching are receding as faculty comfort levels increase and the Internet becomes as common and easy to use as television and radio. What binds technology to traditional education is that now they both bring instructors and students together to study a body of knowledge and assess and apply what has been learned (Keating & Hargitai, 1999).

Limitations

There were a number of limitations in this study. First, it was not possible to have experimental and control groups that were exclusive of each other. Because of instructor's schedules, course schedules, and time restrictions, the current model for this study in which all students participated in both experimental and control settings, was the best possible choice. Had the experimental and control groups been separate, this study could have examined in more detail the relationship between an online learning environment and a traditional classroom.

Another limitation of this study was the absence of random assignment to the control and experimental groups because students were already pre-registered into the classes. Since the two sections were considered to be intact groups, the only form of random assignment was to flip a coin to determine the intervention (online or traditional) that would be applied to the group.

In this study, having two instructors sharing the teaching load of two sections of the same course proved to be a limitation as well. Students were initially confused by the presence of two instructors and a unique teaching schedule. It took some time for the students to become comfortable with the way in which their class was taught. Communication between instructors and students was sometimes confused. Students were not comfortable with having their questions about the instruction in the interventions re-directed to the other instructor. This study could have benefited from having one instructor and one non-instructor (researcher). The fact that one of the instructors was also the researcher for this study was a limitation.

Recommendations for Further Study

Additional research into the use of traditional instructional methods used in online learning environments and not covered in this study should be investigated. Different forms of instruction such as collaborative learning and independent study are being used to present courses on the Internet. Additional research into the effectiveness of these forms of instruction would be valuable.

Research which looks closely at the way students accept or reject the Internet as a medium for learning should be investigated. Student satisfaction with the instruction may be a determining factor in whether or not a course will be accepted.

As online learning environments continue to evolve, especially with the rapid growth of technology, they need to be studied. An understanding of these environments can lead to better design of instruction and a better understanding of the learning which occurs when using online learning environments.

Many institutions are considering online learning environments as a sole method for the delivery of instruction, eliminating, replacing, or substituting the personal face-to-face contact provided in the traditional classroom. Research is needed to determine the long term effects on learning and understanding that online learning environments will have.

And finally, research is needed to identify those characteristics that increase student participation in an online setting. An understanding of the effects that the instruction, the delivery, or the level of interactivity have on the overall success of an online learning environment would be most interesting.

APPENDIX A

COURSE SYLLABUS

ICG 334
Survey of Computer Uses in Education
3 Semester Credits
UNLV – Spring, 1999

Instructors:	Steven Smith Tuesday Classes	Dr. David Heflich Thursday Classes
Office:	CEB 342 email: svsmith@thedigitalclassroom.com dheflich@ccmail.nevada.edu	CEB 342 Ph: 895-1017
Classroom:	CEB 212	
Class Hours:	11:30 – 12:45 PM Tuesday 2:30 - 3:45 PM Tuesday	
Office Hours:	1-2 PM Tuesday or by appointment (Smith) 2-4 PM Wednesday or by appointment (Heflich)	

Course Description- The course will offer an overview of computer-based technology and integrated software applications used in K-12 education. It will combine exposure to a wide range of educational technology witn readings and discussions regarding how computer technology integration is affecting schools today and in the coming years. Topics to be covered include the word processing, databases and spreadsheets, graphics, computer-based multimedia, telecommunications, future technological trends, and social issues in computing. This course is designed to help develop reflective teachers who can use technology with diverse urban populations.

Course Goals/Performance Objectives-

The most important goal of this course is for students to be empowered with computer-based technology. Students should gain a solid introduction and be motivated to pursue appropriate uses of technology for personal and professional purposes. This class is designed to provide a positive beginning in a life-long learning process. At the completion of this course, students will be able to:

1. Approach new computer-based tasks more easily and with greater confidence.
2. Select and evaluate various types of technology-based instruction.
3. Use various computer applications (word processing, database, spreadsheet, graphics, and telecommunications) and evaluate the appropriateness of each for meeting various instructional goals and objectives.
4. Analyze ethic and social issues related to increased use of computers in schools.
5. Assess the effects of current levels of computer implementation, the obstacles to computer integration, and the potential of technology to enhance teaching and learning in the future.

Textbook - No textbook is required for this course. The following are offered as suggestions for supplemental reading:

- *ClarisWorks for Macintosh,* Erickson & Vonk, McGraw-Hill, 1994
- *Tool for Schools,* Land & Turner, Wadsworth Publishing, 1997
- *Macs for Teachers*, Robinette, M., IDG Books, 1997

Materials - Two or more floppy disks and/or a Zip disk

Course Format - Instructional or learning activities used in this course will be:

Lecture/Demonstration

Hands-on Activities (Computer lab)

Discussion

Online instruction

Course Assignments:	**Assignment Due Dates:**
1. Database/Spreadsheet module (100 points)	March 18, 1999
2. Multimedia modules (100 points each)	April 6/ April 15, 1999
3. Internet module (100 points)	April 29, 1999
4. Word Processing module (100 points)	March 4, 1999
5. A Final Exam (200 points)	May 11, 1999
6. Module Quizzes (50 points each)	See course outline

Evaluation:

The final evaluation for the course will be based on the following:

A=	94-100%
A-=	90-93%
B+=	87-89%
B =	83-86%
B-=	80-82%
C+=	77-79%
C =	73-76%
C-=	70-72%
D+=	67-69%
D =	63-66%
D-=	60-62%
F =	59% or below

NOTES:

Note: Out-of-Class Requirements - Additional lab time beyond the scheduled course hours *will be necessary to fulfill the course requirements*. A lab in CEB 309A with educational software used in this course is available.

Note: Class attendance and participation are critical for your learning experience in this class and will be considered in the course grade. You should keep up with the assigned readings as well as classroom and online discussions. Be prepared to contribute fully to the discussions. Please plan to attend all classes and actively participate.

Note: All assignments, quizzes, and tests must be completed to receive a final grade for this course. Assignments not completed by the due date will be marked down 20% for each class session they are late.

Note: In addition to successful academic performance in prescribed coursework, you are enrolled in a professional course of studies, which is governed by a standard code of ethics and programmatic expectations. *The Handbook of the Committee to Review Initial Licensure Students* outlines the UNLV Student Code of Conduct, NEA Code of Ethics for the Teaching Profession, and the ICS Student Expectations. The Handbook is available in the ICS Office

Note: *Academic Integrity Statement.* UNLV and its College of Education demand a high level of scholarly behavior and academic honesty on the part of students. Violations by students in exhibiting honesty while carrying out academic assignments and procedural steps for dealing with academic integrity are delineated within the *Handbook of Regulations Governing Probation and Suspension Within the College of Education*. This publication may be found in the CML (CEB 101), the ICS Office (CEB 354) or in the office of the Dean of the College (CEB 301)

Note: If you have a documented disability that may require assistance, you will need to contact the Disability Resource Center for coordination in your academic accommodations. The DRC is located in the Reynolds Student Services Complex, Room 137. Phone 895-0866 TDD 895-0652

Note: Misdemeanor or felonious conviction (s) may bar teacher licensure in Nevada or other states. If you have any questions please direct them to the Director of Teacher Education, CEB 301, 895-4851.

Note: Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructors no later than February 1, 1999 of his or her intention to participate in religious holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructors or the university that could not reasonably have been avoided.

APPENDIX B

INFORMED CONSENT

UNLV UNIVERSITY OF NEVADA, LAS VEGAS

Informed Consent

My name is Steven B. Smith and I am currently a Doctoral candidate at UNLV engaged in a research project investigating the use of the Internet to distribute learning and provide instruction for university courses. This research will provide an opportunity for you as a student participant to receive instruction outside of the traditional classroom setting in Internet-based an online learning environment. This course has been selected because it represents a model for this type of instruction. I therefore invite you to participate in this research study.

Purpose of study: The purpose of this study is to gain a better understanding of instruction and instructional methodology used in online learning environments. This study will examine traditional and online instruction to better understand the effectiveness of distributed learning outside of the traditional classroom environment. This study will take place during the spring 1999 semester.

Participation: As a participant, you will receive six interventions in both traditional and online instruction. The online learning environment used in this study is called "digitalclassroom" and is accessed over the Internet using a computer. When receiving online instruction, all instruction, materials, and resources will be delivered over the Internet via the digitalclassroom. During the first part of the course, you will receive training in how to use the digitalclassroom. With online instruction, distance education, and distributed learning becoming more and more prominent in the field of education, this study offers the opportunity for students to become familiar with new technologies and instructional delivery methods.

Participation in this study is entirely voluntary. This study will not directly impact your grade in this course nor is it required that you participate in the study to receive a passing grade in this course. Under no circumstances will your non-participation have any effect on your grade in the course. Withdrawal from participation in this study may be done at anytime.

Privacy: All data, student identities and related information will be collected, kept confidential, and stored for three years by the researcher. No student identities will be published or used in any subsequent distribution of the data or results of the study.

Contacts:

Steven B. Smith
svsmith@thedigitalclassroom.com
Researcher/Instructor - ICE 334

Dr. Randall Boone
rboone@ccmail.nevada.edu
Dissertation Committee Chair

UNLV Sponsored Programs
702-895-1357

Dr. David Heflich
dheflich@ccmail.nevada.edu

I understand that I can withdraw from this study at any time by notifying the researcher (Steven B. Smith) in writing. I further understand that I will not be compensated for my participation, and my grade or standing in this class will not be affected by my decision to participate or not participate.

☐ participant ☐ non-participant (check one)

Student Participant

Researcher

APPENDIX C

DEMOGRAPHIC SURVEY

Computer Ability Survey

Demographic Information

Name _____ Age _____ Sex: M / F

Major _____ Minor_____

Credits Completed to Date (est.) _____ Current GPA (est.) _____

Teaching Subject Area(s) _____ Grade Level(s) _____

Do you own a computer? Yes / No (circle one)

Do you have Internet access from home? Yes / No (circle one)

Experience using computers (in years)	< 1	1	2-3	4-5	>5 (circle one)
Weekly Computer Usage (in hours)	< 1	1	2-3	4-5	>5 (circle one)

Computer Knowledge (circle one)

No Knowledge Little Knowledge Knowledgeable Very Knowledgeable Extra Knowledgeable

APPENDIX D

TECHNOLOGIES USED IN THIS STUDY

Technologies Used in this Study

Internet Web Server. The Internet-based web server used in this study was provided by an independent Internet service provider (ISP), Concentric.net. The service is provided for a monthly fee and includes the cost of service and domain hosting.

Computer Gateway Interface (CGI). The program required to run a threaded discussion forum through the digitalclassroom was provided by the Internet service provider and accessed through CGI.

thedigitalclassroom.com web site. This web site consists of a number of web pages that contain text and graphics and make up the user-interface designed for this study.

Visual Page. Symantec's *Visual Page* software is an web authoring program that was used to construct the web pages in HTML.

File Transfer Protocol - FTP. The program *Fetch* for the Macintosh was used to transfer files to the server.

Netscape 4.5. The web browser used to access the digitalclassroom was the latest version by Netscape.

CD Burner. A CD burner was used to create course CD's for students. These CD's will contain a demonstration version of ClarisWorks (version 4.0) for the Macintosh along with associated AppleGuide files required for the intervention. the program used with the CD burner was *Toast*.

ClarisWorks 4.0. A demonstration version of ClarisWorks for the Macintosh was used in this study for both of the guided instruction modules.

PowerPoint 4.0. PowerPoint is a software product used to create presentations used in the Lecture modules.

LCD projector. An LCD projector was used to display the images on the teacher's computer on a large screen for the class to view. The LCD projector was used during the Lecture modules.

Cassette Tape Recorder. A cassette tape recorder was used to record the Lecture presentations.

Electronic Mail. Electronic mail in this study is defined as having the ability to facilitate communication through an electronic mail system. Students who did not have their own email capabilities used an Internet-based email system by Microsoft called *HotMail*.

APPENDIX E

GUIDED INSTRUCTION TUTORIAL (EXAMPLE)

Using ClarisWorks to create a Newsletter

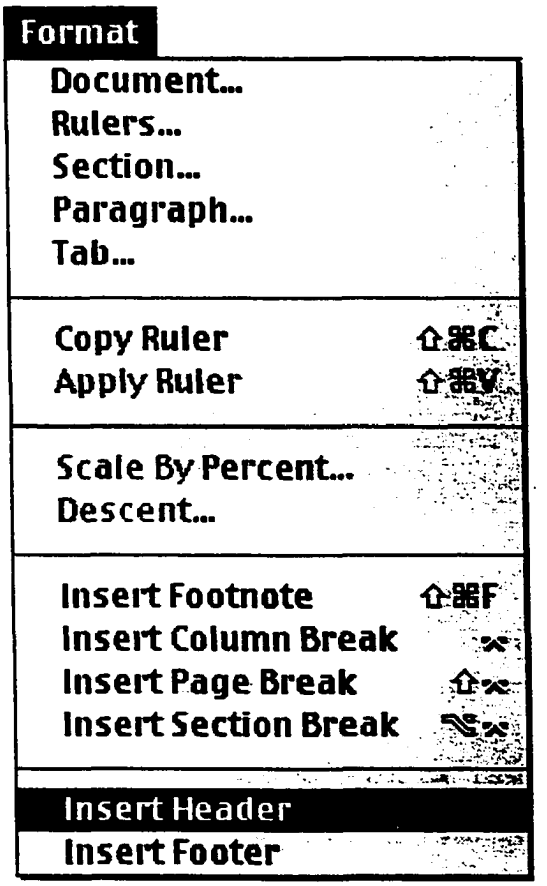
Newsletter Tutorial - Classroom Instruction

The first step in creating a newsletter will be to setup our blank word processing document in a format typically used for newsletters.

Open a new ClarisWorks Word Processing document.

Let's begin with the masthead. A masthead is set apart from the main body of text below. The masthead generally contains the title of the newsletter, the volume number or issue number, the date, and sometimes a graphic or two. The masthead is the "eye catcher" of every good newsletter.

To create a masthead for your newsletter, select **Insert Header** from the **Format** menu.



You will see a line appear that separates the masthead from the main body of text. The next step is to divide our main body of text into columns. Most newsletters and newspapers divide their content into two or more columns. For this tutorial you will create a two-column newsletter format.

Locate the column controls in the control bar at the top of your document

Click once on the "increase-column" control (double-bar) to add a second column to your document.

Make sure that you have correctly setup your document before proceeding. If you have more than two columns visible on your document, you may have clicked too many times on the "increase-column" control. To remove an extra column, click on the "decrease-column" control (single-bar).

If you do not see a horizontal separator line dividing your document into two sections (masthead and main body of text), you will need to repeat the "Insert Header" instructions earlier in this tutorial.

The masthead contains the title of your newsletter, graphics, volume/issue, and date information. To enter text into the masthead, click once within the masthead area to place the cursor.

Type the following text using Helvetica, 24pt., Bold text:

George Washington School [press return]
Newsletter [press return]

If the text you just entered is not automatically centered, select the text and click on the "center" control in the control bar to center the text in the masthead.

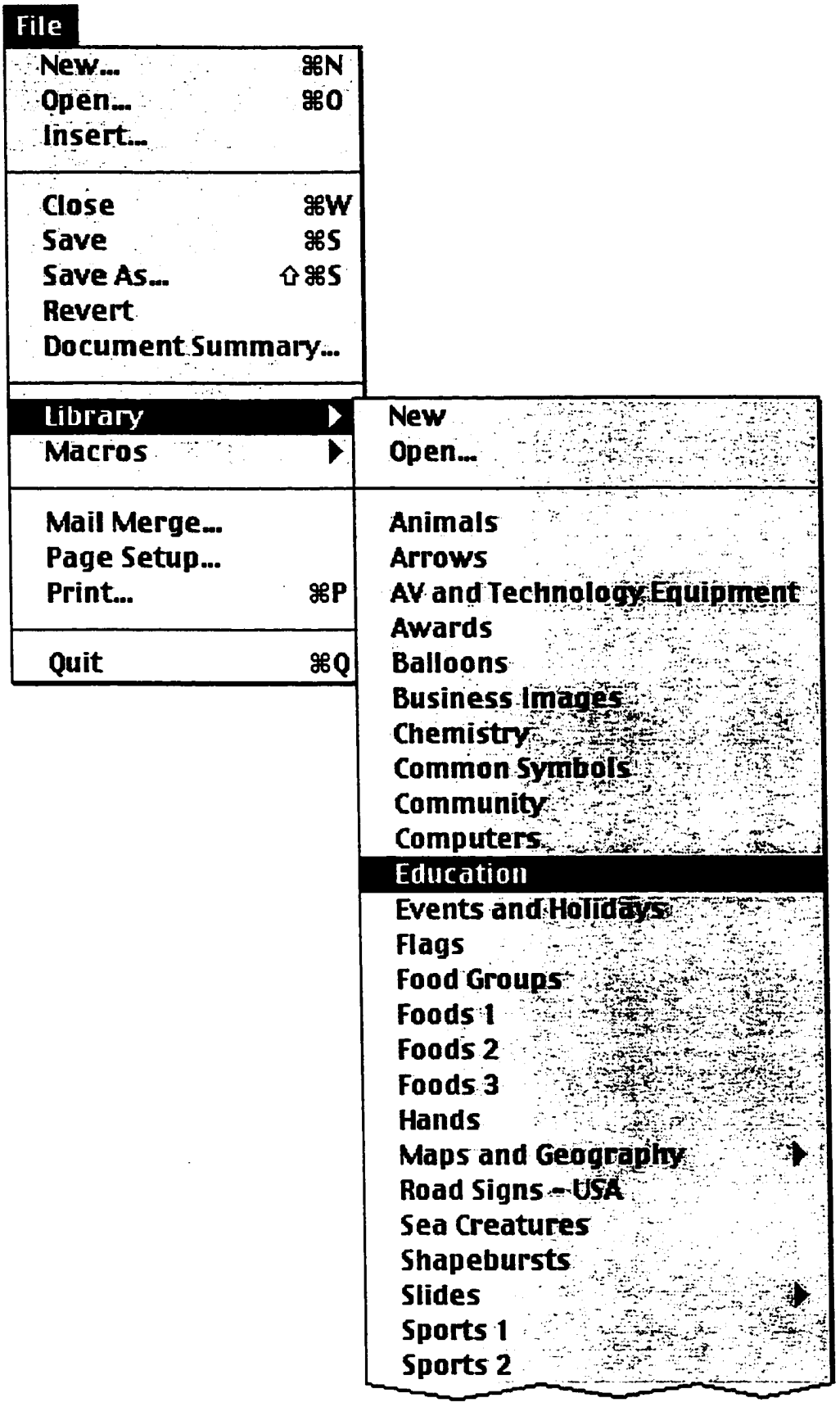
Type the following text using Helvetica, 9pt., Italicized text:

Volume 1 [press tab] August, 1999

Click between "Volume 1" and "August, 1999." Press the "tab" key until the text is separated and spaced evenly at both ends of the masthead.
Tip: If you tab too many times, use the delete key to remove extra tabs.

To make the masthead more visually appealing, we will add a graphic from the ClarisWorks graphics library.

Select **Library** and drag to **Education** from the **File** menu.



A floating window will appear on your document. To move this window to a more convenient location, click on its "title bar" and drag it to a new location on your screen.

For the next step you will need to have the "tool bar" visible.

If the tool bar is visible, skip this step.

If the tool bar IS NOT visible, select **Show Tools** from the **View** menu.

Select the pointer  (graphic selection) tool from the tool bar.

Select the "Pencil" graphic from the floating graphics library window (scroll down the list). Click once on the word Pencil. Click the **USE** button.

Close the graphics library by clicking the "close window" button.

Select the "Pencil" graphic and drag it so that it is positioned (centered) beneath the word "Newsletter" in the masthead.

Select the "line tool"  from the tool bar and draw a horizontal line to separate the masthead from the copy.

Position the line over the existing separator line. Make the line the same width as the document.

Tip: Hold down the "Shift" key to get a perfectly straight line.

You have now completed your masthead! Be sure to check your masthead over to make sure everything looks good.

The next step in creating our newsletter is to add the articles and graphics that make up the main body text area (below the masthead). Click once in the main body text area of your document. The cursor should be blinking below the masthead separation line.

The first article in your newsletter will be from the Principal, Mrs. Lincoln. In newsletters and newspapers articles generally have three parts: a headline, a byline, and the copy.

Press the "return" key once and type the following text in Helvetica, 14pt., Bold text:

Welcome To Our School [press return]

Type the following text using Helvetica, 9pt., Italicized text:

by Martha Lincoln, Principal [press return] [press return]

Press the "tab" key to indent your starting paragraph and type the following text using Helvetica, 12pt., Plain text:

As the new principal of George Washington School, it is my pleasure to welcome all our new students, parents, and staff. As you know, our school has been designed to take advantage of all the latest technological trends and innovations.

[press return] [press tab]

We are having an Open House all next week. Please feel free to stop by and meet our staff and teachers, and take a tour of our new facility.

[press return] [press tab]

There will be refreshments, entertainment, and activities for everyone in your family. We look forward to meeting and working with each and every one of you. [press return]

Select all of the copy you just typed (three paragraphs) and click on the "justified alignment"  control in the control bar at the top of your document to align both sides of the text with the margins of the columns.

Now is a good time to check your work so far. Check to make sure you have a headline, byline, and copy. Check to make sure you have justified your copy.

To enhance our newsletter and make it more interesting, you will now add an appropriate graphic to the end of the copy of the first article.

Select the pointer (graphic selection) tool from the tool bar.

Select **Library** and drag to **Community** from the **File** menu.

Select the graphic "Elementary School" and click the **USE** button.

Close the library graphic window.

Select the "Elementary School" graphic and place it beneath the copy of the Principal's article. Using the "handles", enlarge the graphic to fit the width of the column.

Select the "line" tool from the tool bar and draw a horizontal line below the "Elementary School" graphic. The line should be the same length as the graphic.

Select the line graphic you just created and change the line weight (thickness) to 4pt., using the line palette in the tool bar.

Select the "text" tool  from the tool bar.

Press the return key to move the text cursor down until it is below the line graphic (about two spaces).

Type the following text using Palatino, 14pt., Bold, Red, Centered text:

Open House Schedule

[press return] [press return]

Monday - Thursday

[press return]

8:00 am until 3:00 pm

[press return]

Friday
8:00 am until 12:00 pm

Using the "rectangle" tool  , draw a box (border) around the Open House Schedule copy.

The box (border) will appear "opaque" and will cover the text.

You will need to change the box property from "opaque" to "transparent."

Click on the box to select it, then select "transparent" from the fill palette in the tool bar.

Click on the "text" tool in the tool bar.

Congratulations, you have completed the first column of text and graphics for your newsletter.

Finishing your newsletter. In order to continue on to the second column in your newsletter, you must first tell ClarisWorks to insert a column break.

Select **Insert Column Break** from the **Format** menu.

In the second column of your newsletter, create the following using the skills you have acquired so far...

1. Add a "bell schedule" to column two. Make the text a different color and put a box (border) around the text.

2. Add a line graphic to separate the "bell schedule" from the text/graphics that will follow. You can even change the color of the line if you like!

3. Create (make up) a new article using the same font, size, style, and justification as you did in the first article. Remember to include a headline, byline and copy. You may even want to add an appropriate graphic from the graphic library.

Congratulations! You have completed instruction on how to create a newsletter using this tutorial.

Newsletter Assignment

due Thursday March 4, 1999

Requirements for Newsletter Assignment:

Your assignment is to create a newsletter with an educational theme using what you have learned according to the following guidelines:

- Single page only.
- Two or three column newsletter
- At least 3 graphics (two column) or 4 graphics (three column).
- Minimum of two different fonts/maximum of 4 fonts correctly used.
- Headline - 14pt/Bold
- byline - 9pt/Italicized
- body text - 12pt/plain
- Minimum of 3 articles.
- Appropriate size, style, justification, and/or color.

- At least one element (story, graphic, or important information) in the newsletter should be enclosed in a box (border).
- Separator lines (if needed) to divide articles and graphics.
- No spelling, grammatical, punctuation, or capitalization errors.
- Interesting and appropriate content/graphics.

This assignment is due on Thursday March 4th. On Thursday March 4th, there will be no formal class. The lab will be open for you to use to complete this assignment. If you choose not to attend this class session, you must turn in your newsletter in person to an instructor **BEFORE** the end of class on Thursday.

This assignment is to be turned in on disk (floppy or Zip) by the end of the period on Thursday March 4, 1999.

Newsletter Tips:

When you read a newsletter, you want information quickly. When you write a newsletter, every word must count. Follow these guidelines in your newsletter:

Use a headline. Summarize the article in one or two words. Help your readers skim for what they need.

Get to the point. Introduce all major points in the first paragraph. Let the reader know right away what they can learn from the article.

A newsletter should be a quick read. Most of your readers expect to finish a newsletter in four or five minutes. They want to scan for information, rather than pore over the details.

Organization:

When creating a newsletter , it is important to organize your ideas and collect your graphics in advance. This will save you a lot of time. As you begin to develop your idea, imagine the way you will layout the information. Consider the font size, style and color. Decide how much information you will want to include. Carefully plan your design because you want your readers to "read" your newsletter.

Keep in mind these three simple steps to successfully creating a newsletter: Consider your content; decide what you want to include in your newsletter.

Collect, locate, or create the graphics you want to use in your newsletter.

Create your newsletter in a ClarisWorks word processing document.

Things to remember:

Articles that appear in a newsletter generally adhere to the following guidelines:

The headline of the article is one size larger than the copy.

The byline (author) is generally one or two sizes smaller than the copy.
The copy is always displayed in a readable font (i.e., Helvetica, Palatino, Times, etc.) and never in a difficult to read font (i.e., Old English, handwriting, script, stylized, etc.).

Do not use too many graphics. Select your graphics carefully. Choose appropriate graphics. Too many graphics will detract from the appearance of your newsletter rather than enhance it.

Separate bodies of text from unrelated items. Use separator lines or graphics to visually "divide" the content on the page.

When in doubt...keep it simple!

APPENDIX F

COMPUTER ABILITY SURVEY

Computer Ability Survey

Instructions for completing this survey: Read each of the following statements and select a response that best suits your personal feeling and understanding.

Computer Awareness *Read each of the following statements and rate yourself on your ability to...* (Please circle your answer).

1 = Extremely High, 2 = Very high, 3 = High, 4 = Average, 5 = Low, 6 = Very Low, 7 = Extremely Low

1. use a word processor to create documents.	1	2	3	4	5	6	7
2. use computer-aided instruction (teaching software).	1	2	3	4	5	6	7
3. learn a software package that you have never used before.	1	2	3	4	5	6	7
4. use a computer operating system.	1	2	3	4	5	6	7
5. *teach someone to use a computer software package.*	1	2	3	4	5	6	7
6. discuss strengths and weaknesses of various software packages.	1	2	3	4	5	6	7
7. identify basic parts of a computer and their functions.	1	2	3	4	5	6	7
8. elaborate on various computer applications in society.	1	2	3	4	5	6	7
9. elaborate on the social and economic impact of computers.	1	2	3	4	5	6	7
10. discuss history of computers.	1	2	3	4	5	6	7

Perceived Control

1 = Strongly Agree, 2 = Agree, 3 = Slightly Agree, 4 = Neutral, 5 = Slightly Disagree, 6 = Disagree, 7 = Strongly Disagree

1. I need an experienced person nearby when I use a computer.	1	2	3	4	5	6	7
2. I need someone to tell me the best way to use a computer.	1	2	3	4	5	6	7
3. I could probably teach myself most of the things I need to know about computers.	1	2	3	4	5	6	7
4. I can make the computer do what I want it to do.	1	2	3	4	5	6	7
5. I am in complete control when I use the computer.	1	2	3	4	5	6	7
6. If I had a problem using the computer, I could solve it one way or another.	1	2	3	4	5	6	7
7. I would prefer to learn new computer software packages on my own.	1	2	3	4	5	6	7

APPENDIX G

STUDENT TEST SCORES SPREADSHEET

Student Individual Test Scores
Collaborative Discussion #1

Traditional (Control)

Subj_id	pre_cd1	post_cd1
1	7.00	14.00
2	7.00	11.00
3	*	10.00
4	7.00	11.00
5	5.00	9.00
6	9.00	12.00
7	5.00	14.00
8	7.00	6.00
9	7.00	12.00
10	*	7.00
11	5.00	13.00
12	10.00	11.00
13	8.00	15.00
14	3.00	14.00
15	5.00	13.00
16	10.00	17.00
17	6.00	16.00
18	4.00	12.00
19	5.00	10.00
20	6.00	7.00
21	5.00	11.00
22	7.00	12.00
23	7.00	10.00
24	8.00	7.00
25	7.00	7.00
26	4.00	9.00
27	6.00	12.00
28	6.00	11.00
29	5.00	15.00
30	5.00	16.00

Online (Experimental)

Subj_id	pre_cd1	post_cd1
31	4.00	10.00
32	7.00	7.00
33	6.00	6.00
34	6.00	4.00
35	5.00	11.00
36	4.00	5.00
37	4.00	9.00
38	9.00	10.00
39	4.00	8.00
40	5.00	6.00
41	5.00	12.00
42	7.00	5.00
43	4.00	8.00
44	4.00	10.00
45	5.00	12.00
46	5.00	7.00
47	5.00	7.00
48	7.00	9.00
49	5.00	9.00
50	9.00	12.00
51	3.00	13.00
52	4.00	7.00
53	5.00	14.00
54	8.00	9.00
55	5.00	9.00
56	6.00	9.00
57	4.00	11.00
58	2.00	7.00

There were 20 questions on these tests each worth one point.
An * indicates that the student did not take the test.

Student Individual Test Scores
Collaborative Discussion #2

Traditional (Control)

Subj_id	pre_cd2	post_cd2
1	9.00	15.00
2	6.00	18.00
3	11.00	18.00
4	7.00	16.00
5	4.00	18.00
6	5.00	20.00
7	10.00	13.00
8	3.00	14.00
9	*	8.00
10	6.00	14.00
11	8.00	19.00
12	6.00	13.00
13	10.00	14.00
14	9.00	17.00
15	6.00	16.00
16	8.00	15.00
17	9.00	19.00
18	7.00	13.00
19	*	15.00
20	7.00	12.00
21	6.00	16.00
22	14.00	15.00
23	7.00	19.00
24	9.00	14.00
25	3.00	14.00
26	9.00	14.00
27	9.00	16.00
28	6.00	18.00

Online (Experimental)

Subj_id	pre_cd2	post_cd2
29	6.00	15.00
30	6.00	17.00
31	5.00	14.00
32	4.00	17.00
33	7.00	11.00
34	5.00	15.00
35	6.00	14.00
36	6.00	13.00
37	5.00	14.00
38	6.00	15.00
39	6.00	16.00
40	8.00	17.00
41	7.00	13.00
42	6.00	18.00
43	5.00	15.00
44	6.00	18.00
45	10.00	19.00
46	6.00	14.00
47	4.00	15.00
48	5.00	19.00
49	4.00	8.00
50	6.00	10.00
51	8.00	16.00
52	5.00	14.00
53	4.00	15.00
54	6.00	16.00
55	8.00	12.00
56	4.00	14.00
57	8.00	19.00
58	11.00	17.00

There were 20 questions on these tests each worth one point.
An * indicates that the student did not take the test.

Student Individual Test Scores
Guided Instruction #1

Traditional (Control)

Subj_id	pre_gi1	post_gi1
1	11.00	18.00
2	13.00	15.00
3	12.00	17.00
4	11.00	18.00
5	6.00	20.00
6	15.00	17.00
7	9.00	15.00
8	11.00	*
9	11.00	16.00
10	14.00	18.00
11	10.00	20.00
12	13.00	15.00
13	9.00	15.00
14	11.00	16.00
15	13.00	14.00
16	15.00	19.00
17	18.00	20.00
18	11.00	11.00
19	11.00	16.00
20	18.00	18.00
21	13.00	13.00
22	11.00	15.00
23	11.00	17.00
24	11.00	16.00
25	15.00	14.00
26	9.00	15.00
27	15.00	16.00
28	*	15.00
29	6.00	20.00
30	14.00	18.00

Online (Experimental)

Subj_id	pre_gi1	post_gi1
31	14.00	10.00
32	12.00	7.00
33	11.00	6.00
34	8.00	4.00
35	12.00	11.00
36	14.00	5.00
37	*	9.00
38	16.00	10.00
39	12.00	8.00
40	*	6.00
41	10.00	12.00
42	9.00	14.00
43	14.00	18.00
44	15.00	18.00
45	14.00	15.00
46	11.00	17.00
47	14.00	16.00
48	10.00	14.00
49	14.00	15.00
50	17.00	19.00
51	*	14.00
52	12.00	13.00
53	*	15.00
54	12.00	16.00
55	*	14.00
56	12.00	18.00
57	12.00	17.00
58	10.00	15.00

There were 20 questions on these tests each worth one point.
An * indicates that the student did not take the test.

Student Individual Test Scores
Guided Instruction #2

Traditional (Control)

Subj_id	pre_gi2	post_gi2
1	18.00	20.00
2	11.00	15.00
3	10.00	12.00
4	11.00	14.00
5	10.00	16.00
6	13.00	18.00
7	8.00	14.00
8	7.00	12.00
9	12.00	15.00
10	10.00	14.00
11	10.00	13.00
12	*	*
13	14.00	19.00
14	10.00	15.00
15	15.00	17.00
16	13.00	16.00
17	11.00	13.00
18	*	15.00
19	13.00	16.00
20	*	14.00
21	10.00	15.00
22	12.00	14.00
23	9.00	14.00
24	11.00	19.00
25	9.00	15.00
26	13.00	16.00
27	12.00	15.00
28	7.00	18.00

Online (Experimental)

Subj_id	pre_gi2	post_gi2
29	8.00	15.00
30	8.00	19.00
31	10.00	15.00
32	13.00	14.00
33	6.00	18.00
34	11.00	14.00
35	9.00	13.00
36	*	*
37	10.00	16.00
38	13.00	18.00
39	12.00	15.00
40	12.00	13.00
41	12.00	13.00
42	5.00	13.00
43	9.00	13.00
44	10.00	16.00
45	10.00	19.00
46	11.00	13.00
47	11.00	17.00
48	10.00	17.00
49	9.00	14.00
50	11.00	15.00
51	10.00	14.00
52	9.00	15.00
53	10.00	16.00
54	5.00	15.00
55	8.00	17.00
56	11.00	16.00
57	10.00	17.00
58	11.00	16.00

There were 20 questions on these tests each worth one point.
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Student Individual Test Scores
Lecture #1

Traditional (Control)

Subj_id	pre_l1	post_l1
1	9.00	14.00
2	10.00	10.00
3	9.00	9.00
4	9.00	14.00
5	8.00	13.00
6	12.00	13.00
7	12.00	13.00
8	*	*
9	13.00	14.00
10	12.00	13.00
11	12.00	13.00
12	*	10.00
13	9.00	11.00
14	12.00	13.00
15	10.00	13.00
16	10.00	12.00
17	14.00	14.00
18	12.00	8.00
19	13.00	14.00
20	15.00	13.00
21	7.00	11.00
22	6.00	10.00
23	5.00	11.00
24	11.00	14.00
25	8.00	10.00
26	10.00	11.00
27	9.00	11.00
28	12.00	11.00
29	9.00	14.00
30	11.00	14.00

Online (Experimental)

Subj_id	pre_l1	post_l1
31	11.00	14.00
32	7.00	13.00
33	9.00	12.00
34	10.00	9.00
35	12.00	13.00
36	7.00	13.00
37	8.00	8.00
38	9.00	8.00
39	12.00	9.00
40	10.00	12.00
41	9.00	14.00
42	10.00	*
43	13.00	13.00
44	10.00	14.00
45	10.00	13.00
46	9.00	9.00
47	12.00	11.00
48	11.00	14.00
49	10.00	12.00
50	11.00	13.00
51	8.00	13.00
52	12.00	12.00
53	8.00	9.00
54	11.00	13.00
55	12.00	12.00
56	6.00	12.00
57	14.00	13.00
58	9.00	14.00

There were 20 questions on these tests each worth one point.
An * indicates that the student did not take the test.

Student Individual Test Scores
Lecture #2

Traditional (Control)

Subj_id	pre_l2	post_l2
1	12.00	14.00
2	7.00	13.00
3	8.00	14.00
4	9.00	15.00
5	11.00	12.00
6	9.00	15.00
7	*	10.00
8	6.00	12.00
9	9.00	14.00
10	6.00	13.00
11	8.00	14.00
12	*	*
13	12.00	15.00
14	9.00	13.00
15	9.00	14.00
16	12.00	14.00
17	10.00	13.00
18	6.00	15.00
19	6.00	11.00
20	*	11.00
21	*	11.00
22	9.00	8.00
23	8.00	12.00
24	*	13.00
25	8.00	12.00
26	10.00	14.00
27	10.00	14.00
28	7.00	14.00

Online (Experimental)

Subj_id	pre_l2	post_l2
29	6.00	15.00
30	5.00	14.00
31	5.00	10.00
32	2.00	13.00
33	5.00	11.00
34	8.00	14.00
35	7.00	13.00
36	*	*
37	9.00	15.00
38	10.00	10.00
39	7.00	15.00
40	6.00	12.00
41	*	9.00
42	5.00	9.00
43	7.00	9.00
44	6.00	11.00
45	7.00	13.00
46	5.00	10.00
47	4.00	8.00
48	*	11.00
49	6.00	7.00
50	*	13.00
51	12.00	14.00
52	7.00	11.00
53	10.00	11.00
54	*	11.00
55	8.00	13.00
56	7.00	7.00
57	9.00	14.00
58	9.00	15.00

There were 20 questions on these tests each worth one point.
An * indicates that the student did not take the test.

APPENDIX H

PRETESTS AND POSTTESTS

Advanced Organizer

Collaborative Discussion 1

Article: The Learning Connection: Schools in the Information Age
Conte, et. al. 1997.

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

It has been reported that local school districts spend approximately _____ a year on new technology.

A. $4 million
B. $1 million
C. $4 billion
D. $1 billion

Question 2

Which of the following would be considered the least important issue for concern when integrating technology into schools.

A. educational content
B. professional development
C. equity
D. cost

Question 3

One significant way to measure student success in schools is to measure...

A. the level of student participation.
B. the level to which students assume responsibility for their own education.
C. test scores.
D. student awareness of technology.

Question 4

A goal of technology education is to produce students who are able to...

A. address real-world problems.
B. regurgitate facts.
C. absorb an established body of knowledge.
D. become technology-savy employees.

Question 5

The work place of the future is likely to require workers to be able to...

A. organize, acquire, and interpret information.
B. use word processing and spreadsheet programs.
C. write software.
D. develop multimedia presentations.

Question 6

The rate at which the world's knowledge base doubles is once every...

A. 50 years.
B. 25 years.
C. 2 years.
D. year

Question 7

Which of the following authors has predicted that the introduction of computers into classrooms will fall short of reformers' hopes just as radio and television disappointed earlier generations?

A. Cuban
B. Conte
C. Roszak
D. Riel

Question 8

Today's Internet suffers from a lack of...

A. information.
B. flexibility.
C. quality control.
D. educational resources.

Question 9

One successful tool educators have used to track a students' progress (using technology) is with...

A. test scores
B. attendance
C. portfolio assessment
D. research studies

Question 10

What is the biggest bottleneck limiting the effective use of computer networking in many of the nation's classrooms?

A. access to the Internet.
B. teacher training
C. funding
D. support

Question 11

According to the National Center on Education Statistics, all but _____ of the nations schools will be online (networked/connected to the Internet) by the year 2000.

A. 1%
B. 5%
C. 10%
D. 15%

Question 12

Which of the following is not a component of President Clinton's proposal to connect every classroom to the Internet by the year 2000?

A. every child will have access to a multimedia computer.

B. teachers will receive training.

C. increase the availability of high-quality content.

D. increase national funding of technology initiatives.

Question 13

Which of the following is not a government sponsored program that provides access, interactivity, and information to students, teachers, and parents?

A. ERIC

B. CASA

C. GLOBE

D. NASA

Question 14

The estimated cost per student to ensure technology equity in schools is...

A. $100 - $150 per student.

B. $50 - $100 per student.

C. $25 -$50 per student

D. $30 per student.

E. Question 15

According to the research company, Market Data Retrieval, what percent of teacher's polled believed that Internet access in the classroom helped students achieve better academic results?

A. 2%

B. 73.3%

C. 13.4%

D. 25%

Question 16

Which of the following is not considered to be a higher-order skill expected of students today?

A. creating information
B. analyzing information
C. evaluating information
D. gathering information

Question 17

Analysts have speculated that much of the gain associated with the integration of computers into schools has resulted from _____.

A. the availability of new technology
B. the power of new technology
C. the flexibility of new technology
D. the novelty of new technology

Question 18

According to teachers, which of the following is not an obstacle to technology integration?

A. learning to use hardware
B. learning techniques to manage the transition to student-centered learning
C. arranging the classroom to accommodate new technology
D. acquiring additional knowledge about their subject area

Question 19

According to the National Commission on Educational Statistics, only _____ of public schools require teachers to obtain training in advanced telecommunications.

A. 10%
B. 11%
C. 12%
D. 13%

Question 20

Advocates for a technology-driven overhaul of the current educational system point to all but one of the following as hindrances to the reform process.

A. technical problems

B. lack of support

C. inadequate training

D. insufficient time

Advanced Organizer

Collaborative Discussion 2

Article: Goals 2000: An analysis and Critique
Knudsen & Morrissette, 1998.

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

The Goals 2000: Educate America Act was signed into public law in...

A. 1994
B. 1995
C. 1996
D. 1997

Question 2

Which of the following is not a prevailing theme prompting historical reform efforts?

A. social equality
B. social cohesion
C. excellence in education
D. entitlement

Question 3

According to critics, the Goals 2000 Act is destined to fail due to...

A. a lack of interest.
B. social realities.
C. a lack of effort.
D. a lack of experience.

Question 4

The most significant reason the Goals 2000 Act was enacted was to address...

A. address real-world problems.
B. declining enrollment in schools.
C. falling SAT scores.
D. a need for technology awareness in schools.

Question 5

Goals 2000 outlines ____ goals that must be achieved by American schools by the year 2000.

A. 10
B. 9
C. 8
D. 7

Question 6

Which of the following has not been instrumental in prompting American educational reform?

A. accessible technology
B. decreasing world market
C. advanced communication systems
D. improved travel

Question 7

The United States has turned to educational reform when confronted by...

A. social, political and economic challenges.
B. social, economic and cultural challenges.
C. cultural, political and economic challenges
D. social, political and cultural challenges.

Question 8

Declining scores on the SAT can be attributed to educational success during the...

A. 1940's and 1950's
B. 1950's and 1960's
C. 1960's and 1970's
D. 1970's and 1980's

Question 9

The SAT is designed to predict...

A. I.Q.
B. High School level proficiency
C. success in college.
D. a student's personal aptitude.

Question 10

According to the Goals 2000 Act, by the year 2000, all children will start school ready to...

A. read.
B. learn.
C. write.
D. participate.

Question 11

According to the Goals 2000 Act, by the year 2000, the high school graduation rate will increase to at least

A. 80%
B. 85%
C. 90%
D. 95%

Question 12

According to the Goals 2000 Act, by the year 2000, all students will leave grades four, eight, and 12...

A. having demonstrated competency over challenging subject matter.
B. whether they have passed all courses or not.
C. smarter than they were when they entered.
D. with improved athletic and social skills.

Question 13

According to the Goals 2000 Act, by the year 2000, the Nation's teaching force will have access to...

A. programs for the continued improvement of their professional skills.
B. a wide range of teaching materials.
C. the Internet.
D. educational resources not previously available.

Question 14

According to the Goals 2000 Act, by the year 2000, U.S. students will be first in the world in...

A. athletics.
B. mathematics and science achievement.
C. test scores.
D. the total number of students who graduate college.

Question 15

According to the Goals 2000 Act, by the year 2000, every adult American will be...

A. aware of the Internet.
B. equal to an adult European.
C. knowledgeable in the area of mathematics and science.
D. literate.

Question 16

According to the Goals 2000 Act, by the year 2000, every school in the United States will...

A. be connected to the Internet.
B. be free of drugs, violence, and the unauthorized presence of firearms and alcohol.
C. have a student-teacher ration of 1:15.
D. meet state and local building codes.

Question 17

According to the Goals 2000 Act, by the year 2000, every school will promote partnership that will increase...

A. the availability of new technology.
B. the number of students promoted to the next grade level.
C. parental involvement and participation.
D. student test scores.

Question 18

Crises in American education seem to stem from...

A. failed educational programs.
B. a changing global marketplace.
C. changing society.
D. failure of the educational system.

Question 19

Which county has a national curriculum in which 89.9% of exams are generated by the authors of textbooks that are utilized in the classroom?

A. United States
B. Germany
C. Australia
D. Japan

Question 20

The Goals 2000 legislation supports the provision of grant-driven federal funds to state and local school districts in order to incorporate all but one of the following:

A. rigorous academic standards
B. alignment of curriculum, textbooks, and teacher education
C. teacher training
D. clear student incentives to meet high standards of academic performance

Advanced Organizer
Guided Instruction 1
ClarisWorks Newsletter (WP)

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

Objects created in the draw program can be "nudged" using the _____.

A. arrow keys
B. plus/minus keys
C. function keys
D. space bar

Question 2

Which of the following programs provides a "grid" to assist in aligning objects?

A. Word Processing
B. Database
C. Draw
D. Paint

Question 3

Which of the following tools is not available in the draw program?

A. 
B. 
C. 
D. 

Question 4

Which of the following is the correct menu bar for word processing?

A. File Edit Format Font Size Style Outline View

B. File Edit Format Arrange Options View

C. File Edit Format Transform Options Window

D. File Edit Format Calculate Options Window

Question 5

In the paint program, which of the following tools is the best tool to use when selecting an irregularly shaped image?

A. 

B. 

C. 

D. 

Question 6

Which of the following is the "increase-columns control?"

A. 

B. 

C. 

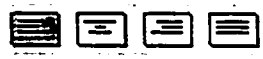
D. 

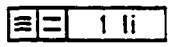
Question 7

Which of the following tools is used to justify text in a word processing document?

A. 

B. 

C. 

D. 

Question 8

Which command inserts a header at the top of a document?

A. File...Insert Header
B. Edit...Insert Header
C. Format...Insert Header
D. Style...Insert Header

Question 9

The Show/Hide Tools command is located in the _____ menu.

A. View
B. File
C. Edit
D. Format

Question 10

Which key on the keyboard, when held down while drawing, results in straight lines, perfect squares, and perfect circles?

A. Space
B. Shift
C. Enter
D. Option

Question 11

A graphic which has been placed in a document using the pointer (graphic selection) tool will have _____ when selected.

A. color

B. disappeared

C. a dotted outline

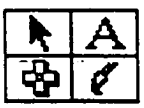
D. handles

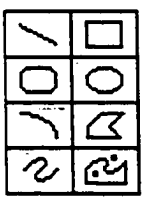
Question 12

Which of the following contains the "transparency/opaque" tool?

A. 

B. 

C. 

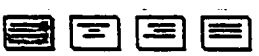
D. 

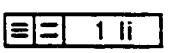
Question 13

Which of the following tools is used to increase-decrease the viewing area in a document?

A. 

B. 

C. 

D. 

Question 14

Which of the following can be "torn" away and placed in another location on the screen?

A. 

B. 

C. 

D. 

Question 15

The ClarisWorks library graphics are located in the _____ menu.

A. Edit

B. Format

C. File

D. View

Question 16

Which of the following is not a tool panel subsection in the draw program?

A. application tools

B. draw tools

C. fill palettes

D. justify

Question 17

When opening a new paint or draw document, which tool is selected by default?

A. 

B. 

C. 

D. 

Question 18

Which tool does not require dragging the cursor in the draw program?

A. rectangle
B. polygon
C. circle
D. lasso

Question 19

Which command reverts to the last action completed in ClarisWorks?

A. File...Save
B. File...Undo
C. File...Quit
D. Edit...Undo

Question 20

Paint images are comprised of tiny _____.

A. lines
B. squares
C. pixels
D. circles

Advanced Organizer
Guided Instruction 2
ClarisWorks Slide Show (DR)

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

A feature in ClarisWorks that allows you to create a common background for all slides is called...

A. Background
B. Master Page
C. Master Background
D. Page View

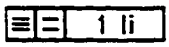
Question 2

Slide show presentations can be created in all but which one of the following programs in ClarisWorks?

A. Telecommunications
B. Word Processing
C. Paint
D. Draw

Question 3

Which of the following tools is used to change the viewable size of a document?

A. 

B. 
C. 

D. 

Question 4

Which of the following is the correct menu bar for the draw program?

A. File Edit Format Font Size Style Outline View

B. File Edit Format Arrange Options View

C. File Edit Format Transform Options Window

D. File Edit Format Calculate Options Window

Question 5

In the draw program, which of the following tools is the best tool to use when working with graphics?

A. 

B. 

C. 

D. 

Question 6

In which of the following menus will you find the **Slide Show...** control?

A. Style
B. Outline
C. Options
D. View

Question 7

Which of the following tools would you use to move a text field?

A. 

B. 

C. 

D. 

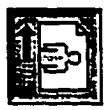
Question 8

Which command inserts makes the margins of a document visible?

A. File...Page View
B. Edit...Page View
C. View...Page View
D. Style...Page View

Question 9

Which of the following is the correct icon for the landscape view?

A. 

B. 

C. 

D. 

Question 10

To set the number of slides in your slide show, you would select...

A. Format...Document
B. File...Document
C. File...Format
D. Option...Number of Slides

Question 11

A graphic which has been placed in a draw document using the pointer (graphic selection) tool will have _____ when selected.

A. color
B. disappeared
C. a dotted outline
D. handles

Question 12

ClarisWorks can insert graphics that have been saved in the _____ format.

A. jpeg
B. eps
C. pict
D. tiff

Question 13

The Portrait view prints documents that are...

A. 8.5 x 14
B. 11 x 8.5
C. 8.5 x 11
D. 14 x 8.5

Question 14

Which command would you use to import graphics into your slide show document?

A. File...Import
B. File...Install
C. File...Insert
D. Option...Insert Graphic

Question 15

Which of the following font sizes would not be appropriate for use in a classroom presentation.

A. 12pt
B. 24pt
C. 36pt
D. 48pt

Question 16

Which key command would you use to end/quit a slide show presentation?

A. g
B. q
C. s
D. d

Question 17

The Edit Master Page feature is located in the _____ menu.

A. Options
B. View
C. File
D. Format

Question 18

To best way move an object such as a graphic or text field is to click...?

A. on its handle.
B. in the middle of the object.
C. twice on it.
D. on it with the text tool.

Question 19

When you drag the handle(s) of a text field, the text in the field will...

A. automatically resize.
B. automatically wrap to the size of the field.
C. not change.
D. be deleted.

Question 20

The Master Page feature is found in the _____ program.

A. word processing
B. paint
C. draw
D. spreadsheet

Advanced Organizer

Lecture 1

Computer-based Technology in the Classroom

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

Which of the following classroom technologies is currently not available to most Clark County School District classrooms?

A. VCR
B. Overhead
C. Distributed Learning
D. Computers

Question 2

An integral component of restructuring today's schools is...

A. new technology
B. new teachers
C. new administrators
D. new schools

Question 3

Technology is changing the way students...

A. study
B. learn
C. do homework
D. play

Question 4

The interactive nature of computers allows students to develop their...

A. gaming skills.
B. knowledge, problem solving and data analysis skills.
C. word processing skills.
D. communication skills.

Question 5

Research has shown that teachers who teach with technology...

A. are not concerned with the quality of their students' work.
B. find it difficult to meet the needs of individual students.
C. expect more from their students.
D. are less willing to experiment

Question 6

According to researchers, the most successful teachers who use technology in the classroom are teachers who use it...

A. effectively
B. often
C. successfully
D. when needed

Question 7

Researchers have noted differences among children as they approach a learning task in a computer lab. Which of the following is not a finding of their research.

A. Students who prefer challenging work perform better.
B. Students who seek teacher approval perform better.
C. Students who achieve more perform better.
D. Students who are motivated by curiosity perform better.

Question 8

Which of the following is not an example of a resource made possible by technology?

A. Internet
B. email
C. CD-ROM
D. Operating System

Question 9

In order for a one-computer classroom to be successful, the _____ must be comfortable with using the computer as a tool.

A. student
B. teacher
C. technology coordinator
D. administration

Question 10

Which of the following is the least important role of technology in the classroom?

A. provide access to information
B. develop knowledge and skills
C. link to other locations
D. games

Question 11

Which of the following is not a recognized source of funding for technology in the classroom?

A. Textbook publishers
B. Federal Government
C. State Government
D. Local (City) Government

Question 12

Recent research relating to school reform and technology contends that...

A. teachers would rather dispense knowledge than coach students.
B. technology often stimulates teachers to present more.
C. teachers are more resistant to learning with technology.
D. teachers tend not to share ideas regarding curriculum with each other.

Question 13

Which of the following would be a goal of technology integration?

A. to develop keyboarding skills
B. to develop gaming skills
C. to develop word processing skills
D. to develop discovery skills

Question 14

Which of the following is not a benefit of technology in the classroom

A. increased access to information
B. interdisciplinary study
C. reduced class sizes
D. project-based learning

Question 15

The most predominant technology courses in High School still center around...

A. occupational education
B. computer awareness
C. graphics production
D. industrial technology

Advanced Organizer

Lecture 2

The Internet in the Classroom

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

Which of the following best describes the Internet?

A. The Internet is a global network of computer networks.
B. The Internet is made up of thousands of computers.
C. The Internet is a collection of servers.
D. The Internet is comprised up of computer kiosks which distribute information over telephone lines.

Question 2

Communication over the Internet is based on the...

A. Ethernet protocol
B. TCP/IP protocol
C. Internet standard
D. AppleShare protocol

Question 3

The World Wide Web was first developed in...

A. Switzerland
B. Germany
C. Italy
D. America

Question 4

The first "Internet" was actually called

A. The Internet 2
B. ARPANET
C. The Information Superhighway
D. The World Wide Web

Question 5

The Internet as we know it today was first opened to commercial access in the early...

A. 1960's
B. 1970's
C. 1980's
D. 1990's

Question 6

The first Graphical User Interface (web browser) was called...

A. Netscape
B. Internet Explorer
C. AOL
D. Mosaic

Question 7

Which of the following is not a search engine?

A. Yahoo!
B. Netscape
C. WebCrawler
D. InfoSeek

Question 8

In Netscape, if you want to mark a web page so that you can visit it again, you would add it to your _____.

A. Browser
B. Desktop
C. Bookmarks
D. Operating System

Question 9

Which of the following is the correct web address for the WhiteHouse in Washington D.C.?

A. www.whitehouse.com
B. www.whitehouse.org
C. www.whitehouse.gov
D. www.whitehouse.edu

Question 10

Which of the following is not required to access information on the Internet?

A. Computer
B. Modem
C. Browser
D. Telephone

Question 11

Search Engines used to locate information on the Internet are actually very large...

A. Multimedia documents
B. Databases
C. Spreadsheets
D. Web pages

Question 12

The Internet is based on...

A. Hypertext links
B. HyperCard links
C. HyperStudio links
D. Hyperactive links

Question 13

The Internet today is comprised of many different networks. Which of the following is not a network on today's Internet?

A. email
B. Newsgroups
C. WWW
D. AppleTalk

Question 14

Which of the following networks allows a user to attach a document and send it to another user?

A. email
B. Newsgroups
C. WWW
D. AppleTalk

Question 15

The Internet currently has over _____ hosts!

A. 10,000,000
B. 20,000,000
C. 30,000,000
D. 40,000,000

Quiz

Collaborative Discussion 1

Article: The Learning Connection: Schools in the Information Age
Conte, et. al. 1997.

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

The amount of money local school districts spend annually on technology is reported to be _____.

A. $4 billion
B. $1 billion
C. $4 million
D. $1 million

Question 2

Some educators have expressed concerns about the way in which technology is integrated into schools. Which of the following would be considered the least important issue for concern.

A. educational content
B. cost
C. professional development
D. equity

Question 3

Which of the following has long been considered a significant measure of student success in schools.

A. the level of student participation.
B. test scores.
C. the level to which students assume responsibility for their own education.
D. student awareness of technology.

Question 4

While efforts are at hand to improve education through the integration of technology, it is still the goal of of many technology educators to produce students who are able to...

A. regurgitate facts.

B. address real-world problems.

C. absorb an established body of knowledge.

D. become technology-savy employees.

Question 5

Students seeking jobs in the next century will likely be required to be able to...

A. use word processing and spreadsheet programs.

B. write software.

C. develop multimedia presentations.

D. organize, acquire, and interpret information.

Question 6

The estimated rate at which the world's knowledge base doubles is once every...

A. 50 years.

B. 25 years.

C. 2 years.

D. year.

Question 7

Which of the following authors has proposed the following: "The introduction of computers into classrooms will fall short of reformers' hopes just as radio and television disappointed earlier generations".

A. Conte

B. Cuban

C. Roszak

D. Riel

Question 8

In recent years, the Internet has benefited from a tremendous growth rate, an increase in availability, and overall easier access. However, in the same time, the Internet continues to suffer from a lack of...

A. information.
B. quality control.
C. flexibility.
D. educational resources.

Question 9

One successful way in which educators have successfully measured a students' progress using technology in the classroom is through the use of...

A. test scores
B. attendance rates
C. portfolio assessments
D. research studies

Question 10

The effective use of computer networking in many of the nation's classrooms has been limited due to insufficient...

A. access to the Internet.
B. teacher training
C. funding
D. support

Question 11

According to the National Center on Education Statistics, all but _____ of the nations schools will be online (networked/connected to the Internet) by the year 2000.

A. 1%
B. 5%
C. 10%
D. 15%

Question 12

Which of the following is not a component of President Clinton's Goals 2000 initiative?

A. every child will have access to a multimedia computer.

B. teachers will receive training.

C. increase the availability of high-quality content.

D. increase national funding of technology initiatives.

Question 13

Which of the following is not a government sponsored program that provides access, interactivity, and information to students, teachers, and parents?

A. ERIC

B. CASA

C. GLOBE

D. NASA

Question 14

The estimated cost to provide technology equity in schools is...

A. $25 -$50 per student

B. $30 per student.

C. $50 - $100 per student.

D. $100 - $150 per student.

Question 15

What percent of teacher's believe that Internet access in the classroom has helped students achieve better academic results?

A. 25%

B. 13.4%

C. 2%

D. 73.3%

Question 16

Today's educators are promoting the acquisition of higher-order skills using technology. Which of the following is not considered to be a higher-order skill expected of students today?

A. analyzing information
B. evaluating information
C. creating information
D. gathering information

Question 17

Analysts have speculated that much of the gain associated with the integration of computers into schools has resulted from _____.

A. the availability of new technology
B. the power of new technology
C. the flexibility of new technology
D. the novelty of new technology

Question 18

Teacher are faced with many obstacles that often prevent them from successfully integrating technology into their classrooms. Which of the following is not considered to be an obstacle to technology integration?

A. arranging the classroom to accommodate new technology
B. learning to use hardware
C. learning techniques to manage the transition to student-centered learning
D. acquiring additional knowledge about their subject area

Question 19

What percent of public schools require teachers to obtain training in advanced telecommunications.

A. 13%
B. 12%
C. 11%
D. 10%

Question 20

Advocates for a technology-driven overhaul of the current educational system point to all but one of the following as hindrances to the reform process.

A. technical problems

B. lack of support

C. inadequate training

D. insufficient time

Quiz

Collaborative Discussion 2

Article: Goals 2000: An analysis and Critique
Knudsen & Morrissette, 1998.

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

In what year did President Clinton sign into public law the Goals 2000: Educate America Act?

A. 1997
B. 1996
C. 1995
D. 1994

Question 2

Several themes were identified in the article as prevailing themes prompting historical reform efforts? Which of the following would not be considered one of these themes?

A. social equality
B. entitlement
C. social cohesion
D. excellence in education

Question 3

According to the authors of the article, the Goals 2000 Act is destined to fail because of...

A. a lack of interest.
B. a lack of effort.
C. social realities.
D. a lack of experience.

Question 4

The Goals 2000 Act was enacted in order to address...

A. falling SAT scores.
B. address real-world problems.
C. declining enrollment in schools.
D. a need for technology awareness in schools.

Question 5

There are ____ goals in the Goals 2000 Act

A. 10
B. 9
C. 7
D. 8

Question 6

Which of the following has not been instrumental in prompting American educational reform?

A. decreasing world market
B. accessible technology
C. advanced communication systems
D. improved travel

Question 7

When confronted by _____, the United States turns to educational reform.

A. social, economic and cultural challenges
B. cultural, political and economic challenges
C. social, political and economic challenges
D. social, political and cultural challenges

Question 8

According to the authors, educational success during the _____ has resulted in declining scores on the SAT.

A. 1940's and 1950's
B. 1950's and 1960's
C. 1960's and 1970's
D. 1970's and 1980's

Question 9

The SAT was designed to determine a students'...

A. I.Q.
B. a student's personal aptitude.
C. High School level proficiency.
D. success in college.

Question 10

By the year 2000 all children will start school ready to...

A. read.
B. write.
C. learn.
D. participate.

Question 11

By the year 2000 the high school graduation rate will increase to at least

A. 80%
B. 85%
C. 90%
D. 95%

Question 12

By the year 2000, all students will leave grades four, eight, and twelve...

A. having demonstrated competency over challenging subject matter.
B. whether they have passed all courses or not.
C. smarter than they were when they entered.
D. with improved athletic and social skills.

Question 13

By the year 2000, the Nation's teaching force will have access to...

A. a wide range of teaching materials.
B. the Internet.
C. programs for the continued improvement of their professional skills.
D. educational resources not previously available.

Question 14

By the year 2000, U.S. students will be first in the world in...

A. athletics.
B. the total number of students who graduate college.
C. test scores.
D. mathematics and science achievement.

Question 15

By the year 2000, every adult American will be...

A. literate.
B. aware of the Internet.
C. equal to an adult European.
D. knowledgeable in the area of mathematics and science.

Question 16

By the year 2000, every school in the United States will...

A. be connected to the Internet.
B. have a student-teacher ration of 1:15.
C. be free of drugs, violence, and the unauthorized presence of firearms and alcohol.
D. meet state and local building codes.

Question 17

By the year 2000, every school will promote partnership that will increase...

A. the availability of new technology.
B. the number of students promoted to the next grade level.
C. parental involvement and participation.
D. student test scores.

Question 18

According to the authors, _____ are/is responsible for crises in American education.

A. a changing global marketplace
B. failed educational programs
C. changing society
D. failure of the educational system

Question 19

Which county has a national curriculum in which 89.9% of exams are generated by the authors of textbooks that are utilized in the classroom?

A. United States
B. Japan
C. Germany
D. Australia

Question 20

Grant-driven federal funds to state and local school districts were incorporated into the Goals 2000 Act in order to incorporate all but one of the following:

A. rigorous academic standards
B. alignment of curriculum, textbooks, and teacher education
C. clear student incentives to meet high standards of academic performance
D. teacher training

Quiz
Guided Instruction 1
ClarisWorks Newsletter (WP)

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

To "nudge" an object created in the draw program use the _____.

A. function keys
B. plus/minus keys
C. arrow keys
D. space bar

Question 2

The ClarisWorks program that provides a "grid" in the background by default to assist in aligning objects is called...

A. Draw
B. Word Processing
C. Database
D. Paint

Question 3

Which of the following tools is not available in the draw program?

A. 
B. 
C. 
D. 

Question 4

Which of the following is the correct menu bar for word processing?

A. File Edit Format Arrange Options View

B. File Edit Format Font Size Style Outline View

C. File Edit Format Transform Options Window

D. File Edit Format Calculate Options Window

Question 5

Which of the following tools is the best tool to use when selecting an irregularly shaped image to move while working in the Paint program?

A. 

B. 

C. 

D. 

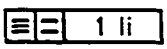
Question 6

Which of the following is the "alignment control?"

A. 

B. 

C. 

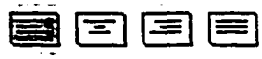
D. 

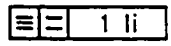
Question 7

Which of the following tools is used to apply columns in a word processing document?

A. 

B. 

C. 

D. 

Question 8

Which command would you use to insert a header (masthead) at the top of a document?

A. File...Insert Header

B. Format...Insert Header

C. Style...Insert Header

D. Edit...Insert Header

Question 9

In which of the following menus would you find the Show Tools/Hide Tools command (ClarisWorks 4.0)?

A. View

B. File

C. Edit

D. Format

Question 10

What key would you use in combination with the mouse get straight lines, perfect squares, and perfect circles?

A. Space

B. Enter

C. Shift

D. Option

Question 11

Graphics which have been inserted into a document with the pointer (graphic selection) tool will have _____ when selected.

A. handles

B. color

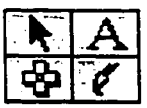
C. disappeared

D. a dotted outline

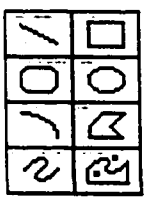
Question 12

Which one of the following contains the "transparency/opaque" tool?

A. 

B. 

C. 

D. 

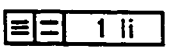
Question 13

Which of the following tools would you use to "zoom in" or "zoom out" your view of your document?

A. 

B. 

C. 

D. 

Question 14

Which one of the following is a "tear-away" palette that can be relocated on your screen?

A. 

B. 

C. 

D. 

Question 15

To locate the built-in ClarisWorks library graphics you would look in the _____ menu.

A. Edit

B. Format

C. File

D. View

Question 16

Which one of the following is not a part of the tool panel?

A. justify commands

B. application tools

C. draw tools

D. fill palettes

Question 17

Which one of the following tools is the selected "default" tool when opening a new paint or draw document?

A. 

B. 

C. 

D. 

Question 18

One of the following tools in the Draw program does not require dragging the mouse with the mouse button down. Which one is it?

A. rectangle
B. polygon
C. circle
D. lasso

Question 19

Which command would you use to "immediately" correct a mistake in ClarisWorks?

A. File...Save
B. Edit...Undo
C. File...Undo
D. File...Quit

Question 20

The Paint program creates images comprised of _____,

A. lines
B. squares
C. pixels
D. circles

Quiz
Guided Instruction 2
ClarisWorks Slide Show (DR)

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

The feature in ClarisWorks you would turn on to allow for the creation of a common background for all slides is called...

A. Background
B. Master Background
C. Master Page
D. Page View

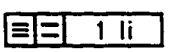
Question 2

Which of the following programs in ClarisWorks can not be used to create a Slide Show?

A. Word Processing
B. Draw
C. Paint
D. Telecommunications

Question 3

If you want to change the viewable size of a document (make it larger or smaller), which of the following tools would you use?

A. 
B. 
C. 
D. 

Question 4

Which of the following is the correct (default) menu bar for the draw program?

A. File Edit Format Arrange Options View

B. File Edit Format Font Size Style Outline View

C. File Edit Format Transform Options Window

D. File Edit Format Calculate Options Window

Question 5

Which of the following tools is used to move and resize graphics in a draw program?

A. 

B. 

C. 

D. 

Question 6

The **Slide Show...** control is located in which of the following menus (ClarisWorks 4.0)?

A. View

B. Style

C. Outline

D. Options

Question 7

Which of the following tools would you use to create a text field?

A. 

B. 

C. 

D. 

Question 8

Which of the following menu commands would you use to make the margins of a document visible?

A. File...Page View

B. View...Page View

C. Edit...Page View

D. Style...Page View

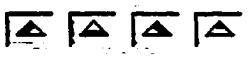
Question 9

Which of the following icons, when selected, changes the document view to landscape view?

A. 

B. 

C. 

D. 

Question 10

Which of the following menu commands would you use to set the number of slides in your slide show?

A. Option...Number of Slides

B. File...Document

C. File...Format

D. Format...Document

Question 11

A graphic which has been placed in a draw document using the pointer (graphic selection) tool will have _____ when selected.

A. handles

B. color

C. disappeared

D. a dotted outline

Question 12

ClarisWorks can insert different types of graphics. If the graphics are not originally in this format, ClarisWorks will convert them to the _____ format before inserting them.

A. jpeg

B. pict

C. eps

D. tiff

Question 13

In **Portrait View**, your document prints (and is viewable on your screen) in which of the following formats:

A. 8.5 x 11

B. 8.5 x 14

C. 11 x 8.5

D. 14 x 8.5

Question 14

Which of the following menu commands is used to import a picture (or other document) into your slide show?

A. File...Import
B. File...Insert
C. File...Install
D. Option...Insert Graphic

Question 15

Of the following font sizes, which one is the least effective when used in a slide show presentation?

A. 24pt
B. 36pt
C. 12pt
D. 48pt

Question 16

Which key on your keyboard would you use to end/quit a slide show presentation?

A. d
B. g
C. s
D. q

Question 17

In which of the following menus is the **Edit Master Page** command located?

A. View
B. Options
C. File
D. Format

Question 18

The correct way to move an object such as a graphic or text field is to click...

A. in the middle of the object and drag.
B. on its handle and drag.
C. twice on it and drag.
D. on it with the text tool and drag.

Question 19

When you click and drag the handle(s) of a text field, the text in the field will...

A. automatically resize.
B. not change.
C. automatically wrap to the size of the field.
D. be deleted.

Question 20

The Master Page feature is found only in the _____ program.

A. draw
B. word processing
C. paint
D. spreadsheet

Quiz
Lecture 1
Computer-based Technology in the Classroom

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

Most Clark County School District classrooms do not have access to one of the following classroom technologies:

A. Distributed Learning
B. VCR
C. Overhead
D. Computers

Question 2

Which of the following is considered an integral component of school restructure today?

A. new teachers
B. new technology
C. new administrators
D. new schools

Question 3

Technology is affecting the way students...

A. study
B. play
C. do homework
D. learn

Question 4

The interactive nature of computers is helping students to develop their...

A. gaming skills.
B. word processing skills.
C. knowledge, problem solving and data analysis skills.
D. communication skills.

Question 5

Current research supports that teachers who teach with technology...

A. expect more from their students.
B. are not concerned with the quality of their students' work.
C. find it difficult to meet the needs of individual students.
D. are less willing to experiment

Question 6

Researchers have shown that the most successful teachers are teachers who use technology in the classroom...

A. effectively
B. often
C. successfully
D. when needed

Question 7

It has been demonstrated that there are differences among children as they approach a learning task in a computer lab. Which of the following is not true.

A. Students who prefer challenging work perform better.
B. Students who seek teacher approval perform better.
C. Students who achieve more perform better.
D. Students who are motivated by curiosity perform better.

Question 8

Which of the following is not a classroom technology resource?

A. Operating System
B. Internet
C. email
D. CD-ROM

Question 9

One-computer classrooms are most successful when the _____ is comfortable with using the computer as a tool.

A. administration
B. student
C. technology coordinator
D. teacher

Question 10

Which of the following least represents the effective use of technology in the classroom?

A. games
B. provide access to information
C. develop knowledge and skills
D. link to other locations

Question 11

According to the lecture, which of the following is not an identified source of funding for technology in the classroom?

A. Federal Government
B. Textbook publishers
C. State Government
D. Local (City) Government

Question 12

Recent research into school reform and technology suggests that...

A. teachers would rather dispense knowledge than coach students.
B. teachers are more resistant to learning with technology.
C. teachers tend not to share ideas regarding curriculum with each other.
D. technology often stimulates teachers to present more.

Question 13

Which of the following best represents the goals of technology integrators?

A. to develop keyboarding skills
B. to develop discovery skills
C. to develop gaming skills
D. to develop word processing skills

Question 14

Which of the following is not a benefit of technology in the classroom?

A. increased access to information
B. interdisciplinary study
C. reduced class sizes
D. project-based learning

Question 15

Which of the following is the most predominant technology course taught in CCSD High Schools?

A. occupational education
B. computer awareness
C. graphics production
D. industrial technology

QUIZ

Lecture 2

The Internet in the Classroom

Instructions: Carefully read each question and circle the correct answer for each question to the best of your ability.

Circle the Correct Answer

Question 1

Which of the following statements best describes the Internet?

A. The Internet is comprised up of computer kiosks which distribute information over telephone lines.
B. The Internet is made up of thousands of computers.
C. The Internet is a global network of computer networks.
D. The Internet is a collection of servers.

Question 2

The communication protocol used to transfer information over the Internet is called...

A. AppleShare protocol
B. Ethernet protocol
C. Internet protocol
D. TCP/IP protocol

Question 3

The World Wide Web was originally developed in this country.

A. Germany
B. Switzerland
C. Italy
D. America

Question 4

Before we had the Internet, we had...

A. ARPANET
B. the Internet 2
C. the Information Superhighway
D. the World Wide Web

Question 5

Commercial access to the Internet was not seen until the early...

A. 1990's
B. 1980's
C. 1970's
D. 1960's

Question 6

The first Web Browser developed by Marc Andreeson at M.I.T. was called...

A. Mosaic
B. Netscape
C. Internet Explorer
D. AOL

Question 7

Which of the following is a Web Browser?

A. Yahoo!
B. Internet Explorer
C. WebCrawler
D. InfoSeek

Question 8

In Netscape, if you want to mark a web page so that you can visit it again, you would add it to your _____.

A. Browser
B. Desktop
C. Bookmarks
D. Operating System

Question 9

Which of the following is the correct web address for the WhiteHouse in Washington D.C.?

A. www.whitehouse.com
B. www.whitehouse.edu
C. www.whitehouse.org
D. www.whitehouse.gov

Question 10

Which of the following technologies is not required to access information on the Internet?

A. Computer
B. Modem
C. Browser
D. Telephone

Question 11

Search Engines on the Internet are actually very complex...

A. Multimedia documents
B. Spreadsheets
C. Databases
D. Web pages

Question 12

One way to navigate the Internet is by clicking on...

A. HyperCard links
B. Hypertext links
C. HyperStudio links
D. Hyperactive links

Question 13

The Internet today is comprised different networks. Which of the following is not a network on today's Internet?

A. AppleTalk
B. email
C. Newsgroups
D. WWW

Question 14

Which of the following networks allows a user to attach a document and send it to another user?

A. Newsgroups
B. email
C. WWW
D. AppleTalk

Question 15

Which of the following best represents the total number of hosts on the Internet today?

A. 10,000,000
B. 20,000,000
C. 40,000,000
D. 30,000,000

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