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A Comparative Study of Hybrid and Internet-Based Educational Technology Course Modules

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A COMPARATIVE STUDY OF HYBRID AND INTERNET-BASED EDUCATIONAL
TECHNOLOGY COURSE MODULES

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TECHNOLOGY COURSE MODULES

A dissertation submitted in partial fulfillment
of the requirement for the degree of
Doctor of Philosophy

By

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ABSTRACT

The purpose of this study was to examine students' attitudes and performance toward the teaching methods in an educational technology course. Undergraduate students enrolled in the Educational Technology course ETEC 2002L at the University of Arkansas had been exposed to both on-line modules and in-class instruction. The sample size for this study was 155. The results included 110 valid surveys completed by the students on paper.

The data collected from the survey were analyzed using percentages, means, and *t* test of paired samples to find if there was a significant difference in students' attitudes toward on-line versus hybrid instruction. Four two-way ANOVAs were performed to test whether there was a significant difference between students' attitude toward the on-line vs. hybrid teaching methods. The independent variables in this study were students' age, gender, computer experience, and prior experience with on-line courses. An independent sample *t* test was completed to investigate if there was a significant relationship between the students' performance and the teaching method. A Pearson Correlation Coefficient test was made to test whether there was a significant relationship between students' performance and their attitude toward on-line versus hybrid instruction.

Findings indicated that students agreed that participating in the on-line as well as the in-class lectures positively impacted their attitude toward the instructional technology. However, the results indicated that there was no difference in the students'

attitudes toward either hybrid or on-line teaching methods. The ANOVA results showed that age, gender, computer experience, and prior experience with on line courses were not significant factors in defining an attitude toward either hybrid or on-line method.

When comparing students' performance, the only difference between the two teaching methods was found in one assignment out of the four assignments that students submitted. When looking for a relationship between students' performance and their attitude toward any of the teaching methods, results showed that there was a significant correlation between the students' performance and their attitude in the on-line method in one out of the four lessons given to the students.

In general, this study outlines the importance of studying the various factors that affect students' attitude and their performance in educational technology courses. Recommendations to enhance the students' performance and perception toward educational technology courses were given after the conclusions are presented.

To the soul of my brother, Ahmed.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
CHAPTER ONE: INTRODUCTION	1
Statement of the Problem	4
Purpose of the Study.....	5
The Research Hypotheses.....	6
Research Questions.....	6
Significance of the Study.....	7
Limitations of the Study	8
Definition of Terms	8
CHAPTER TWO: REVIEW OF RELATED LITERATURE	11
On-line Learning.....	13
<i>Teacher Challenges:</i>	18
<i>Student Challenges:</i>	18
Technology Tools	19
<i>Course Homepage:</i>	20
<i>Electronic Mail:</i>	20
On-line Versus Hybrid Instruction	21
Advantages and Disadvantages of On-line Learning	25
Advantages and Disadvantages of Hybrid Learning	26
Hybrid and On-line Methods and Teaching Educational Technology	27
CHAPTER THREE: METHODOLOGY	29
<i>Research Questions</i>	29
<i>Research Type and Design</i>	30
<i>Participants</i>	30
<i>Course Content</i>	30
<i>The Hybrid Method</i>	32
<i>The On-line Method</i>	33
<i>On-line verses Hybrid teaching methods (The Intervention Experiment)</i>	33
<i>Data Collecting Procedures</i>	36
<i>Instrumentation</i>	36
<i>The Validity and Reliability of the Instrument</i>	37
<i>Procedures of Quantitative Analysis</i>	37
<i>Data Analysis</i>	38
<i>Statistical Analysis</i>	39
<i>The Attitude Subscales</i>	40
CHAPTER FOUR: RESULTS	41
Part One: Analyzing the Data Collected from the Survey.....	42

<i>Reliability Analysis</i>	42
<i>Demographic Analysis of the Participants</i>	43
Attitude Toward On-line and Hybrid Instruction	45
<i>On-line Method</i>	45
<i>Hybrid Method</i>	51
<i>ANOVA for Age</i>	57
<i>ANOVA for Gender</i>	58
<i>ANOVA for Computer Experience</i>	59
<i>ANOVA for Prior Experience with On-line Courses</i>	61
Part Two: Analyzing Students Performance	62
Qualitative Review	66
CHAPTER FIVE: DISCUSSIONS AND CONCLUSIONS, AND	
RECOMMENDATIONS	68
<i>Overview</i>	68
<i>Findings</i>	72
<i>Research question one</i>	72
<i>Research question two</i>	73
<i>Research question three</i>	74
<i>Research question four</i>	76
<i>Research question five</i>	77
<i>Research question six</i>	78
Discussions and Conclusions.....	80
Recommendations	82
REFERENCES	84
APPENDICES	90
Appendix A: Attitudes Toward On-line vs. Hybrid Lectures	91
Appendix B: IRB Approval.....	94
Appendix C: Instructional Unit for Creating Database Using MS Access.....	96
Appendix D: Instructional Unit for Creating Mail Merge.....	107
Appendix E: Instructional Unit for Creating Grade Book Using MS Excel	120
Appendix F: Assignments Rubrics	132

LIST OF TABLES

Table 3.1:	Sections, Units, and Design of the Study	35
Table 3.2:	The Attitude Survey Statements.....	40
Table 4.1:	Results of Reliability Analysis	42
Table 4.2:	Demographic Characteristics for On-line Class, Age, Gender and, Years of Computer Experience of University of Arkansas Students Enrolled in the Educational Technology Course (ETEC2002L). (From self-reported data)	44
Table 4.3:	Demographic Characteristics for Interactive Media Usage of the University of Arkansas Students Enrolled in the Educational Technology Course (ETEC2002L). (From self-reported data).....	45
Table 4.4:	The Frequency Percentage, Mean, Standard Deviation and Total Number of the On-line Statements in the Survey	46
Table 4.5:	The Frequency Percentage, Mean, Standard Deviation and Total Number of the Hybrid Statements in the Survey	51
Table 4.6:	Types of Interactive Media and their Frequency and Percentage.	56
Table 4.7:	Results of the Paired Sample <i>t</i> Test, On-line vs. Hybrid.....	57
Table 4.8:	Descriptive Statistics for the On-line and Hybrid Scales	57
Table 4.9:	Descriptive Statistics for Attitude by Age and Teaching Method.....	58
Table 4.10:	Analysis of Variance for Attitude by Age and Teaching Method.....	58
Table 4.11:	Descriptive Statistics for Attitude by Gender and Teaching Method	59
Table 4.12:	Analysis of Variance for Attitude by Gender and Teaching Method.....	59
Table 4.13:	Descriptive Statistics for Attitude by Computer Experience and Teaching Method.....	60
Table 4.14:	Analysis of Variance for Attitude by Computer Experience and Teaching Method.....	60
Table 4.15:	Descriptive Statistics for the Prior Experience with On-line Courses	61

Table 4.16: Analysis of Variance for Prior Experience with On-line Courses	61
Table 4.17: Mean Levels for Assignments Under the On-line and Hybrid Groups. (Each Assignment Worth 10 Points).....	62
Table 4.18: The Results of <i>t</i> Test for each Lesson in the Two Teaching Methods	63
Table 4.19: Pearson Correlation Factor Between Assignment Performance and Attitude Toward the Teaching Approach	64

CHAPTER ONE

Introduction

Education has taken a tremendous turn in the 21st century. Traditionally, teaching and learning take place when the teacher and the students are in the same place at the same time; this allows the communication process to occur. Today, education is not limited by time and space. Rapid developments in the technologies used for education such as the internet, telephone, and televised conferences have expanded the options available for both learners and the instructors. Furthermore, new technologies produce courses that use a variety of media to be delivered to students in different locations in order to serve the educational needs of growing populations (McIsacc & Gunawardena, 1996; Osguthorpe & Graham, 2003; Beard, Harper, & Riley, 2004).

However, studies have shown that new and veteran educators who do not have the skills required to use these new technologies in their teaching and learning process still prefer to instruct their students the old fashioned way (Cavanaugh, Cavanaugh, & Boulware, 2001). If those instructors are forced to use the new technologies in their instruction, many times they will lean toward a minimum usage or will depend on recommendations from other technology experienced faculty members (Reid, 2005).

Nonetheless, teaching without the personal presence of the teacher in the classroom to instruct the students is becoming the miracle of 21st century education (Beard, Harper, & Riley, 2004). The innovative use of technology has begun to eliminate the distinctions between face-to-face and recent distance learning environments (Osguthorpe & Graham, 2003).

Due to the increasing percentage of university students and working adults who have prior knowledge of computers and the internet, new opportunities for learning experiences must be created to better meet their needs, interests, and work schedules (Cooper, 1999).

It has been assumed that the teaching-learning transaction between a teacher and a student requires a shared physical space where the learner and the teacher interact with one another. The common presumption, traditionally, has been that learning requires face-to-face interaction. This instructional method, however, has been criticized because it allegedly encourages passive learning, ignores individual differences and needs of the learner, and does not pay sufficient attention to problem solving, critical thinking, or higher-order thinking skills (Johnson, Aragon, Shaik, & Palma-Rivas, 2000).

A transformation in teaching methods and how students learn has taken place in the last three decades as a result of recent industrial, scientific, and information management changes. In the past, the use of technology in education had been considered to be purely facilitative. This situation has changed in today's educational environment. Educators now look to the use of computer-based technology as a necessary component for enhancing and improving education.

One of the revolutions that technology has contributed to education is the construction of "Distance Education" as a structured learning and teaching environment. In this form of education, students and teachers are separated in time and space. Distance Education is becoming more popular due to the fast-paced lives that students are living. In attempting to serve educational needs, developing technologies are allowing more

universities to deliver more courses to students in various locations using a variety of media (McIssac & Guanawarden, 1996).

Various forms of delivery associated with distance education use the internet as the major delivery system. Distance education delivery contexts range from Web-supported or Web-enhanced instruction, known as the *hybrid mode*, to the administration of completely distant learning courses, known as *on-line mode* (Dabbagh, 2001).

The availability of the internet as well as state-of-the-art technologies have shifted the learning and teaching paradigms from institution-centered teaching and learning to “anybody, anytime, anywhere” teaching and learning (Clark, 2003). This shift toward learner-centered instruction has enabled educational institutions to reach out to non-traditional students who are unable to pursue basic or advanced education due to distance and time restrictions. Research has shown that most on-line learning students are professional adults who are seeking better opportunities to improve their skills in a changing workplace environment (Cooper, 1999; Ivers, Lee, & Carter-Wells, 2005; Mahone-Brown, 1998).

On the other hand, the hybrid mode has been reported to have more advantages over the completely on-line or face-to-face teaching. In most of the hybrid courses, instructors reported that this method allows them to accomplish the course learning objectives more sufficiently than traditional and complete on-line courses do. It was also noted that this method increases the interaction and contact among students and between the students and their instructors. As for the students, they feel that they are getting a better education since they are using technology in their learning process and at the same

time they can maintain the face-to-face interaction with the instructor to ask questions and get feedback any time they want (Garnham & Kaleta, 2002).

In general, tremendous improvements in the teaching and learning methods have lead to more positive attitudes in the past three decades. However, a specific measure for these improvements should be sought to evaluate these methods and their deliverables.

Statement of the Problem

The existence of the internet has created a new system for curriculum delivery that enables students to access course materials at their own convenience. This new system has eliminated distance and time barriers from the teaching and learning process. The delivery of any on-line course is likely to be structured in one of two formats; the synchronous format, where students are required to follow a pre-determined time schedule to participate in the course in real-time, and the asynchronous format, where students can participate in the course at anytime anywhere but not in real-time (Lesh, Guffey, & Rampp, 2000).

Although on-line learning is gradually being introduced to several types of undergraduate and graduate courses, there are few research studies that investigate the use and the effectiveness of on-line learning in teaching educational technology courses for pre-service teachers. This course is traditionally taught in a face-to-face environment.

The challenge that teacher educators face while preparing for the 21st century is how to engage the latest technologies with pedagogy. This problem appears clearly, especially in educational technology programs. The educators of these courses are expected to embrace the available and new technologies such as on-line teaching into their course structure. The National Council for Accreditation of Teacher Education

(NCATE) requires that new technologies are to be implemented in teachers' education (Lan, 1999). Therefore, a new technology such as on-line teaching should be implemented into important courses such as educational technology. Nevertheless, any new technology should be examined before it can be generalized. The current study was designed to investigate the on-line teaching for the educational technology course. More information about the accreditation of teachers in education can be found at: www.ncate.org.

Purpose of the Study

Despite the format of an on-line course, instructions have to be delivered through modules that can be identified as a unit of instruction in which a single topic or a small section of a broad topic is studied in a given period of time. The purpose of this study is to compare on-line course modules with equivalent instruction taught in a hybrid (face-to-face and on-line) format. Comparison includes student ratings for: (a) performance confidence, (b) attitude toward each teaching approach, and (c) if prior experience with on-line courses has an effect on students' attitude toward both methods.

In this study, University of Arkansas undergraduate students enrolled in the Educational Technology 2002 Lab (ETEC 2002L) was the sample used for this research. The ETEC 2002L course had 10 sections with about 200 students, 20 in each section. The students of eight sections participated in this research.

The main objective of the study was to incorporate and determine the effectiveness of two different internet-based instructional modules. The study's goal was to bring a "new paradigm" for the practice of Teacher Education Programs which make

instruction more relevant, more responsive, and more meaningful in teaching educational technology courses on-line.

The Research Hypotheses

1. Students have a positive attitude in favor of hybrid class settings.
2. Student age is a significant factor in determining attitudes concerning on-line versus hybrid teaching approaches.
3. Student gender is not a significant factor in determining attitudes toward the on-line versus hybrid teaching approach.
4. Student experience with computers and internet usage is a significant factor in determining attitudes toward the on-line versus hybrid teaching.
5. Students' performance in class assignments is better in the hybrid when compared to on-line teaching approach.

Research Questions

1. Do students experience a change in attitude toward instructional technology as a result of participating in the course?
2. Do student attitudes differ for on-line versus hybrid instruction?
3. How do the variables of student age, gender, and prior computer experience relate to students' attitudes toward on-line versus hybrid instruction?
4. Is there a significant difference between students' experience with on-line courses and their attitudes toward on-line versus hybrid instruction?
5. Is there a significant difference in student performance in the online versus hybrid instruction?

6. Is there a significant relationship between student performance and their attitude toward the on-line versus hybrid instruction?

Significance of the Study

Recently, colleges and universities have been pressuring faculty to teach courses on-line. Many faculty members have never taught on-line, and therefore wonder what does teaching on-line look like? How does it differ from face-to-face? Could on-line tools be incorporated into a face-to-face course?

The premise of this study was to compare on-line versus hybrid teaching approaches as formats of on-line instruction. This comparison will help identify students' attitudes toward learning educational technology applications in two on-line formats. Understanding students' attitudes toward learning computer instructional applications on-line will help academic educators, curriculum developers, instructional designers, distance education coordinators, program planners, and software developers to create a better environment and instructions for courses that involve on-line instruction.

Also, by understanding students' attitudes, faculty and institutions in general can address the weaknesses of teaching educational technology courses in the two on-line formats. This will enable program developers to improve the efficiency and quality of educational technology courses offered on-line or in hybrid settings. This understanding will also enable instructors in educational institutions to better reach students and increase the effectiveness of educational technology on-line courses.

In addition, this study will help faculty and institutions discover how gender, age, and previous computer and internet experience relate to on-line and hybrid instruction. The revelation of the effect of each of these factors on the students' attitudes toward

learning educational technology on-line will help educators, curriculum developers, and administrators to consider these factors when planning to implement on-line learning in designing on-line educational technology course curriculum.

Limitations of the Study

This study had the following limitations:

1. The students enrolled were only from the ETEC 2002L course which limits the generalization of the results.
2. Because there is more than one instructor teaching the ETEC 2002L course, there might be some differences in the teaching styles.
3. The students may not have wanted to participate in the survey when requested to do so which might have effected the final attitude results.
4. Bias may be encountered (favorable or unfavorable) in how much the students like the instructor, and by the perception of risk that the answers may affect one's grade.
5. Because this research involved only students in one college at the University of Arkansas, results may not generalize to other institutions.

Definition of Terms

The following terms are defined as they were used through out the study.

Asynchronous - a type of two-way communication that occurs with a time delay, allowing participants to respond at their own convenience. In other words, it is a two-way communication format that takes place but not at the same time. An example of an

application of asynchronous communication is an electronic bulletin board found at www.tamu.edu/ode/glossary.html.

Attitude - Attitude is a system that is composed of four elements: affective responses, cognitions, behavioral intentions, and behaviors. Those elements vary in:

- ◆ Direction – positive or negative.
- ◆ Degree amount – positive or negative feeling.
- ◆ Intensity- the level of commitment the individual has toward the position.

Attitudes are not directly observable, however, the actions and the behaviors that result from the attitude is what may be observed and measured. Attitudes are learned or established tendencies to respond. (Miller, 2005).

ETEC 2002L- Educational Technology 2002 Lab. It is a criterion-based course designed to provide teachers and beginning technology users with conceptual knowledge and skills in the area of fundamental computer technology and traditional educational media. It also provides hands-on experience with the use of technologies for educational purposes. This course involves a lecture class (ETEC 2001), and a lab (ETEC 2002L). The lab portion of this course was used in this study.

Face-to-face learning- it can also be referred to as classroom or traditional learning. It is the learning process that takes place when the teacher, the students, and the teaching materials exist in the same place at the same time.

Hardware- the mechanical devices that comprise a computer system, such as the central processing unit, monitor, keyboard, and mouse, as well as other equipment such as printers and speakers.

ISTE- International Society for Technology in Education. The mission of ISTE is “to provide leadership and service to improve teaching and learning by advancing the effective use of technology in education” (www.iste.org).

Modules- a unit of education or instruction with a relatively low student-to-teacher ratio, in which a single topic or a small section of a broad topic is studied for a given period of time (www.answers.com).

NCATE: The National Council for Accreditation of Teacher Education (NCATE) is recognized by the U. S. and state Departments of Education as the accrediting body for colleges and universities that prepare teachers and other professional personnel for work in elementary and secondary schools. Through its voluntary, peer review process, NCATE ensures that accredited institutions produce competent, caring, and qualified teachers and other professional school personnel who can help all students learn (www.ncate.org).

On-line learning- A learning experience or environment that uses the internet and the WWW as the primary delivery mode of communication and presentation (<http://www.intelera.com/glossary.htm>).

Software- a computer program which provides the instructions that enable computer hardware to work. There are two kinds of software; system software that operates the machine itself (i.e., Windows) and application software that requires and provides specific functionality (i.e., MS word, spreadsheet).

Synchronous - A type of two-way communication that occurs with virtually no time delay, allowing participants to respond in real time (www.trainingfinder.org/CDC_lingo.htm, 2005).

CHAPTER TWO

Review of Related Literature

The internet is the latest trend that is reshaping higher education. Since it launched, the flexibility, interactivity, effectiveness, convenience, and potential cost have impacted the quality of instruction (Chang, 2003). It is difficult to find a technical innovation that can impact education more than the internet because its ability to distribute and retrieve information rapidly, at a minimum cost, anywhere, and any place (Kuchnike, Aragon, & Bartlett, 2001).

While it offers a new learning environment that is gaining popularity in education, internet based courses, in some subjects, have no significant difference on students' achievement, performance, and test scores. Prior research comparing on-line and face-to-face courses have consistently found students who learned in an on-line environment achieved comparably to students learning in a traditional classroom and there was no significant difference found in the performance of the two groups. This evaluation has been based on comparison of final grades for students who took on-line courses compared with grades of students who participated in classroom based courses. This argument is in accordance with Baker (2003), Clark (2003), Gagne and Shepherd (2001), Gunnarsson (2001), and Webster and Hackley, (1997).

Nevertheless, Schulman and Sims (1999), in a comparative study proposed that the learning of on-line students is equal to the learning of in-class students. The results of their study, however, indicated that students who self-selected to enroll in on-line courses have higher scores than in-class students.

On the other hand, Ewing-Taylor (1999) argued that web-enhanced course delivery (hybrid) has a positive impact on students' attitudes over totally on-line courses. In these courses the instructor supplements his/her course with web-based technology by offering the syllabi, course materials, and assignments on the web. The students believe that they had adequate support because they had face-to-face contact with the instructor every week. Hybrid courses and hybrid degree programs promise the best of both, on-line and face-to-face. It offers some of the convenience of on-line courses without the complete loss of face-to-face contact (Young, 2002). This enhanced students' self-confidence toward implementing technology into their learning process. However, researchers have found that interaction among students does not increase their learning achievement in the hybrid setting but it does increase their satisfaction toward on-line learning (Ivers, Lee, & Cater-Wells, 2005). This finding, in turn, has a positive impact on students' self-motivation to take on-line courses in the future. On the other hand, other studies showed somewhat opposite results. Wegner, Holloway, and Garton (1999) conducted a comparative study to investigate the satisfaction attitude toward on-line courses. The research found that there was no significant difference in test scores and satisfaction between students who received their instruction from face-to-face mode and those who received internet-based instructions and test.

In general, researchers have identified several variables that can affect students' attitudes toward on-line instruction. These variables include prior experience with computers, prior experience with on-line courses, peer interaction, student/teacher interaction, and technical and institutional support (Ivers, Lee, & Carter-Wells, 2005). In addition to these variables, other researchers claimed that there are constant factors that

determine the students' attitudes toward on-line learning particularly. These factors might positively or negatively influence students' attitudes toward on-line courses. These factors are categorized into four groups. First, technological factors with regard to the stability, compatibility, cost of the technology, and computer literacy. Second, environmental factors, those include the change and the transmission of information such as flexibility, communication, information, and social issues. Third, institutional factors, such as copyright issues, accreditation, and privacy. Fourth, personal factors, which are the issues related to on-line students such as academic dishonesty and student control (Tsai, 2001).

On-line Learning

On-line learning is considered to be a modern type of distance education that is delivered by using computers, internet, and multimedia. It includes several disciplines such as collaboration, traditional learning, and content management as well as the ability to use several instructional strategies, different instructional events, individualized and private learning, accessibility, and promote consistency (Lesh, Guffy, & Rampp, 2000).

The rapped development and incorporation of technology in the delivery of instruction has been explosive in the past ten years. Opportunities to receive coursework via the internet exist now in most universities while the opportunity in pursuing an entire degree program on-line is becoming a reality at more institutions around the nation (Wegner, Holloway, & Garton, 1999).

The increasing role of the internet in the world has opened more opportunities and raised several issues for universities. The internet is becoming the most popular medium. It provides user friendly, easy access to text, graphics, audio, and video materials (Hazari

& Schno, 1999). The main questions to be asked relating to internet use in higher education are: (1) how can a university student or teacher prepare for on-line instruction? (2) how can universities use on-line capabilities to improve the quality of learning outcomes?

Recently, there has been an increasing need for universities to use the internet as part of the transformation to a flexible form of teaching and learning. On-line learning in universities is being seen as an “area of growth” for two reasons. First, it provides a way to achieve higher economics than face-to-face instructional methods. Second, it provides more access to regular as well as non-traditional students (Sweeny & Ingram, 2001; Waters & Gasson, 2005). Moreover, on-line courses help students engage in the active application of knowledge, principles and values, and provide them with feedback that allows their understanding to grow and evolve (Chickering & Ehrmann, 1996).

Chang (1999) identified web learning environments as “a powerful teaching and learning arena where new practices and new relationships can make significant contributions to learning” (p. 1). Much of the research that was conducted about on-line learning and teaching has focused on the internet as an existing form of technology that can support learning rather than focusing on whether or not it enhances the actual learning process and the academic outcomes (Sweeny & Ingram, 2001).

Gunnarsson (2001) conducted a study trying to understand students’ attitudes and achievement in on-line courses. The results showed that students enjoyed working in an on-line environment. They reported that they loved the flexibility, they needed to keep pace with their career while pursuing a degree and, they did not feel isolated. In the study, while the students reported procrastinating and cramming for the examination,

they found that they had learned as much as in a face-to-face environment, if not more, because the structure of the course forced them to study in order to avoid failing.

The convenience and flexibility of using the World Wide Web have increased the demand for its application and attracted many students who are unable to attend on-campus courses due to work commitments, busy lifestyles, or distance (Mahone-Brown, 1998). This mode of education is becoming more popular because it is helping to accommodate the needs and responsibilities of non-traditional students who are over the age of twenty five, or adult professionals who are seeking advanced training or a degree, or students who are unable to attend on-campus courses (Chin, Chang, & Bauer, 2000; Cooper, 1999; Green, 2000; Hiltz, 1997; Ivers, Lee, & Cater-Wells, 2005; Lesh, Guffey, & Rampp, 2000; Regan, Lacey, & Nagy, 2002).

Experiencing a huge demand for college courses to be taught over the web, many universities are pressuring faculty to teach courses on-line. According to Mortera-Gutierrez & Beatty (2000) as recently as 1993, 100 colleges and universities had offered internet-based courses. Currently, two-thirds of the 3,200 accredited four-year colleges and graduate schools in the United States offer on-line courses. At Texas A&M University, the number of courses offered at a distant had increased from 2 courses in 1990 to more than 180 courses in 1998.

With the growing number of on-line courses, the increasing accessibility of computers and computer users, students of all ages are taking advantage of distance learning or are using computers to enhance their face-to-face classroom experience (Arbaugh, 2000) which means that computers are no longer confined to computer science

classrooms, they are available to all students, on different levels regardless the major that they are studying.

Professors are infusing on-line learning into their classroom teaching as a way for students to conduct teamwork and continue discussion outside the classroom. In addition, it is widely assumed that on-line learning has a positive impact on student higher order thinking and learning (Quitadamo & Brown, 2001).

The ideal on-line course in general, should possess several characteristics: (a) provide a means of assessing, generating and sharing information, (b) support students' articulation of knowledge, (c) allow students' reflection on what they have learned, (d) represent and simulate real-world problems, (e) provide structure for students' thinking, (f) support conversation among students within the learning community, (g) integrate different learning perspectives offered by the students, and (h) encourage students' control of their learning decisions (Jonassen, Carr, & Yueh, 1998). When an on-line learning environment is properly structured and utilized to its potential, it will result in developing on-line courses that are capable of moving education from teacher-centered, lecture-based, and passive-instruction, to learner-centered, self-reflecting, and active-learning (Quitadamo & Brown, 2001).

In general, the use of technology in the classroom has reported several benefits. These benefits include; (a) increased motivation, (b) improvement in self-concept, (c) advanced mastery of basic skills, (d) more student-centered learning, (e) more student-engagement in the learning process, and (f) more active processing. All these advantages will result in improving students' higher-thinking skills, better recall for

knowledge and information, and gaining confidence directing their own learning (Step-Greany, 2002).

There have been several theories describing the benefits of on-line learning. Hazari and Schno (1999) argued that the interaction provided by the internet allows for more opportunities for immediate assessment and feedback in order to monitor students' progress and their pace of learning. Lesh, Guffy, and Rampp (2000) have listed three factors that appear to influence the effectiveness of feedback. The first factor is the degree to which feedback provides accurate information. The second factor is the immediacy of the feedback, and the third one is the level of materials involved. On the other hand, student characteristics such as confidence and competence will affect these factors and in return this will influence the feedback.

There was a continuous debate about the factors that influence successful student learning in the on-line domain and how to effectively integrate on-line learning technologies into the learning process (Jonassen, Carr, & Yueh, 1998; Quitadamo & Brown, 2001). One of the foremost factors was the internet connection. The type of internet connection whether it was a dial up connection, DSL, or cable modem can heavily impact the on-line process. Internet speed has always been an issue when students want to download class materials or submit a discussion participation in the class discussion board.

As teaching on-line is becoming more popular with more education institutions and with more on-line courses offered in traditional universities, many academic challenges are still facing both teachers and the students in their on-line courses (Muirhead & Betz, 2005). These challenges are categorized as follows:

Teacher Challenges:

- Student plagiarism of assignments
- Students' weak writing skills
- Providing adequate feedback on assignments
- Managing learning team problems
- English was not the student's first language
- Unrealistic grade expectations

Student Challenges:

- Lack of basic computer skills
- Inconsistent grading of papers
- Writing quality papers
- Effectively handling the action research project

Despite the criticism of on-line learning that it depersonalizes the teacher/student relationship and limits interpersonal interaction, research shows that on-line courses can be designed to promote higher-order learning skills such as analysis, synthesis, and evaluation (Mahone-Brown, 1998; Regan, Lacey & Nagy, 2002).

More perceived disadvantages appear to exist regarding on-line learning. Most on-line courses are designed and established without the proper input from students about the best format of the course, consideration of the impact on students' learning and the best skills that students need to encounter in order to survive such courses. On the other hand, many students learn best with direct interaction between them and their professors. On-line learning decreases and sometimes prohibits this interaction to make learning and

direct involvement less personal (Mahone-Brown, 1998; Wegner, Holloway, & Garton, 1999).

In addition, lack of technological skills required to survive most types of on-line courses may cause fear to some students when they approach learning situations provided by “non-traditional” modes. Students enrolled in on-line courses reported spending significantly more time on accessing the course materials and doing course work than in face-to-face courses (Beard, Harper, & Riley, 2004; Ewing-Taylor, 1999; Mahone-Brown, 1998).

One of the areas described to be time consuming for students enrolled in on-line courses was the interaction with the instructor and other students in the same course. Most on-line courses require students to use e-mail, chat rooms, or discussion boards. These communication tools were found to require significant time spent by the student to access the on-line course, to read the course materials, and to participate in the on-line community in order to accomplish success in those courses (Cooper, 1999; Ewing-Taylor, 1999; Junk & Kirk-Fox, 1998; Mahone-Brown, 1998).

Despite the increased time required for success in on-line courses, students in Kroder, Suess, and Sachs (1998) study said that they found on-line courses worthwhile and would take additional courses via the Web. This means that even with these time consuming courses students attitudes are in some cases affected positively as a result of enhanced self-confidence.

Technology Tools

The rapid infusion and integration of technology into education has enabled educators to present materials in ways that did not exist few years ago (Junk & Kirk-Fox,

1998). The questions that should be asked are what are the most effective technologies that can be used in the educational process and how to use them? The most common and useful technologies that alter the classroom atmosphere are: course homepage and electronic mail (Maxwell, 2003; Sandra, 1996).

Course Homepage:

This is considered to be one of the important advantages of on-line courses. Having an on-line course means that this course has a homepage. This homepage will include information about the course such as the course syllabus, course required assignments, other course materials, and information about the instructor. This will allow students who are thinking about taking the course to look through the topics covered, course requirements, and qualifications of the instructor. When students are enrolled in the course, and while they are working on their computers no matter where they are, they can access course assignment directions from the homepage. A course homepage will also decrease the copying done by the instructor when each student can access his/her syllabus, assignment sheets, and other course information. Additionally, students have access to the course information through out the semester so if they lose any copy of any handout or assignment they can go to the course homepage and access the information they lost (Junk & Kirk-Fox, 1998).

Electronic Mail:

Using e-mail in on-line courses includes communicating for questions or feedback not only with the course instructor but also with other fellow students enrolled in the course. It can also be used to download or send attachments in order to submit course

assignments. E-mail is a handy way to inform students of upcoming assignments, exams, individual or group feedback, or other course events (Chin, 1998; Jung & Kirk-Fox, 1998). Messages sent via e-mail can be personalized when appropriate to help an individual student or a group (distribution list) e-mail where everyone in the course is getting the same message. Many students find that communicating and interacting with the instructor and other students via e-mail has increased when compared to face-to-face meetings especially with those students who are shy, have verbal challenges, or when English is not their first language. In other words, today's students who are busy commuting can now communicate and collaborate with other classmates even if they are not physically together (Chickering & Ehrmann, 1996).

In the following section, a thorough discussion of the on-line versus the hybrid learning environments will be presented.

On-line Versus Hybrid Instruction

Over the years, education has taken a remarkable change and became more widespread, reachable, and affordable for most individuals. The explosive and rapid growth of the internet in addition to the state-of-the-art network communication technologies have enabled a shift in the teaching-learning paradigm from "institution-centered" instruction to "anytime, anywhere, anybody" teaching-learning models. This shift has caused universities and higher education institutions to reach out to non-traditional students who are unable to pursue advanced education due to time and distance limitations (Clark, 2003; Dabbagh, 2001; McIssac & Gunawardena, 1996; Osguthrope & Graham, 2003).

Today, on-line instruction is becoming a trend in university classroom instruction. Teaching without the physical presence of the teacher in the classroom is becoming the miracle of the twenty first century. On-line learning has provided education from university classrooms to home allowing more individuals to pursue higher education without the inconvenience of traveling to campus to complete the course. Students now can get their degrees with little or no college participation, physical presence, or physical interaction with the teacher and other students (Beard, Harper, & Riley, 2004; Cooper, 1999).

The number of institutions offering on-line courses is increasing throughout the years as well as the number of students enrolled in those courses. During the academic year of 1999-2000, 60% of the distance education courses offered through universities were on-line based courses. By looking at the fall term of the academic year of 2002, 81% of all higher education institutions offered on-line courses. Over 1.6 million students took at least one of these courses (Allen & Seeman 2003, NCES 2003 as cited in Cavanaugh, 2005; The Institute of Higher Education, 2000).

It was also reported through a survey by the U.S. Department of Education's National Center for Education Statistics (NCES) that from 1994-95 the number of distance education programs increased by 72 percent and an additional 20 percent of the institutions surveyed plan to establish distance education programs within the next three years (The Institute for Higher Education, 2000). In general, distance education as a delivery context has different ranges and combinations starting from Web-enhanced instruction, known as *hybrid mode* to the administration of fully distance courses known as *on-line mode*.

“Hybrid” is the expression commonly used nationwide to describe courses that combine face-to-face classroom instruction with computer-based learning (Koohang & Durante, 2003). The hybrid instructional model recognizes classroom and technology as fundamental partners in the instructional design of any hybrid course. Hybrid or web-enhanced courses transfer a significant part of the course materials to be web-based, such as the syllabi, course contents, and assignments, which as a result, reduces the amount of classroom seat time (Learning Technology Center, UWM). In hybrid mode a significant portion of the learning activities have been moved on-line which means that the time traditionally spent in the classroom is reduced but not eliminated (Garnham & Kaleta, 2002).

The goal of such hybrid courses is to combine the best features of face-to-face teaching with the best features and technologies of on-line learning to create an active independent learning environment that will result in reducing class seat time (Garnham & Kaleta, 2002; Koohang & Durante, 2003). This type of distance learning course works best for adult learners because of its convenience. In addition, the characteristics of adult students such as independence, self-direction, motivation, and establishing learning objectives are more reasons to make adult students more likely than others to be involved in distance education programs (Koohang & Durante, 2003). Conversely, Ewing-Taylor (1999) argued that this type of course delivery has a positive impact on students’ attitudes toward on-line courses because students feel that they have adequate support since they have face-to-face contact with the instructor and each other every week. According to Brown (2001) hybrid courses have a higher success rate than face-to-face courses and on-line courses.

Recently, universities are offering more courses in different areas using the hybrid instructional model such as: communications, human resources, management, marketing, finance, and strategic management (Koohang & Durante, 2003). While learning technologies and delivery media continue to change and progress, one thing is certain: corporate, government, and academic organizations favor hybrid learning over any single delivery mode programs (Singh, 2003).

“On-line mode” is identified when the network serves as the principal environment for course discussions, assignments, and interactions. Other media such as textbooks, telephones, or face-to-face meetings might be incorporated as part of the overall instructional design of the course (Dabbagh, 2001). Heckman and Annabi (2005) argued that on-line communication is an excellent tool for learning; especially discussion based learning, because it provides increased reflection time, more independent participation, and better writing.

In addition, on-line learning provides the following features: (1) a different learning experience than face-to-face learning because learners are different, (2) different types of communication done through computers and the world wide web, (3) participation is also different due to the freedom in the on-line courses and the diverse student population, (4) the social dynamic of the learning environment is different due to the isolation that accompanies on-line learning, (5) less discrimination and prejudicial judgment (Yang & Cornelius, 2004).

Replacing traditional classrooms with web-based learning opportunities and models is becoming a trend in educational settings. Employers, businesses, hospitals, and government departments are picking up the pace of integrating and incorporating on-line

learning opportunities in their workplace. According to Gonzales (2005) there are 284,844 students enrolled in the University of Phoenix, 100 percent of them are currently earning their degree exclusively on-line. Also, in 2004 the Department of Defense had launched over 47,000 on-line training modules to train staff across 21 states.

Advantages and Disadvantages of On-line Learning

On-line courses have become an approach of learning that meets the learners' needs for fast and convenient access to education (Buckley, 2003). This method allows students to talk at the same time and participate equally in the course (Turner & Crews, 2005). Technology is also becoming a strategy to attract students to education. According to Yang and Cornelius (2004) more than 54,000 on-line courses were offered in 1998, with over 1.6 million students enrolled. Allen and Seaman (2003) in a recent study reported that over 1.6 million students took at least one on-line course during the Fall of 2002, and over one-third of these students (578,000) took all their courses on-line.

Among those students and institutions where on-line courses were offered, thirteen percent took at least one on-line course. The number of students taking at least one on-line course was expected to increase by 19.8 % over a one-year period from Fall 2002 to Fall 2003, to reach a total of 1.9 million students who took at least one on-line course.

On-line learning also has some advantages that are not found in traditional learning, such as: (1) increased time to digest information, increased time to respond, (2) time and place flexibility, (3) enhanced communications among the learners regardless of time and place, (4) knowledge acquired and transferred among learners, (5) the ability to conduct open discussions, (6) equal chance for each student to contribute to the

discussion, (7) access to information and discussion around the clock, (8) a higher involvement in the process on the part of the learners (Sandra, 1996).

As with any medium or any instructional delivery system, there are also disadvantages. One of the most important disadvantages is the capacity of communication links and the slow modems that students' might have. These can impede the delivery system of audio, video, and graphics streams, especially in rural areas and for people with disabilities. Also, learners' success in such courses depends on the level of their technical skills in computer operation and internet navigation as well as the ability to deal with any technical difficulties. Information overload is also a disadvantage in on-line courses especially for students with high anxiety levels. Students who lack management skills will find on-line courses overwhelming. In addition, social isolation is also a drawback in on-line courses as well as the lack of non-verbal cues which can hinder communication. Although the internet is an excellent way to promote active learning, it can create passive learners (Sandra, 1996).

Advantages and Disadvantages of Hybrid Learning

Hybrid or computer-mediated courses have advantages over face-to-face and on-line courses. They deliver the best of both worlds offering some of the convenience available in on-line courses without the complete loss of face-to-face contact. From an instructors' perspective, hybrid courses allow the instructor to accomplish the learning objectives related to the course more successfully. Also, the interaction between the instructor and the students and among students themselves has increased according to most faculty who taught on-line courses (Granham & Kaleta, 2002). From a faculty perspective, hybrid courses also solve the limited classroom and office hours' problem.

Both professors and students are willing to give more time to the course. However, this time is not the same time for everybody and it is not in the same place as well (Brown, 2001).

Hybrid and On-line Methods and Teaching Educational Technology

Over the years, educational technology has played an important role in improving the quality of education. It provided options and flexibility for both teachers and students in their teaching and learning practices. With the availability of the internet and computer technologies for most teachers, educational technology has become increasingly essential in the field of education and especially in teachers' education programs. Recently, schools are provided with multimedia software, on-line resources, and many other technologies that provide teachers and students with an unlimited wealth of information, communications tools, research tools, new modes of learning, and shared professional practices (Oh & French, 2004).

Teachers who implement new technologies into their teaching have to learn how to use these technologies. To do that, educational technology courses were offered at various educational institutions. These courses are designed to prepare teachers to incorporate technology into teaching and learning. Educational technology courses at the University of Arkansas incorporate a variety of computer-based technologies including internet search techniques, word processing applications, graphic organizers using digital cameras and scanners, database applications, spreadsheet applications, presentation production, and web design. The computer applications include Microsoft Office (word processing, database, spreadsheet, and Power Point), Mozilla Composer, and many other applications and tools on a needed basis.

Although there have been numerous studies comparing the two teaching methods (on-line and face-to-face), most of the research has been done in microeconomics, macroeconomics, science, human resources development, accounting, communications, mathematics, humanities, nursing, and social sciences. Nonetheless, there were a few comparison studies using educational technology courses (Cavanaugh, Cavanaugh, & Boulware, 2001; Lan, 1999).

Cavanaugh, Cavanaugh, and Boulware (2001) conducted a study to compare the effect of the teaching approach on students' attitude and performance in educational technology courses. The students in the study were divided into two groups where each group was exposed to one of the teaching approaches, either on-line or face-to-face. The results did not show any significant difference between the students' attitudes or performance toward the teaching approach.

In her study, Lan (1999) incorporated internet-based instruction and face-to-face lectures in a hybrid method in teaching educational technology courses. The study was designed to examine the effectiveness of technology in transferring learning to active instead of passive. The results showed that the hybrid method can be effective in making this transfer. However, the study did not show any results comparing the hybrid method to totally on-line or totally face to face instruction.

CHAPTER THREE

Methodology

In this chapter the methodology for the study is described. This methodology includes the research questions, a description of the research type and design, a description of the ETEC2002L course content, description of the two teaching methods followed in teaching the course, description of the intervention between these two methods, data collection procedures, the participants, the instrument used, the validity and reliability of the instrument, and the process of analyzing the data.

Research Questions

1. Do students experience a change in attitude toward instructional technology as a result of participating in the course?
2. Do student attitudes differ for on-line versus hybrid instruction?
3. How do the variables of student age, gender, and prior computer experience relate to students' attitudes toward on-line versus hybrid instruction?
4. Is there a significant difference between students' experience with on-line courses and their attitudes toward on-line versus hybrid instruction?
5. Is there a significant difference in student performance in the online versus hybrid instruction?
6. Is there a significant relationship between student performance and their attitude toward the on-line versus hybrid instruction?

Research Type and Design

In terms of the study questions, descriptive and analytical research designs were used. The main purpose of the descriptive analysis was to identify information about students' attitudes toward hybrid versus on-line methods, and if their attitude was related to their age, gender, and prior computer experience. This analysis was also designed to detect if students' prior experience with on-line courses had an effect on their attitude toward hybrid versus on-line methods.

The analytical analysis was conducted to determine if there were differences in the students' performance in each of the teaching methods. The analytical analysis of the research included: developing the research instrument, conducting the survey, collecting and organizing survey data, grading performance-based assignments, analyzing the results and findings, and using these results to develop recommendations.

Participants

The participants of this research were 155 undergraduate ETEC 2002L students. The course was offered during the spring of 2006 at the University of Arkansas. There were nine sections in the course supervised by five instructors. Since each one of the lesson modules had to be taught in one of the two teaching methods, the study was conducted using only eight sections. The total number of students in these sections was 155. However, due to attrition only 110 students participated in the study.

Course Content

ETEC 2002L course is an introductory educational technology lab that works in conjunction with a lecture course to provide and expose students to applied experiences

necessary to successfully integrate computer-based instruction (Educational Technology syllabus/ Spring 2006). The course is designed to prepare teachers to use a variety of computer-based technologies including internet search techniques, word processing applications, graphic organizers, digital cameras and scanners, database applications, spreadsheet applications, presentations, and web design. The computer applications that the course deals with include Microsoft Office (word processing, database, spreadsheet, and power point), Mozilla Composer, and many other applications and tools.

In addition to addressing various computer applications and technologies, the course is designed so that students investigate the use of educational software in the classroom that helps in enhancing the learning and teaching process. Also, in this course, students learn how to develop lesson plans integrating technology into instruction.

During the course, students were assigned several projects such as: (1) design lesson plans that integrate technology applications, (2) create a database using Microsoft Access, (3) create and compose a letter using Microsoft Word, (4) create a grade book using Microsoft Excel, (5) develop an instructional presentation using Microsoft Power Point, (6) design a technology plan, and (7) develop an instructional web page.

At the end of the semester, students put all their work together and produce a technology portfolio produced on a CD-ROM. This portfolio should include all the work that they have done during the class. Blackboard academic management system was used to support this course. Through Blackboard, students were able to access the syllabus, calendar, schedule of assignments, course materials and grading rubrics, the discussion board, and their grades.

The ETEC 2002L is a supplemental lab course for a lecture-based on-line course. The instructional lessons that were used in this research were: (1) database, (2) mail merge, (3) spreadsheet I, and (4) spreadsheet II. The instructional documents that were used in the study and assignment rubrics related to those units are listed in Appendices C through I. The course has been designed in accordance with ISTE and NCATE standards.

The Hybrid Method

ETEC 2002L course was taught through a hybrid method. This method combined in-class and on-line instruction. For the in-class part, students were required to come to class in order to obtain instructions and learn the lessons. This meant that students learned in this course through face-to-face interaction with the instructor and with their peers. In the on-line part of the course the students used the internet to access web pages that were designed for the course. Every one of the lab sections had its own web page. Each instructor was responsible for two web pages, one for each section that he/she taught. The students had access only to their section web page. On these web pages, students were able to access the course syllabus, a calendar that contained the schedule for each subject and the due dates for the assignments. The students were also able to access the course materials through these web pages. The grading rubrics were also included in these web pages. These rubrics were used to show the students their grades for the assignments related to the instructional units. The assignments were delivered to the instructor through the web page using the assignment drop box.

The On-line Method

The on-line method was implemented through pre-recorded lessons. These lessons were recorded by the instructors for the sections that they taught. Each instructor created recordings for the two sections that he/she taught using Tegrity® software. This software enabled instructors to create audio and video recordings that included their voices and a live capture of the software screen that the instructor was explaining. The recordings were created a few days before the scheduled on-line lectures. After the recordings were completed, instructors made the pre-recorded modules available for students on-line through the class web page according to their class time so that the students who were scheduled to have an on-line lecture for any particular day had the instruction available for them during their class time. The beginning of any on-line module presented the objectives of the lesson, the software that should be used for that lesson, where that software was located, and instructions how to run the module while applying the lesson. During the on-line lectures, students' attendance to class was not mandatory which meant that students were able to access the on-line modules anywhere at anytime through their class web page. Prior to any on-line lecture, instructors informed students about the upcoming on-line class, how to access the on-line module, where the module would be available on the class web page and at what time. They also informed them that the assignment submission process would be the same as the one used in submitting in-class lessons assignments.

On-line versus Hybrid teaching methods (The Intervention Experiment)

The research experiment started the fourth week of the semester and lasted for two weeks. During this period, four lessons were taught to students. The first one was a

Database lesson using Microsoft Access software. In this lesson students learned how to create a simple database that included fifteen fields related to student information such as: parent last name, parent first name, student's last name, student's first name, address, state, and zip code. Students were also asked to find five more fields of their own choice. After completing and inserting all fifteen fields, students were asked to fill in the fields with ten fictitious names and information about each name. Upon completion of record insertion, students were required to sort those records in alphabetical order, adjust the column width for each field column, and capitalize and punctuate where necessary. A copy of the instructional document is available in Appendix C. After completing the assignment, students were asked to submit the file and the corresponding rubric to the assignment drop-box on Blackboard. A copy of the rubric used to grade students' work is available in Appendix F.

The second lesson was a Mail Merge lesson using Microsoft Word software. In this lesson, students typed a parent or client letter that informed those individuals about an up coming event. Some of the fields created in the pervious database assignments were merged into the body of this letter including the parent name and address any personal information about the student or the client that had been added in the database. Also, students were required to add a date, a salutation, a body of three paragraphs, a complementary closing, and a signature. A copy of the instructional document is available in Appendix D. After completing the letter, students were asked to submit the letter file to the assignment drop-box on Blackboard. A copy of the rubric used to grade students' work is available in Appendix F.

The third and fourth lessons were Spreadsheet I and Spreadsheet II lessons, respectively. Microsoft Excel software was used in these lessons. Students learned how to create a grade book for a fictitious class. The grade book included: students' last name, students' first name, ten homework assignments, total points, and percentages. The students were instructed to use a formula to determine the percentages according to the total points of the assignments that they chose to insert. Upon completion of records insertion, students were required to sort those records in alphabetical order, adjust the column width for each field column, insert a fictitious title for their grade book, change the color of two columns in the grade book, orient cells, and capitalize and punctuate where necessary. A copy of the instructional document is available in Appendix E. After completing the assignment, students are asked to submit the file and the corresponding rubric to the assignment drop-box on Blackboard. A copy of the rubric used to grade students' work is available in Appendix F.

All eight sections (sections were given the following numbers, 1, 2, 3, 4, 5, 6, 8, and 9) were taught the same lesson in the same day. The sections were divided into two groups. Each group was assigned a teaching method. The first group contained sections 1, 2, 4, and 6. The second group contained sections 3, 5, 8, and 9. Table 3.1 shows the lessons and their corresponding mode of teaching.

Table 3.1
Sections, Units, and Design of the Study

Section #	Database	Mail Merge	Spreadsheet I	Spreadsheet II
1, 2, 4, 6	Hybrid	On-line	Hybrid	On-line
3, 5, 8, 9	On-line	Hybrid	On-line	Hybrid

Each lesson had a corresponding assignment that was submitted on-line to the instructor. The feedback on these assignments and the grade was submitted to the student on-line. The grade of each assignment was saved in a spreadsheet and made available to the researcher as a measure of performance.

Data Collecting Procedures

A survey packet was handed to the instructors of the participating sections. The packet consisted of an informed consent form and the survey instrument. The informed consent document explained the purpose and intention of the survey and assured anonymity of the individual respondents. The four instructors who taught the different sections agreed to participate in the study.

One week prior to the beginning of the study, the researcher asked the instructors to explain to the students their rights, the purpose of the study, the procedure of the study and the time schedule, the nature of the on-line modules, and how to seek help if any problem occurred during the study. The researcher asked each instructor to hand the survey to students in order to make sure that all participants received a copy of the survey.

Instrumentation

The instrument that was used to collect attitude and demographic data for this study was a two-section survey. The first section was used to collect information about the students' age, gender, years of computer experience and their interactive media use. The students were also asked in this section to indicate if they had previously taken an on-line course. The second part was an 18-item Likert-type instrument that was designed

to collect information about the learners' attitude toward the on-line and hybrid instructional methods. The instrument presented positively worded statements. Each statement had five alternatives to choose from: strongly agree=5, agree=4, neither agree nor disagree=3, disagree=2, and strongly disagree=1. Higher scores indicated more favorable attitudes toward the teaching method. The survey is presented in Appendix A. The students' attitudes toward the teaching approach were categorized into two subscales: 1) Students' attitude toward the on-line approach, and 2) Students' attitude toward the hybrid method. The survey instrument was adopted from a study that investigated if on-line methods promote achievement (Martindale, 2004).

The Validity and Reliability of the Instrument

The content validity of the instrument was evaluated by members of the dissertation committee. To compute the reliability of the instrument, the reliability coefficient (Cronbach's Alpha) of the instrument-response results was calculated. For the on-line method, Cronbach's Alpha was .91, and for the hybrid method Cronbach's Alpha was .83. The reliability coefficient is a statistical value that describes the degree to which scores on a measure produce consistent results and are free of random error.

Procedures of Quantitative Analysis

1. The research instrument was designed as part of a survey package along with instructions. These instructions were intended to familiarize the responder with the purpose of the survey and encourage the responder to answer the question/statement as accurately and honestly as possible.

2. Approval from the University of Arkansas Institutional Review Board (IRB) to use the research instrument was obtained before it is was administered.
3. Arrangements to administer the survey to the ETEC lab were discussed with the supervisor of the ETEC lab and course.
4. The survey was administered by the researcher and the graduate assistants that were supervising the ETEC labs.
5. The survey was distributed to all students after the two-week period ended.
6. The collected data from the survey was entered into SPSS for analysis.
7. Only surveys that were filled out completely were included in the analysis.
Surveys with only a few answers were not accepted.

Data Analysis

The collected data from the survey was organized into spreadsheets for analysis. Raw data tables included the responder's assumed number as the row, the question or the statement as the column, and the participant's response was converted into a numerical value in the corresponding cell.

In the survey there were two sections. In the first section, information about age, gender, experience with computers, experience with on line courses and interactive media use were collected. In the second section, there were 18 statements with options including five possible intervals on a scale of 5 to 1, from strongly agree to strongly disagree. The student University ID number was included in the survey. That facilitated tracking the student's performance and grades and his/her attitude toward the teaching approach in the course.

Statistical Analysis

Analysis of the collected data was performed using SPSS. The statistical analysis included descriptive and inferential statistics for the data collected from the survey instrument. In the inferential statistics, the mean of the students' responses for each of the 18 statements was computed. Statements 1, 3, 6, 8, 9, 12, 13, and 15 were used as the sub-scale that measures the students' attitude toward the on-line approach. Statements 2, 4, 5, 7, 10, 11, 14, and 16 were used as the sub-scale that measures the students' attitude toward the hybrid approach. A paired sample t test was run to compare the two teaching methods. The test was done by pairing the observations in the on-line approach to the observation in the hybrid approach to determine whether the mean of one approach was significantly higher than the mean of the other approach.

To investigate the effect of age, gender, computer experience and experience with on-line courses on the students' attitude toward the teaching approach an Analysis of Variance (ANOVA) was performed. The two-way ANOVA tested whether the teaching approach was especially effective for any of the subgroups of age, gender, computer experience or on-line course experience.

The students' performance was determined using their assignment grades for each lesson. To determine if there was a significant difference between the students' performance by the teaching approach, an independent sample t test was run for each assignment. To find out if students' performance in each assignment was related to their attitude toward the teaching approach (on-line or hybrid), a Pearson correlation coefficient test was run.

The Attitude Subscales

The following statements were used to collect information about the students' attitude regarding the two teaching methods:

Table 3.2
The Attitude Survey Statements

#	On-line statements	#	Hybrid Statements
1	Participation in the on-line lectures positively impacted my attitude towards the use of instructional technology.	2	Participation in the in-class lectures positively impacted my attitude towards the use of instructional technology.
3	I preferred the on-line lectures.	4	I preferred the in-class lectures.
6	Getting to a computer to view the on-line lectures is easy for me.	5	Getting to the classroom for lectures is easy for me.
8	I prefer being able to view the course lectures based on my own schedule.	7	I prefer having a fixed time, date, and location for the course lectures.
9	I liked being able to see the instructional units presented on-line.	10	I liked being able to see the instructional units presented in a live classroom setting.
12	I got distracted during the on-line lectures.	11	I got distracted during the classroom lectures.
13	I was satisfied with the on-line lecture presentations.	14	I was satisfied with the classroom lecture presentations.
15	I would like to take other on-line lectures like the ones presented in this course.	16	I would like to take other in-class lectures like the ones presented in this course.

CHAPTER FOUR

Results

This chapter presents an analysis for the data collected to investigate the differences between the on-line and hybrid approaches followed in teaching educational technology course units. In general, the investigation was done in two steps. The first step was the analysis of the data collected from a survey that was administered to the ETEC 2002L students in the spring of 2006 at the University of Arkansas. The survey measured the students' attitudes toward the teaching approaches in the course. The survey also reflected the demographics (gender, age, computer experience) of the students participating in the study. The researcher also included a question to ascertain if the students had participated in previous on-line courses. This question is anticipated to reflect the students' readiness for the on-line instruction in this course.

The second step was to measure the students' performance in each of the two methods. This was done by grading the students' homework assignments in each class. Four assignments were given to the participating students, two for each class setting. Correlation between the students' performance and their perception toward the teaching approach was made to reflect the students' overall attitudes toward the teaching method in this course.

To help interpret the data, findings were divided into two parts; the first part focused on analyzing the data collected from the survey. The second part focused on students' performance in the assignments completed after taking the units.

Part One

Analyzing the Data Collected from the Survey

Reliability Analysis

As was mentioned in chapter three, participants in the survey of this study were undergraduate students enrolled in eight of the nine Educational Technology Course (ETEC 2002L) sections offered during the spring of 2006 at the University of Arkansas. Among the 155 students enrolled in the eight sections, 110 completed the survey. In addition, the students were asked to provide their university ID number in order to track their performance. Six students did not provide their ID numbers; however, they did complete the survey. One student provided a wrong ID number but he/she still completed the survey. The data collected from these isolated incidents were used in the perception analysis part of the study but were excluded in the students' performance analysis.

The reliability of the survey was measured by Cronbach's Alpha approach. The 110 students responded to 18 items on a scale from 1 to 5. Table 4.1 presents the results of the reliability analysis of the survey items.

Table 4.1
Results of Reliability Analysis

Method	Total Number of Cases	Total Number of Valid Cases	Number of Items	Alpha Value	How Strong
On-line	110	107	8	.91	Strong
Hybrid	110	109	8	.83	high

As can be seen in Table 4.1, the reliability coefficient for the sub-scale items that measured students' attitude toward the on-line instruction was .91, which is considered strong for surveys that measure people's opinions. As for the sub-scale items that

measured students' attitudes toward the hybrid instruction, the reliability coefficient was .83, which is high enough to be taken as a reliable measure for the students attitude toward the hybrid approach (Huck, 2004).

Demographic Analysis of the Participants

The first part of the survey (section 1) was devoted to collecting demographic data of the participants. Table 4.2 shows the percentages and the demographic characteristics of Educational Technology students who participated in the survey (from self-reported data).

The survey included a question to ascertain whether students had taken an on-line course in the past. Among the 110 students, 24 (21.8%) indicated that they took an on-line lecture in the past and 80 (72.7%) have not. Six (5.5%) responses were missing.

Concerning the age distribution among students, Table 4.2 shows that 60 students (54.5%) were in the age of 20 or younger, 34 students (30.9%) were in the age of 21-25, four students (3.6%) were in the age of 26-30, four students (3.6%) were in the age of 31-35, four students (3.6%) were in the age of 36-40, and four students (3.6%) were over the age of 40.

Also, as can be seen in Table 4.2, 35 students (31.8%) were males, and 75 students (68.2%) were females. The number of female students who participated in the survey was two-thirds the total number of students who participated in the survey.

With regard to participants experience with computers, Table 4.2 shows that three students (2.7%) have less than one year of experience with computers, eight students (7.3%) have 1-2 years of experience, 17 students (15.5%) have 3-5 years of experience, and 82 students (74.5%) have over 5 years of experience with computers. It can be

concluded that the majority of the students (over 70%) who participated in the survey had over 5 years of experience in using with computers.

Table 4.2
Demographic Characteristics for On-line Class, Age, Gender and, Years of Computer Experience of University of Arkansas Students Enrolled in the Educational Technology Course (ETEC2002L). (From self-reported data)

	N	%
Taken On-line class		
<i>Yes</i>	24	21.8
<i>No</i>	80	72.7
Age		
<i>20 or younger</i>	60	54.5
<i>21-25</i>	34	30.9
<i>26-30</i>	4	3.6
<i>31-35</i>	4	3.6
<i>36-40</i>	4	3.6
<i>Over 40</i>	4	3.6
Gender		
<i>Male</i>	35	31.8
<i>Female</i>	75	68.2
Years of Computer Experience		
<i>Less than 1</i>	3	2.7
<i>1-2</i>	8	7.3
<i>3-5</i>	17	15.5
<i>Over 5</i>	82	74.5

The last part of section one of the survey identified the types of interactive media students were familiar with. From Table 4.3, it can be seen that all 110 students (100%) have used the internet, 68 students (61.8%) experienced computer games, 64 students (58.2%) played an on-line game, 96 students (87.3%) had used email, 56 students

(50.9%) had experience with short message service (SMS), and finally nine students (8.2%) indicated they have experience with other types of interactive media as well (video conferencing, graphic design, and MS office).

Table 4.3
Demographic Characteristics for Interactive Media Usage of the University of Arkansas Students Enrolled in the Educational Technology Course (ETEC2002L). (From self-reported data)

Interactive Media	N	%
Internet	110	100
PC-Games	68	61.8
On-line Games	64	58.2
E-mail	96	87.3
Short Message Service (SMS)	56	50.9
Other (video conferencing, graphic design, etc)	9	8.2

Attitude Toward On-line and Hybrid Instruction

Section two of the survey measured students' attitudes toward on-line and hybrid instructional methods. This section consisted of 18 statements to which the student had to respond by choosing one of the following scales: strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, and strongly agree = 5.

For analysis purposes, the statements were divided into two groups. Each group measured the students' attitude toward one of the two teaching methods (Table 3.2).

On-line Method

There were eight statements that measured the students' attitudes toward the on-line method (see Table 3.2). Table 4.4 summarizes the frequency and the percentages for these statements on a numeric scale. An interval scale was used to describe the value of

the means of all items across all five categories. For “strongly disagree” category, 1 to 1.5 was used; for “disagree” category, 1.5 to 2.5 was used; for “neutral” category, 2.5 to 3.5 was used; for “agree” category, 3.5 to 4.5 was used; and for “strongly agree” category, 4.5 to 5 was used.

Table 4.4
The Frequency Percentage, Mean, Standard Deviation and Total Number of the On-line Statements in the Survey

On-line attitude statement	Frequency Percentage of Answers					M	Std. Deviation	N
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree			
	(5) %	(4) %	(3) %	(2) %	(1) %			
Statement 1	27	21	33	12	7	3.50	1.21	110
Statement 3	23	20	16	28	13	3.14	1.38	110
Statement 6	32	37	16	12	3	3.83	1.09	109
Statement 8	30	33	16	16	6	3.64	1.22	110
Statement 9	28	32	26	11	3	3.71	1.08	109
Statement 12	17	21	26	25	11	2.93	1.25	110
Statement 13	24	36	23	10	7	3.62	1.15	109
Statement 15	26	26	23	15	11	3.41	1.32	110

The mean of the students’ responses to statement one, “*Participation on the on-line lectures positively impacted my attitude towards the use of instructional technology*”, was 3.50 which lies in the “agree” category. According to Roblyer (2003) instructional technology can be defined as “the practice of utilizing technology as a way to solve educational challenges by using a combination of processes and tools with emphasis on computers and their related technologies”. In light of this definition, the purpose of the

statement was to measure how much the on-line instruction affected the students' attitudes toward this method. The total number of students who responded to this statement was 110 students. As seen in Table 4.4, 27% of students strongly agreed that participation in the on-line modules of the course have positively impacted their attitude toward instructional technology, 21% of the students mildly agreed that the on-line modules of the course have positively impacted their attitude toward instructional technology, 33% were neutral about the on-line modules, 12% disagreed that the on-line modules of the course positively impact their attitude toward instructional technology, and 7 % strongly disagreed that the on-line modules positively impacted their attitude toward instructional technology.

By combining the number of students in the strongly agree and agree categories together in one group, and the number of students in the disagree and strongly disagree categories into another group, a total of 53 students considered the on-line portion of the course to be helpful in learning instructional technology, and 21 students or less than 20% did not consider the on-line modules to be helpful in learning instructional technology.

The mean of the students' responses to statement three, "*I preferred the on-line lectures*", was 3.14 which lies in the "neutral" category. The total number of students who responded to this statement was 110. As seen in Table 4.4, 23% of students strongly agreed that they preferred the on-line lecture, 20% only agreed that they preferred the on-line lectures, 16% were neutral about their preference for the on-line lecture, 28% disagreed that they preferred the on-line lecture, and 13% strongly disagreed that they preferred the on-line lectures. When the number of students in the strongly agree and

agree categories are combined together into one group, and the number of students in disagree and strongly disagree categories are combined into another group it can be noticed that 47 students preferred the on-line portion of the course, and 45 students did not prefer it.

The mean of the students' responses to statement six, "*Getting to a computer to view the on-line lectures is easy for me*", was 3.83 which lies in the "agree" category. The total number of students who responded to this statement was 109. As seen in Table 4.4, 32% of students strongly agreed that it was easy for them to get to a computer to view the on-line lectures, 37% agreed that it was easy for them to get to a computer to view the on-line lectures, 16% were neutral about the this statement, 12% disagreed that it was easy for them to get to a computer to view the on-line lectures, and 3% were strongly disagreed that they could easily find a computer to view the on-line lectures. It is noticeable that more than half of the total number of students who responded to this statement (69%) agreed that getting to computer to view the on-line lectures was easy for them. According to a report released by the office of research and planning at Mesa Community College (2000), 85% of college students have access to computers at home and 90% of them have internet access (p.1). This means that 76% of college students have a computer with internet access at home. This percentage is in agreement with the results with the current report, implying that a computer with internet access is not a major obstacle for college students.

The mean of the students' responses to statement eight, "*I prefer being able to view the course lectures based on my own schedule*", was 3.64 which lies in the "agree" category. The pre-recorded modules were available for students on the class homepage

which means that students had access to these modules and could view the lectures at any time. The total number of students who responded to the statement was 110. Of the respondents, 30% of the students strongly agreed that they prefer to be able to view the course lectures based on their schedules, 33% of the students agreed that they prefer to be able to view the course lectures based on their schedule, 16% were neutral about their preference, 16% disagreed that they prefer to view the course lectures based on their own schedule, and 6% strongly disagreed that they prefer to view the course lectures based on their schedule, implying that those students preferred to come to class at a predetermined place, date, and time. Table 4.4 shows that 63% of the students preferred to view the course lectures based on their own schedule.

The mean of the students' responses to statement nine, "*I liked being able to see the instructional units presented on-line*", was 3.71 which lies in the "agree" category. Of the 109 students who responded to this statement, 28% strongly agreed that they liked to see the instructional units presented on-line, 32% students agreed that they liked to see the instructional units presented on-line, 26 % were neutral about seeing the instructional units on-line, 11% disagreed that they liked to see the instructional unit presented on-line, and 3% strongly disagreed that they liked to see the instructional units presented on-line.

The mean of the students' responses to statement twelve, "*I got distracted during on-line lectures*", was 2.93 which lies in the "neutral" category. The total number of students who responded to this statement was 110. Of the students who responded to this statement, 17% strongly agreed that they got distracted during on-line lectures, 21% agreed that they got distracted during on-line lectures, 26% were neutral, 25% disagreed that they got distracted during on-line lectures, and 11% strongly disagreed that they got

distracted during the on-line lectures. Since this item is negatively stated, the weighting was reversed, because disagreement with an unfavorable statement is psychologically equivalent to agreement with favorable statement. Therefore, for unfavorable statements strongly agree received a weight of 1 and strongly disagree a weight of 5 (Ary, Jacobs, & Razavieh, 2002).

The average mean of the students' responses to statement thirteen, "*I was satisfied with the on-line lecture presentations*", was 3.62 which lies in the "agree" category. The number of students who responded to this statement was 109, where 24% of students strongly agreed that they were satisfied with the on-line lecture presentations, 36% agreed that they were satisfied with the on-line presentation, 23% were neutral about their satisfaction, 10% disagreed that they were satisfied with the on-line lecture presentation, and 7% strongly disagreed that on-line lecture presentations were satisfactory for them.

The last statement in this sub-scale was statement number fifteen in the survey, "*I would like to take other on-line lecture like the ones presented in this course*". It had an average response of 3.41 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 26% strongly agreed that they would like to take another on-line lecture like the ones presented in this course, 26% of the students agreed that they would like to take another on-line lecture like the ones presented in this course, 23% of the students were neutral about this statement, 15% of students disagreed that they would like to take another on-line lecture like the ones presented in this course, and finally, 11% strongly disagreed that they would like to take another on-line lecture like the one presented in the course.

Hybrid Method

There were eight statements that measured students' attitude toward the hybrid method. Table 4.5 summarizes the frequency and the percentages for these statements on a numeric scale.

Table 4.5
The Frequency Percentage, Mean, Standard Deviation and Total Number of the Hybrid Statements in the Survey

Hybrid attitude statement	Frequency Percentage of Answers					M	Std. Deviation	N
	Strongly Agree (5) %	Agree (4) %	Neutral (3) %	Disagree (2) %	Strongly Disagree (1) %			
Statement 2	25	33	31	8	4	3.66	1.06	110
Statement 4	20	27	30	16	6	3.37	1.60	110
Statement 5	17	40	17	15	10	3.40	1.23	109
Statement 7	27	23	22	20	8	3.39	1.30	110
Statement 10	21	46	22	6	6	3.69	1.04	110
Statement 11	6	16	30	31	17	3.37	1.14	110
Statement 14	27	47	20	2	4	3.93	0.94	110
Statement 16	18	32	30	12	7	3.43	1.14	110

The mean of the students' responses to statement two, "*Participation in the in-class lectures positively impacted my attitude toward the use of instructional technology*", was 3.66 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 25% of the students strongly agreed that their participation in the in-class portion of the course positively impacted their attitude toward instructional technology, 33% agreed that their participation positively impacted their attitude toward instructional technology, 31% had neutral attitudes toward their

participation, 8% disagreed that their participation in the in-class part of the course positively impacted their attitude toward instructional technology, and 4% of the students strongly disagreed that their participation in the course had this impact. Even though the majority of students strongly agreed with this statement, it was surprising to see that 31% of the students were neutral to this statement. This percentage represents almost one third of the total number of participants.

The mean of the students' responses to statement four, "*I preferred the in-class lectures*", was 3.37 which lies in the "neutral" category. The total number of students who responded to this statement was 110, where 20% of them strongly agreed that they preferred the in-class lectures, 27% agreed that they preferred the in-class lectures, 30% were neutral about their preference, 16% of the students disagreed that they preferred the in-class lectures, and 6% of the students strongly disagreed that they preferred the in-class lectures.

The mean of the students' responses to statement five, "*getting to the classroom for lectures is easy for me*", was 3.40 which lies in the "neutral" category. The total number of students who responded to this statement was 109, where 17% of them strongly agreed that getting to the classroom for lectures was easy, 40% agreed that it was easy to get to the classroom, 17% were neutral about that, 15% disagreed that it was easy for them to get to the classroom, and 10% strongly disagreed that this statement.

The mean of the students' responses to statement seven, "*I prefer having a fixed time, date, and location for the course lectures*", was 3.39 which lies in the "neutral" category. As seen in Table 4.5, the total number of students who responded to this statement was 110, where 27% of them strongly agreed that they preferred having a fixed

date, time, and location for the lectures, 23% agreed with the preference of having fixed date, time, and location for the course lectures, 22% were neutral about that, 20% disagreed that they preferred a fixed date, time, and location for the course lectures, and 8% strongly disagreed with this preference. If strongly agree and agree categories were combined together into one category to represent agree; and disagree and strongly disagree categories to represent disagree, it can be concluded that the students who responded to this statement were divided into two groups, 55 students (50%) preferred having fixed date, time, and location for the lecture, while the 31 students (28%) did not prefer having a fixed date, time and location for the lecture.

The mean of the students' responses to statement ten, "*I liked being able to see the instructional units presented in a live classroom setting*", was 3.69 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 21% of them strongly agreed that they liked seeing the instructional units in a classroom settings, 46% of students agreed that they liked seeing the lectures in a classroom settings, 22% of the students were neutral about this statement, 6% of students disagreed that they liked seeing the instructional units presented in a classroom setting, and 6% of students strongly disagreed that they liked seeing the instructional units presented in a classroom setting.

The mean of the students' responses to statement eleven, "*I got distracted during the classroom lectures*", was 3.37 which lies in the "neutral" category. The total number of students who responded to this statement was 110, where 6% of students strongly agreed that they got distracted during the in-class lectures, 16% agreed that they got distracted during the in-class lectures, 30% were neutral about this statement, 31% of the

students disagreed that they got distracted during the in-class lectures, and 17% of the students strongly disagreed with the in-class distraction item. Because this item is negatively stated, the weighting was reversed. For unfavorable statements strongly agree received a weight of 1 and strongly disagree a weight of 5 (Ary, Jacobs, & Razavieh, 2002).

The mean of the students' responses to statement fourteen, "*I was satisfied with the classroom lecture presentations*", was 3.93 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 27% of the students strongly agreed that they were satisfied with the in-class lecture presentations, 47% agreed that they were satisfied with the classroom presentations, 20% of the students were neutral in their response, 2% disagreed that they were satisfied with the in-class lectures, and 4% strongly disagreed that they were satisfied with the classroom lectures. Looking at Table 4.5, around 75% of the students who responded to this statement agreed that they were satisfied with the classroom lecture presentations.

The average mean of the students' responses to statement sixteen, "*I would like to take other in-class lectures like the ones presented in this course*", was 3.43 which lies in the "neutral" category. The number of students responded to this statement was 110, where 18% of the students strongly agreed that they would like to take other in-class lectures like the ones presented in this course, 32% of students agreed that they would like to take other in-class lectures like the ones presented in this course, 30% of the students were neutral about this statement, 12% of the students disagreed that they would like to take other in-class lectures like the ones presented in this course and, 7% of students strongly disagreed that they would like to take in-class lectures like the ones

presented in this course. Results indicated that half of the students (50%) agreed with this statement.

The survey included a statement to know if the students wanted to have a choice in the classroom setting. Statement seventeen "*I would like to have a choice as to whether to take a course on-line or in a classroom setting*", had an average response of 4.00 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 56% strongly agreed to have a choice as to whether to take a course on-line or in a classroom setting, 35% of the students agreed that they would like to have the choice to take another course on-line or in a classroom setting, 9% were neutral, and 1% disagreed with this statement. None of the participants strongly disagreed. According to these results, more than 90% of the students wanted to have a choice whether to take a class on-line or class room setting. This indicates that the students realized the difference between the two approaches and wanted to have a say in it.

As for statement eighteen, "*My experience with interactive media was helpful in this class*", the average response was 4.00 which lies in the "agree" category. The total number of students who responded to this statement was 110, where 41% strongly agreed, 38 % agreed, 16% were neutral, 4% disagree and 2% strongly disagreed. In general, it can be inferred from the high mean that students felt their experience with interactive media was helpful.

Table 4.6 present the frequencies and the percentages of students' experience with interactive media (from self-reported data). The total number of students who responded to this statement was 110. The sample of 110 (100%) indicated that they had experience

with internet. 62% had experienced computer games, 58% had experience using on-line games, 87% had used emails, 51% of the students had experience using short message service, and only 8% of the students had experience with other types of interactive media such as; graphic design software, and video conferencing.

Table 4.6
Types of Interactive Media and their Frequency and Percentage.

Types of interactive media	Frequency and Percentage of Usage			
	Checked		Not checked	
	N	%	N	%
Internet	110	100.0	0	0
Computer games	68	62	42	38
On-line games	64	58	46	42
Email	96	87	14	13
Short Message Service (SMS)	56	51	54	49
Other	9	8	101	92

In order to compare the on-line scale to the hybrid scale, a paired sample *t* test was run to compare the two teaching methods. The test was done by pairing the responses in the on-line scale to the corresponding responses in the hybrid scale. This test determined if there was a significant difference between the two teaching methods.

The results of the *t* test are shown in Table 4.7. The analysis did not reveal any significant difference between the on-line and hybrid approaches, $t(109) = -.51; p = .61$. The sample means of the students' response in each subscale are shown in Table 4.8. The means are comparable which reflect the non significant difference result that was obtained from the *t* test. Quantitatively, $M = 3.47, SD = .95$ for on-line approach, for the hybrid approach, $M = 3.54, SD = .76$.

Table 4.7

Results of the Paired Sample t Test, On-line vs. Hybrid

	N	Mean	St. deviation	Std. Error	df	<i>t</i>	<i>p</i>
On-line/Hybrid	110	0.70	1.45	.14	109	.51	.61

Table 4.8

Descriptive Statistics for the On-line and Hybrid Scales

Attitude Scale	Mean	N	St. Deviation	St. Error Mean
On-line	3.47	110	.95	.09
Hybrid	3.54	110	.76	.07

Because the *t* test did not reveal any significant differences between students attitude toward the two instructional methods, the students' demographic data were examined to see if it revealed new information about the students' attitude toward the teaching method. Four Two-way Analysis of Variance (two-way ANOVA) were conducted to investigate the students' attitude toward the teaching method according to one of the four demographic variables (age, gender, computer experience, and students' prior experience with on-line courses). The predetermined level of significance of .05 was chosen for this analysis.

ANOVA for Age

For analysis purposes, the age intervals were collapsed into two intervals instead of six. The first interval contained the students with age 20 or younger whereas the second interval contained students over 20 years of age. Table 4.9 shows the means, standard deviations, and the total student number in each interval.

Table 4.9
Descriptive Statistics for Attitude by Age and Teaching Method

Teaching Method	Age	Mean	Std. Deviation	N
On-line	20 or younger	3.45	.94	60
	Over 20	3.43	.97	50
Hybrid	20 or younger	3.58	.75	60
	Over 20	3.49	.78	50

The two-way ANOVA revealed that the effect of age proved to be non-significant. Table 4.10 shows the inferential statistics of this analysis. The result for the age is $F(1,108) = .66; p = .41$. The table shows that the interaction between the two age groups and their attitude is not significant also, $F(1,108) = .01; p = .93$. No significant difference was observed between students who are younger than 20 and students who over 20 and their attitude toward on-line and hybrid approaches.

Table 4.10
Analysis of Variance for Attitude by Age and Teaching Method

Source	SS	df	MS	F	Sig.	η^2
Age	.28	1	.28	.66	.41	.006
Method	.26	1	.26	.24	.62	.002
Age * Method	.01	1	.01	.01	.93	.00
Within groups	115.36	108	1.07			
Total	115.91	109				

ANOVA for Gender

Table 4.11 shows the means, standard deviations, and the total student number in each gender group.

Table 4.11
Descriptive Statistics for Attitude by Gender and Teaching Method

Teaching Method	Gender	Mean	Std. Deviation	N
On-line	Male	3.57	.92	35
	Female	3.42	.96	75
Hybrid	Male	3.48	.85	35
	Female	3.56	.72	75

The results from the two-way ANOVA are shown in Table 4.12. The results indicated that there was no significant difference among students' gender and their attitude toward on-line and hybrid methods, $F(1,108) = .11; p = .74$. The table shows that the interaction between the two groups of gender (male and female) and their attitude toward on-line and hybrid methods is not significant, $F(1,108) = .61; p = .44$. No significant difference can be observed between male students and female students and their attitude toward on-line and hybrid approaches.

Table 4.12
Analysis of Variance for Attitude by Gender and Teaching Method

Source	SS	df	MS	F	Sig.	η^2
Gender	.05	1	.05	.11	.74	.001
Method	.04	1	.04	.04	.85	.00
Gender * Method	.65	1	.65	.61	.44	.006
Within groups	114.72	108	1.06			
Total	115.46	109				

ANOVA for Computer Experience

For analysis purposes, the computer experience intervals were collapsed into two categories instead of four; the first category was for the students with less than five years of computer experience. The second category was for the students with over five years of

computer experience. Table 4.13 shows the means, standard deviations, and the total student number in each category

Table 4.13

Descriptive Statistics for Attitude by Computer Experience and Teaching Method

Teaching Method	Computer experience	Mean	Std. Deviation	N
On-line	Less than 5 years	3.53	.87	28
	Over 5 years	3.44	.98	82
Hybrid	Less than 5 years	3.70	.72	28
	Over 5 years	3.48	.77	82

Table 4.14 shows the results of the ANOVA for computer experience. The results indicated that there was no significant difference among students' levels of computer experience and their attitude toward on-line and hybrid methods. The effect of computer experience proved to be non-significant, $F(1,108) = 2.38$; $p = .13$. The table shows that the interaction between the two groups and their attitude toward on-line and hybrid methods was not significant, $F(1,108) = .17$; $p = .68$. No significant difference can be observed between students with less than five years of experience and students with over five years of experience and their attitude toward on-line and hybrid methods.

Table 4.14

Analysis of Variance for Attitude by Computer Experience and Teaching Method

Source	SS	df	MS	F	Sig.	η^2
Computer Experience	.99	1	.99	2.38	.13	.022
Method	.44	1	.44	.42	.52	.004
Comp. Exp. * Method	.19	1	.19	.17	.68	.002
Within groups	115.19	108	1.07			
Total	116.81	109				

ANOVA for Prior Experience with On-line Courses

Table 4.15 shows the means, standard deviations, and the total student number in each group interval.

Table 4.15
Descriptive Statistics for the Prior Experience with On-line Courses

Teaching Method	Gender	Mean	Std. Deviation	N
On-line	Taken on-line course	3.65	.98	24
	Have not taken	3.43	.94	80
Hybrid	Taken on-line course	3.51	.83	24
	Have not taken	3.53	.77	80

The results of the ANOVA for prior experience with on-line courses indicated that there was no significant difference among students' levels of prior experience with on-line courses and their attitude toward on-line and hybrid methods. $F(1,102) = .85; p = .36$. The table shows that the interaction between the two groups of prior experience with on-line courses (taken on-line course and have not taken on-line course) and their attitude toward on-line and hybrid methods proved to be non-significant, $F(1,102) = .55; p = .46$.

Table 4.16 shows the results of this ANOVA.

Table 4.16
Analysis of Variance for Prior Experience with On-line Courses

Source	SS	df	MS	F	Sig.	η^2
Taken On-line Courses	.37	1	.37	.85	.36	.008
Attitude	.02	1	.02	.02	.91	.00
Taken OL * Attitude	.59	1	.59	.55	.46	.005
Within groups	109.25	102	1.07			
Total	110.23	103				

No significant difference was observed between students who have taken on-line courses prior to this course and students who have not taken an on-line course prior to this course and their attitudes toward the teaching method.

Part Two

Analyzing Students' Performance

To analyze the students' performance, grades for the assignments given in each teaching method were analyzed. The four assignments (Database, Mail Merge, Spreadsheet I and, Spreadsheet II) and their corresponding instructional method (on-line vs. hybrid) are given in Table 3.1.

Student performance was determined using grades received for each assignment. The mean levels for the assignments are shown in Table 4.17. Each of the four lessons was taught in two instructional methods (on-line and hybrid). The assignments were graded by the instructors and were available for the researcher to analyze.

Table 4.17
Mean Levels for Assignments Under the On-line and Hybrid Groups. (Each Assignment Worth 10 Points)

Subject	On-line		Hybrid	
	N	Mean	N	Mean
Database	48	7.79	54	8.13
Mail Merge	54	7.76	48	8.24
Spreadsheet I	48	9.04	54	9.95
Spreadsheet II	54	9.51	48	9.10

To test for a significant difference between the students' performance in each of the teaching methods an independent sample *t* test was run for each assignment. The results are shown in table 4.18.

Table 4.18
The Results of t Test for each Lesson in the Two Teaching Methods

	<i>t</i>	df	<i>p</i>	<i>d</i>
Database	.50	100	.62	-.10
Mail Merge	.70	100	.49	-.14
Spreadsheet I	3.0	48	.004*	-.57
Spreadsheet II	-1.10	100	.28	.22

* $p < 0.05$

The analysis of the independent sample *t* test for the Database assignment revealed no significant difference in students' performance between the on-line and the hybrid method, $t(100) = .50$; $p = .62$. The effect size for this assignment was $d = -.10$.

The independent sample *t*-test results for the Mail Merge assignment also showed no significant difference in students' performance between students who learned this assignment on-line and students who learned it via the hybrid setting, $t(100) = .70$; $p = .49$. The effect size for this assignment was $d = -.14$.

The Spreadsheet I assignment independent sample *t* test indicated a significant difference in student performance between students who learned this assignment in the on-line method for this lesson and students who experienced the hybrid method for this lesson, $t(100) = 3.0$; $p < .05$. The effect size for the Spreadsheet I assignment was $d = -.57$.

Finally, for the Spreadsheet II assignment, the analysis of the independent sample *t* test failed to reveal a significant difference in students' performance between the on-line

group and the hybrid group, $t(100) = -1.10$; $p = .28$. The effect size for this assignment was $d = .22$.

To find out if students' performance on assignments was related to their attitude toward the teaching approach (on-line or hybrid), a correlation coefficient test was performed. Results for Pearson Correlation between the students' performance and their attitude toward the teaching approach are presented Table 4.19.

Table 4.19
Pearson Correlation Factor Between Assignment Performance and the Attitude Toward the Teaching Approach

Subscale	Attitude Toward		Attitude Toward	
	On-line	p	Hybrid	p
Database	.24	.10	-.22	.11
Mail Merge	.33	.02*	-.15	.30
Spreadsheet I	.11	.45	-.05	.74
Spreadsheet II	.25	.07	-.15	.32

* $p < 0.05$

The correlation between the students' performance in the Database assignment and their attitude toward the on-line method was positive with $r = .24$ with $p = .10$. This p value indicates no significant correlation between these two variables. The correlation between the students performance in this assignment and their attitude toward the hybrid method was negative $r = -.22$ with $p = .11$. This indicates that there was no significant correlation between the students' performance and their attitude toward this method also.

The correlation between the students' performance in the Mail Merge assignment and their attitude toward the on-line method was positive with $r = .33$ with a $p < .05$. This p value indicates a significant correlation between these two variables. On the other hand, there was no significant correlation between the students' performance on this

assignment and their attitude toward the hybrid method, $r = -.15$ (negative correlation); $p = .30$.

The correlation between the students' performance in the Spreadsheet I assignment and their attitude toward the on-line method was positive with $r = .11$; $p = .45$. This p value indicates no significant correlation between the two variables. The correlation between the students' performance in this assignment and their attitude toward the hybrid method was negative with $r = -.05$; $p = .74$. This result also indicates that there was no significant correlation between the students' performance and their attitude toward the hybrid method.

The correlation between the students' performance in the Spreadsheet II assignment and their attitude toward the on-line method was positive with $r = .25$; $p = .07$. This p value indicates no significant correlation between these two variables. The correlation between the students performance in this assignment and their attitude toward the hybrid method was negative with $r = -.15$; $p = .32$. This result also indicates that there was no significant correlation between the students' performance in this assignment and their attitude toward the hybrid method.

It can be noticed from Table 4.19 that there was a different correlation trend for each of the teaching methods. There is a weak positive correlation between students' performance in the different assignments and their attitude toward the on-line method. On the other hand, there is weak negative correlation between students' performance in the different assignments and their attitude toward the hybrid approach.

Although the results indicated a weak and non-significant correlation between the students' attitudes and their performance, the observed positive and negative trends might

suggest that the students' performance depended on their attitude toward the teaching method in the following manner: students who liked the on-line method performed well in the given assignments. However, students who did not like this teaching method did not perform as well in the assignments. In the hybrid method students who liked this method did not perform well in the given assignments whereas students who did not like this method performed better in the given assignments.

Qualitative Review

When interviewing the ETEC 2002L instructors to get their feedback on the teaching method for this course, many of them complained about the long hours needed to prepare for the on-line course. Although the same lessons were given to the students in both teaching methods, the on-line modules required preparation, planning, and pre-recording using the Tegrity® software. Using this software, instructors were able to record their voices and capture the lessons that were supposed to be taught on-line. The only disadvantage of Tegrity® software was that it did not allow any correction for any mistakes during recording. This drawback resulted in repeating the recording several times until the desired quality of recording was achieved. However, this was not the only extra work that the instructors had to do. They had to respond to more emails coming for students needing help in using the software to learn the lessons or emails about the designated assignments. This required more time from the instructors answering emails and providing explanation about the steps to take to complete the on-line modules to learn the lessons.

When asked about their perceptions toward on-line versus hybrid methods, the instructors indicated that they did not feel that there was a difference between the two teaching methods. They also commented that even though on-line methods decreased the amount of classroom work, there was a lot to take care of before and after the on-line lessons.

When interviewing the students and asking them about their opinions toward the teaching method in this course, two students commented “*I like it because I can pause the recording, apply the step, and then play the recording again*”. Another student comment was “*it was easy and straight forward, but I still prefer the face-to-face method because I like to ask questions*”.

Attendance during the on-line lessons was low. However, assignment submission was the same as for the hybrid lessons. This means that students were able to access the on-line modules and complete the assignments in the due time. During the last day of the study inclement weather was present. The attendance in the four on-line sections was very low. However, all students were able to get to the on-line modules and submit the assignment for the lesson. No problem on submission was reported.

CHAPTER FIVE

Discussions and Conclusions, and Recommendations

Overview

On-line instruction is quickly becoming a trend in university classroom instruction. The explosive growth of the internet and state-of-the-art networks and communication technologies have enabled a shift in the learning and teaching paradigm from classroom centered instruction to anybody, anytime, anywhere learning.

A review of literature confirmed that the internet is becoming a powerful tool that is used to enhance teacher education programs in order to access the wealth of information available on the internet. Currently, a considerable research effort supporting the integration of the internet in education is being made. However, the majority of these studies focus on students' perceptions and achievement in regular courses that do not involve the use of technology as the medium of instruction.

The problem addressed in this study was that, although on-line learning is gradually being introduced to several types of undergraduate and graduate courses, there are few research studies that investigate the use and the effectiveness of on-line learning in teaching an educational technology course for pre-service teachers. This course is usually taught in a face-to-face environment.

The challenge that teacher educators face is how to engage the latest technologies with pedagogy. This problem appears clearly, especially in educational technology programs (Lan, 1999). The educators of these courses are expected to embrace the available and new technologies into their course structure. They are also expected to be

leaders in this field (Maxwell, 2003). The National Council for Accreditation of Teacher Education (NCATE) requires that new technologies are to be implemented in teachers' education (Lan, 1999). Therefore, a new technology such as on-line teaching should be implemented into important courses such as educational technology.

There have been few studies comparing the two teaching methods (on-line and face-to-face) in educational technology courses. Cavanaugh, Cavanaugh, and Boulware (2001) compared the effect of teaching approach on the students' attitude and performance in educational technology courses. The results did not show any significant difference between the students' attitudes or performance toward the teaching approach. On the other hand, the study conducted by Lan (1999) showed that a hybrid method containing on-line and face to face instruction can be effective in transferring learning from passive to active in educational technology courses.

In this research study, which examined educational technology courses, the focus was on the students' attitude and their performance in the on-line versus hybrid (face to face with on-line) instructional methods. During the course, students were exposed to the two teaching approaches. Some lessons were given to them totally on-line and other lessons were given to them in a hybrid setting. Because the students experienced the two modes of teaching, a realistic comparison was made and students reported their true perceptions toward each teaching method. The results of this study can be used to determine the effective teaching approach for educational technology courses and incorporate the knowledge into planning for future courses.

The current study attempted to compare on-line course modules with equivalent instruction taught in a hybrid (face-to-face and on-line) format. Comparison included

students' (a) performance and (b) attitude toward each teaching method. The main objective of the current study was to incorporate and determine the effectiveness of the two different teaching methods in delivering instructional modules. The study was expected to bring a "new paradigm" for the practice of Teacher Education Programs which would make instruction more relevant, more responsive, and more meaningful in teaching educational technology courses on-line.

To accomplish these goals, the following research questions were asked:

1. Do students experience a change in attitude toward instructional technology as a result of participating in the course?
2. Do student attitudes differ for on-line versus hybrid instruction?
3. How do the variables of student age, gender, and prior computer experience relate to students' attitudes toward on-line versus hybrid instruction?
4. Is there a significant relationship between students' experience with on-line courses and their attitudes toward on-line versus hybrid instruction?
5. Is there a significant difference in student performance in the online versus hybrid instruction?
6. Is there a significant relationship between student performance and their attitude toward the on-line versus hybrid instruction?

A survey was developed to answer the research questions. The survey was composed of two parts; demographics, where students were asked age, gender, how many years of experience with computers do they have, what types of interactive media they are most familiar with, and if they had taken an on-line course prior to this study. The second part of the questionnaire had 18 Likert-scale statements.

The survey was distributed to all available Educational Technology students who were enrolled in eight of the nine sections involved in the study. The total number of students in these sections was 155. However, only 110 students took the designated survey questionnaire. The data collected from the survey were analyzed using percentages, means, and a *t* test of paired samples to identify any significant differences in students' attitudes toward on-line versus hybrid instruction. Four two-way ANOVAs were conducted to test whether there was a significant difference between students' age, gender, computer experience, and prior experience with on-line courses and their attitude toward on-line versus hybrid instruction. An independent sample *t* test was performed to investigate if there was a significant relationship between the performances of the students in each of the teaching methods. Pearson Correlation Coefficient test was done to test whether there was a significant relationship between students' performance and their attitude toward on-line versus hybrid instruction.

The research experiment involved four teaching lessons as explained in the methodology section. Two of these lessons were given to students using on-line modules. Students' attendance to the classroom was not mandatory during the on-line lessons and instructors were asked not to interfere with the students during the delivery of these lessons. The students were able to obtain the lesson information and the assignments from the internet; this means that they were able to obtain these lessons from anywhere they chose and at any time. Instructions for the lesson were also available on the class website. The assignments for the on-line modules were submitted on-line through the assignment drop box using the class website on the blackboard management system.

The other two lessons were delivered in a hybrid classroom environment with face-to-face interaction. During the delivery of these lessons the instructors were involved with the students and interacting with them. The only way for the students to obtain information about the face-to-face lesson, ask questions, and get personal feedback was to attend the class sessions at a specific time and location. Instructions for the lesson were available on the class website. Assignments at the end of each lesson were submitted on-line through the assignment drop box using the Blackboard website.

Findings

The following is an overview of the findings of the study, which were organized based on the order of research questions.

Research question one

Do students experience a change in attitude toward instructional technology as a result of participating in the course?

This question was designed to investigate if students' participation in the ETEC 2002L course through the two learning approaches (on-line and hybrid) changed the way they perceived learning about educational technology.

The first two statements in the second part of the survey were assigned to answer this question. Statement one was related to the students' participation in the on-line part of the course. The mean for the students' response to this statement was 3.50 on a 5.0 scale. This means that students agreed that their participation in the on-line part of the course positively impacted their attitude toward instructional technology. The second statement was related to the in-class part of the course. The mean for the students'

response to this statement was 3.66 on a 5.0 scale. This means that the student also agreed that their participation in the in-class part of the course positively impacted their attitude toward instructional technology. Without doing any further analysis we can conclude that student participation in this course enhanced their attitude toward instructional technology.

Research question two

Do student attitudes differ for on-line versus hybrid instruction?

The data needed to answer this question were gathered from section two of the survey. A set of eight statements (statements 1, 3, 6, 8, 9, 12, 13, and 15) from the 18 statements were designed to measure students' attitudes toward the on-line approach. Another set of eight statements (statements 2, 4, 5, 7, 10, 11, 14, and 16) from the 18 statements were designed to measure students' attitudes toward the hybrid approach.

The means of the statements included in each sub-scale are given in Table 4.4 and Table 4.5. Comparison was made between the means for the two sub-scales using a paired sample t test. The test showed that there was no significant difference in the students' attitudes. Therefore we can conclude that students enrolled in the ETEC 2002L course did not prefer either approach (on-line or hybrid) over the other. This result indicates several aspects. First, the students did not feel that the on-line modules were taught in a different manner than the in-class lessons. In other words, the same step-by-step approach that was used to teach the in-class lessons was followed in explaining the on-line modules.

Second, because the same instructor who taught the hybrid session recorded the on-line modules, any instructor bias that might create a level of anxiety had been

eliminated. Students who were familiar with the instructor in the classroom could also work comfortably when they heard the same instructor teaching them on-line. Knowing that the instructor who taught them during the hybrid session was the same voice they heard reduced this level of anxiety when working on the on-line modules. This reduction of anxiety eliminated any difference that might have occurred between the two methods. However, the effect of anxiety and other stress factors on the students' attitudes must be investigated.

Thirdly, the number of lessons included in the research as well as how long the study lasted, might not be sufficient to detect major differences between the two teaching approaches. However, the number of students in the statistical group sample was sufficient to draw reliable conclusions for this research.

Research question three

How do the variables of student age, gender, and prior computer experience relate to students' attitudes toward on-line versus hybrid instruction?

The data needed to answer this question were gathered from section one and two of the survey. The first section provided information about students' age, gender, and computer experience. The second section provided the attitude sub-scales and students rating for each statement in these scales. To find out if there was a relationship between any of these variables and students' attitude toward the teaching approach, two-way ANOVAs were run to test each one of them. The results indicated the following:

1. The ANOVA of the students' attitude toward the two teaching methods by age did not show any significant difference. In the analysis the students were divided into two groups, with students 20 years or younger placed in one group, and

students over 20 placed in the other group. This grouping was performed based on the fact that 55% of the students were in the 20 years or younger group. In similar studies, for undergraduate courses, Koohang and Durante (2003) and Ladyshewsky (2004) both reported that age was not a significant factor in determining a difference in attitude toward the teaching approach. In the case of this research project, the lack of significant relation between age and attitude could be attributed to the fact that the ETEC 2002L is an undergraduate course where the curriculum is generic enough to be appropriate for all college student ages.

2. The ANOVA of the students' attitude toward the two teaching methods by gender did not show any significant difference also. Although 32% of the group consisted of male students, the total number of these students was sufficient (35 students) to reflect their attitude toward the teaching approach. Koohang and Durante (2003) reported in their study that gender was not a significant factor in determining a difference in the teaching approach. The same result was found in this study. This could be due to the fact that the level of difficulty or easiness in getting to the internet or coming to class is the same for both male and female students. Therefore no significant difference could be drawn between the students' attitude based on their gender.
3. The ANOVA of the students' attitude toward the two teaching methods by student prior experience with computers did not show any significant difference also. The study sample was divided into two groups based on prior computer experience. The first group contained students with less than 5 years of computer experience

and the second group contained students with more than five years of computer experience. Only 25% of the students had less than 5 years of computer experience. This means that the majority of the sample had 5 years or more of computer experience. However, this fact did not result in a significant difference in the students' attitudes toward any teaching approach for the ETC 2002L course. On the other hand, Koochang and Durante (2003) reported a significant difference between the students' attitudes toward the teaching approach based on the number of years in computer experience. This difference in results could be due to the fact that in this study there were a higher percentage of students who have 5 years or more of computers experience, resulting in a reduction of a chance in finding any significant difference in students' attitude based on their experience with computers.

Research question four

Is there a significant difference between students' experience with on-line courses and their attitudes toward on-line versus hybrid instruction?

The data needed to answer this question were gathered from section one and two of the survey. The first section provided information about the students' prior experience with on-line courses. The second section provided the attitude sub-scales and student ratings for each statement in these sub-scales. To find out if there was a relationship between this variable and students' attitude toward each of the teaching approaches, a two-way ANOVA was run to test the relationship. The result indicated that the students' attitudes toward the two teaching methods by their experience with on-line courses did not show any significant difference. In the study sample only 23% of the students

indicated that they had taken an on-line course in the past. This means that most of the students (77%) were new to the on-line setting. However, this fact did not introduce a significant difference in their attitudes toward the teaching approach for the ETEC 2002L course. This result could be attributed to the fact that all students had experience with internet and emails as indicated in the interactive media results (see Table 4.3) and they were as enthusiastic to learn through the on-line environment as students with previous on-line courses. Therefore, prior experience with on-line courses was not a major factor in determining a significant difference in the students' attitude toward the teaching approach. In a similar study, Neuhauser (2002) compared the on-line and face to face methods in teaching the same course. The two sections were taught by the same instructor and used the same instructional materials. The results indicated that there was no significant difference between the students' attitudes toward the teaching method whether the students had prior experience with on-line courses or not.

Research question five

Is there a significant difference in student performance in the online versus hybrid instruction?

The data needed to answer this question were gathered from the students' grades in the assignments included in the study in addition to the attitude sub-scales that measured their attitude toward the two teaching methods. To find if there was a significant difference between the students' performance in each teaching method a *t* test of independent samples was run for each assignment.

The results of the *t* tests were outlined in chapter four. The only significant difference between the two teaching methods was found in the spreadsheet I lesson. The

mean grade for the students who took this lesson in a hybrid mode was higher than those who took it on-line. This result could be due to the fact that in the spreadsheet I lesson, instructions were given to the students on how to use a mathematical formula as a part of building a spreadsheet. The students were asked to implement this formula in their assignment. However, the students may have needed help in understanding the implementation of this mathematical formula. Although the on-line instruction explained how to use this formula, the students in the hybrid mode got more opportunities to understand the implementation by asking questions about the formula. This indicates that the assumption that the students' knowledge in math was sufficient may not be valid in this case. More explanation was needed to implement the formula in the assignment than what was offered in the on-line lessons. According to Waters and Gasson (2005), in order to provide students with effective on-line learning, educators, program developers and curriculum planners need to design on-line environments in a different way than those associated or involved with face-to-face classroom environments. Otherwise, on-line learning will suffer from a paucity of experience where students are expected to take responsibility for their own learning but are given a poor support system that is supposed to make the learning process possible in traditional classroom settings.

Research question six

Is there a significant relationship between student performance and their attitude toward the on-line versus hybrid instruction?

The data needed to answer this question were gathered from the students' assignments' grades and the two attitude scales for both teaching methods. To determine if there was a significant difference between the students' performance in each lesson and

their attitude toward the teaching approach of that lesson, a correlation coefficient test was run. Results for Pearson Correlation between the students' performance and their attitude toward the teaching approach are presented in Table 4.19. The results show that only in the case of the Mail Merge lesson there was a significant correlation between the students' attitude toward the on-line method and their performance. We can attribute the positive correlation to the fact that this lesson was the first lesson to be taken on-line for two of the four sections in the study. The nature of instructions in this lesson was challenging but not difficult to implement. The students were satisfied with their interaction with the on-line mode because they felt independent and capable of dealing with the on-line instruction without the instructors help. On the other hand, the first on-line lesson for the other two sections was the Database lesson. The lesson instructions were simple and straight forward and most of the students did not need help to follow the instructions in the two learning modes. Therefore, there was no significant relationship in the students' attitude between the two teaching approaches for the Database lesson.

In general, it can be noticed from Table 4.19 that the correlation factor between the attitudes toward the on line approach has a positive sign whereas it is negative for the hybrid approach. To explain the difference in the correlation factors, statements 6 and 7 of the survey were reexamined. The mean of responses to Statement 6, *"Getting to a computer to view the on-line lectures is easy for me"*, was 3.39 which lies in the "agree" category. The mean of responses to Statement 7, *"I prefer having a fixed time, date and location for the course lectures"*, was 3.83 which also lies in the "agree". To see if there is a significant difference between the students' responses in these two statements a paired sample *t* test was made. The results indicated a significant difference between the

responses for these two statements. $t(109) = 2.24, p < 0.05$. This result indicated that the students preferred the on-line mode over the hybrid mode in obtaining the information for their lessons. However, from the sign of the correlation factors and the means for the assignment grades shown in Table 4.17 it may be concluded that although students' performance was better in the hybrid mode, they preferred the on-line method. This explains the negative correlation factor between the students' performance and their attitude in the hybrid mode. The classroom environment gave the students the opportunity to ask questions to the instructors and hear the instructor's answers to other students' questions. These answers might be used as clues to solve a problem that they were facing at the same time. Therefore, students' performance was enhanced in the hybrid mode. However, within this mode they were limited in place and time. They did not have the freedom of going on-line to obtain the instruction at anytime, anywhere. They had to solve the assignment within the time limit. This is why they preferred the on-line method. Although they needed more help in the on-line method, they can do the assignments at their convenience time with no time limits.

Discussions and Conclusions

The data analysis of this study demonstrates that learning on-line is equal to the learning hybrid mode for the ETEC 2002L course. The study gave attention to the variables of age, gender, computer experience and experience with on-line courses. Age was found to be an insignificant factor. Age in this study did not prove to be a significant factor in determining a distinguished attitude toward the teaching method. The two age groups in this study perceived the on-line and hybrid approaches in the same manner.

There was no significant difference for the variable of gender. Males and females equally perceived the on-line and hybrid approaches. This result conflicts with the result found in a study conducted by Brown and Liedholm where female students in their study were found to be at a significant disadvantage in the face-to-face sections (Brown & Liedholm, 2002).

The computer experience variable was not a significant factor. The students in the two groups perceived the on-line and hybrid approaches in the same manner. Finally, the experience with on-line courses was not a significant factor also. The students who did or did not take a course on-line, perceived the on-line and hybrid approaches in the same manner.

According to Johnson, Aragon, Shaik, and Plama-Rivas (2000), students' attitude and satisfaction toward any teaching approach is impacted when (a) the technology is transparent and functions both reliably and conveniently, (b) the course is specifically designed to support learner-centered instructional strategies, (c) the instructor role is that of a facilitator and coach, and (d) there is a reasonable level of flexibility. All these factors were feasible in this study, which might have resulted in the insignificant difference between the two methods followed in teaching the ETEC 2002L course.

The correlation factor between the students' attitude and their performance in the on-line approach was positive. As has been mentioned above, the students were excited to implement a new approach in their learning experience. Nevertheless, they did not have sufficient information to do better on their assignments than in the hybrid approach. According to Lan (1999), students who got their learning on-line felt that they did not waste lectures and discussion that may be relevant to only few individuals. More time

may be devoted to develop higher level cognitive skills or dealing with common concerns.

In conclusion, based on the findings of this study, it was evident that for the ETEC 2002L students, there was no difference in teaching this course in on-line or in a hybrid mode. This course can be taught in either approach depending on the institutional needs. In other words, students can take this course on-line if the educational institution is not able to provide all requirements for a hybrid or face-to-face course. On the other hand, if the course is offered on-line, the students could obtain the same learning experience anywhere at anytime as the hybrid mode. However, there is a trade off in this case; the students in the on-line course might not perform in their assignments as well as the students who are taking this course in a face-to-face mode. The on-line curriculum designers cannot anticipate all students' prior needs to take an on-line course. This was evident in this study when the students were asked to implement a mathematical formula while they were taking the lesson in the on-line method. Therefore, not all courses can be given in on-line mode unless enough information and instructions are provided for the students to cover all levels of prior knowledge and experience that any student might possess.

Recommendations

On the basis of the findings of the study and the information obtained from the literature regarding students' attitudes toward the on-line versus hybrid methods in teaching educational technology courses, the following recommendations were made:

1. It is recommended that a mixture of face to face (hybrid) and on line methods be followed when teaching this course.

2. It is recommended that when teaching this course using the on-line method, planners should pay attention to the prior computer knowledge.
3. It is recommended that both students and faculty be prepared for on-line courses by providing the necessary training and building an understanding of differences between on-line and traditional courses.
4. It is recommended that technical support be provided to both students and faculty who are involved in the on-line course.
5. It is recommended that similar studies be conducted for educational technology courses to obtain more information about other factors (such as anxiety) that influence the students' attitudes toward the teaching method in the educational technology courses.
6. It is recommended that a similar study for educational technology courses be conducted over a longer period of time.
7. The study was limited to educational technology lab (ETEC2002L); it is recommended that the study be replicated including the lecture part of the course.

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Appendixes

Appendix A

Attitudes Toward On-line vs. Hybrid Lectures

Attitudes Toward On-line vs. Hybrid Lectures

Students ID: -----

I have taken an on-line lecture in the past. Yes No

SECTION 1

Please answer the following questions by checking the corresponding option:

1. Your age:

20 or younger

21-25

26-30

31-35

36-40

Over 40

2. Your gender:

Male

Female

3. Your experience with computers:

Less than 1 year

1-2 years

3-5 years

Over 5 years

4. Which of these interactive media do you have experience with? (check all that apply)

Internet

Computer Games

On-line Games

E-mail

Short Message Service

Other

(SMS)

Specify -----

SECTION 2

Using the scale below, please indicate the strength of your agreement/disagreement with the statements using the five point scale shown below where 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree

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

Description / Identification of Survey Item	Scale				
	S A	A	N	D	S D
1. Participation in the on-line lectures positively impacted my attitude towards the use of instructional technology	5	4	3	2	1
2. Participation in the in-class lectures positively impacted my attitude towards the use of instructional technology.	5	4	3	2	1
3. I preferred the on-line lectures.	5	4	3	2	1
4. I preferred the in-class lectures.	5	4	3	2	1
5. Getting to the classroom for lectures is easy for me.	5	4	3	2	1
6. Getting to a computer to view the on-line lectures is easy for me.	5	4	3	2	1
7. I prefer having a fixed time, date, and location for the course lectures.	5	4	3	2	1
8. I prefer being able to view the course lectures based on my own schedule.	5	4	3	2	1
9. I liked being able to see the instructional units presented on-line.	5	4	3	2	1
10. I liked being able to see the instructional units presented in a live classroom setting.	5	4	3	2	1
11. I got distracted during the classroom lectures.	5	4	3	2	1
12. I got distracted during the on-line lectures.	5	4	3	2	1
13. I was satisfied with the on-line lecture presentations.	5	4	3	2	1
14. I was satisfied with the classroom lecture presentations.	5	4	3	2	1
15. I would like to take other on-line lectures like the ones presented in this course.	5	4	3	2	1
16. I would like to take other in-class lectures like the ones presented in this course.	5	4	3	2	1
17. I would like to have a choice as to whether to take a course on-line or in a classroom setting.	5	4	3	2	1
18. My experience with interactive media was helpful in this class.	5	4	3	2	1

Appendix B
IRB Approval



College of Education and Health Professions
Curriculum & Instruction Department

215 Peabody Hall
Fayetteville, Arkansas 72701
(479) 575-4209
(479) 575-6676 (FAX)

MEMORANDUM

DATE: February 3, 2006

TO: Nilly Al-Banna
Dr. Cheryl Murphy
Dr. Mounir Farah

FROM: Michael Wavering, Chair *MW*
CIED Review Committee

RE: Review of the Proposal "A Comparative Study of Hybrid and Internet-Based Educational Technology Course Modules in the Preparation of Teachers"

Thank you for submitting your proposed research project through the CIED Review Committee for consideration of issues of human subject protection. The research was approved with exempt status because of its conformity to points a, b, c, d, and e (2, 3, and 4) on pages 20 and 21 of the Policies and Procedures Governing research with Human subjects of the University of Arkansas, Fayetteville. The proposal is approved; however, only the protocol provided has approval. If there are any changes or additions to the protocol during the study, please advise the IRB before any new initiation.

Best wishes with an interesting proposal.

cc: Institutional Review Board

2001 Distinguished Program in Teacher Education awarded by the Association of Teacher Educators.

Appendix C

Instructional Unit for Creating Database Using MS Access

Creating a Database Using MS Access

Objectives: After this lesson you will be able to:

- Create a simple database
- Create and manipulate database fields
- Enter and save records in your database

A database stores and organizes related information. There is no limit to the type of information that can be stored in a database, as long as it is effectively organized. The information within a database may be reorganized, updated, and selected according to specific categories. Some uses of databases include: keeping student, employee, or inventory records. Reports can be easily prepared from the information in the database.

Lesson Overview

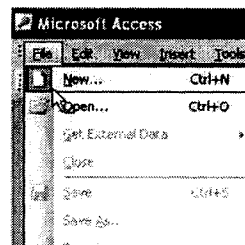
You will need to create a database for the class described in your DID model lesson plan. The information contained in your database will be used for your parent letter.

- Please capitalize and punctuate where it is necessary.
- Merge it with your parent letter – mail merge.

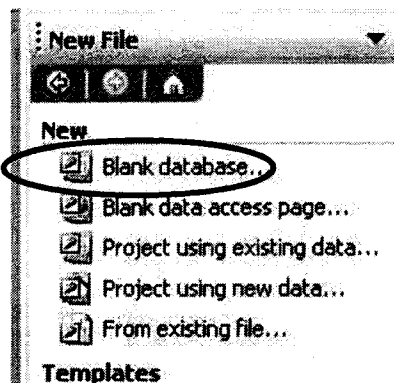
Your database should have the following:

- 10 records (one record for each student in your class).
- 15 fields (Student Last, Student First, Prefix (use Mr., Ms., or Dr.), Parent Last, Parent First, Street, City, State, Zip, Phone Number, and 5 additional fields of your choice).

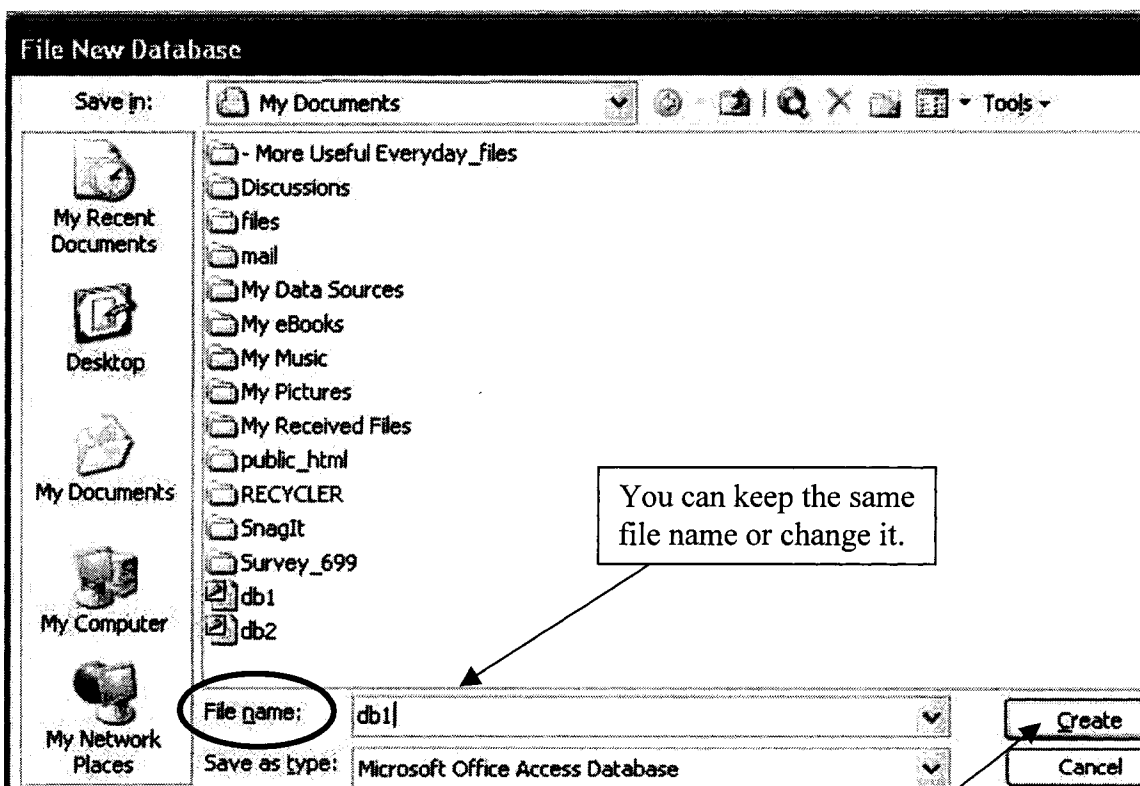
Creating a Database



- Launch Access, go to File and Select New...
- Go to the blue banner on the right side of your screen.

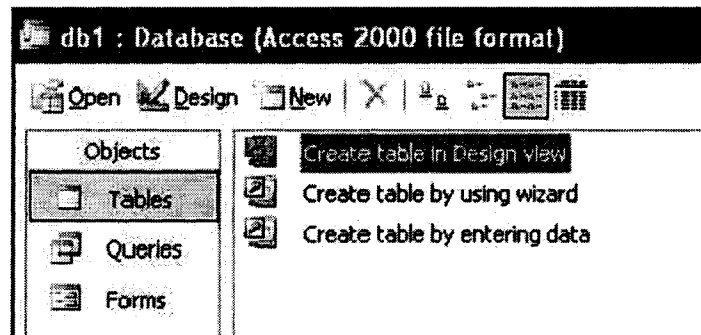


- Click on the Blank database button.
- Access will require that you save your database. Browse your folders to choose where you want to save it. You can use the file name provided by default db1, or you can rename it.

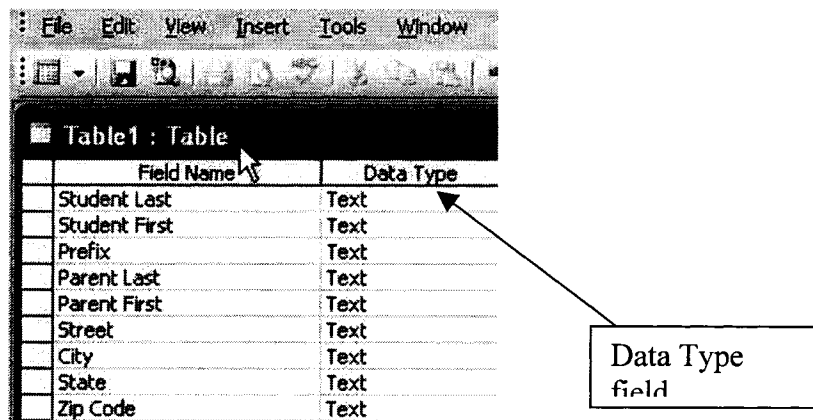


- Click the Create button to save the database.
- The following screen will pop up.

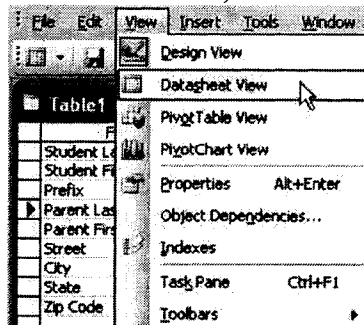
Create button



- Double click on Create table in Design view. This is highlighted by default.
- Design View is the view that you use when creating or changing fields. Records cannot be entered when you are in Design View.
- Insert the following fields under Field Name: Student Last, Student First, Prefix, Parent Last, Parent First, Street, City, State, Zip, and Phone Number.
- Set the data type for each field to Text.

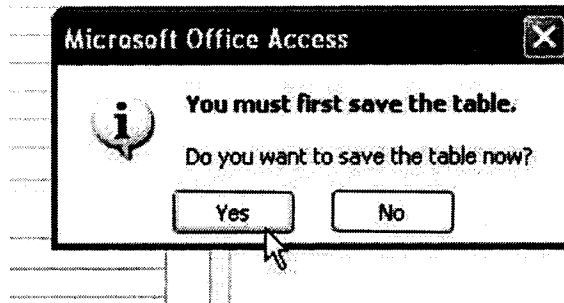


- On the menu bar, click on view and select Datasheet View.

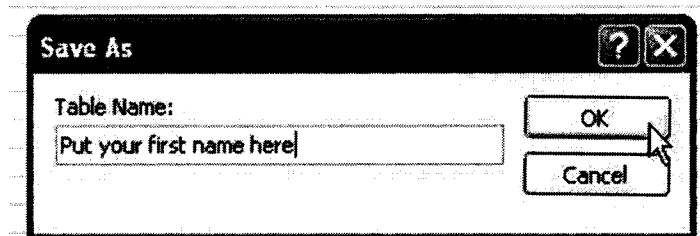


The Datasheet View is the view of the table you can use to enter or edit data in records. You cannot change the structure or format of a database in Datasheet View.

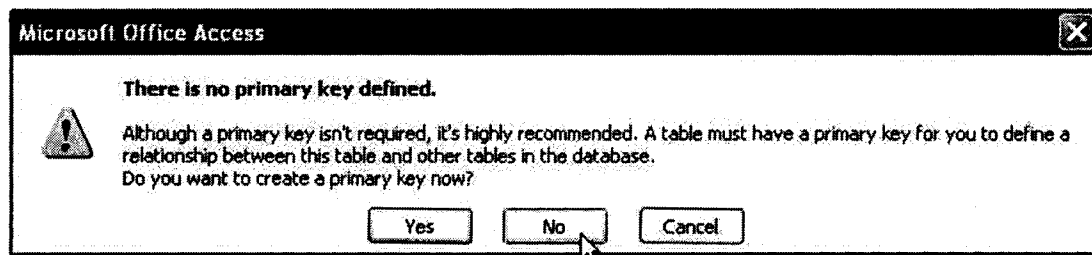
- A dialog box will pop up asking you to save the table. Click the Yes button.



- Enter your first name as the table name and click the OK button.



- When you click OK, the following window will pop up to ask if you want to define a primary key, click the NO button.

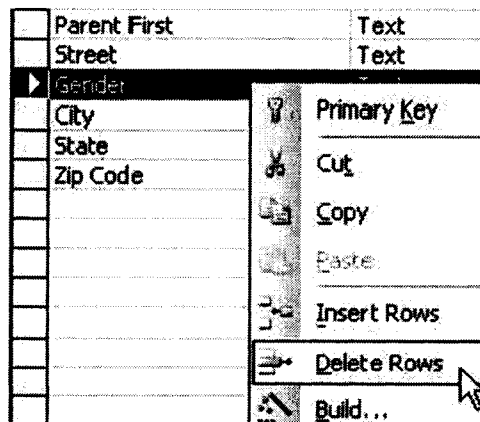


Now you can start entering appropriate data in the table. Here is an example of a table with data records.

Student Last	Student First	Prefix	Parent Last	Parent First	Street
Arnesman	Joseph	Mr.	Arnesman	Don	123 Scool
Botsford	Nicole	Mr.	Botsford	Leo	456 Pine
Boyd	Laura	Mr.	Boyd	Billy	789 Ashley
Bozeman	Astin	Mr.	Bozeman	Jim	159 Oak
Cunningham	Benjamin	Mr.	Cunningham	Hayden	357 North Main
Drew	William	Mr.	Gaye	Jake	258 Elm
Johnson	Clay	Mrs.	Johnson	Bessie	456 Lake
Smith	John	Ms.	LaGrone	Pam	852 Wilcoxin
Lassitter	Brooke	Mrs.	Lassitter	Charlotte	654 Hwy 169
Newcome	Rebecca	Mr.	Newcome	Joel	494 Hwy 169
Oldham	Emily	Mrs.	Oldham	Joan	462 Hwy 169

Adding and Deleting Fields

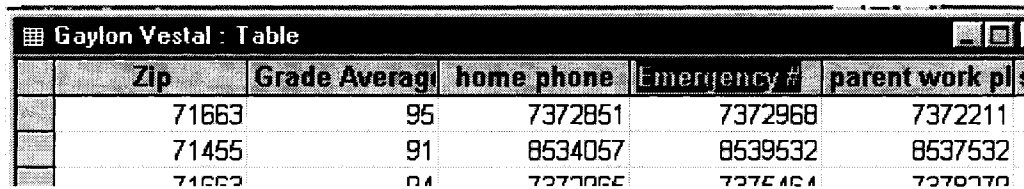
- Go to View at upper left corner of the menu bar and Select Design View
- Highlight the field you want to delete (example: Gender).
- Right-click and select Delete Rows from the menu.



- To add a new field, Select Insert Rows.

Renaming Fields

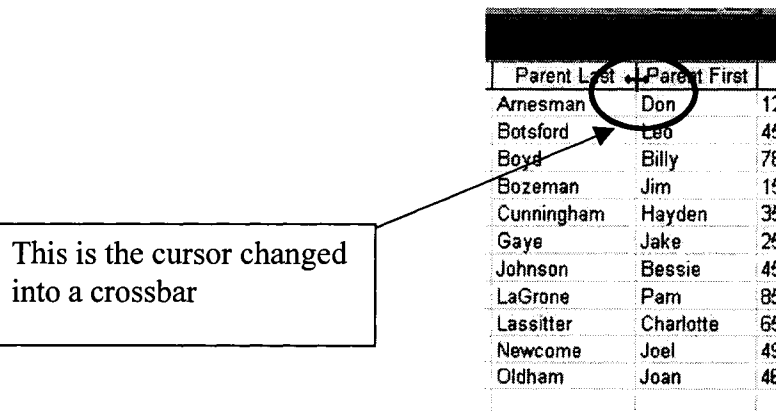
- Select View on the menu bar and click on Datasheet View
- In Datasheet View, double-click on the field name you want to change (example: Emergency Number). Access will highlight that field and you can type in the new field name.



Zip	Grade Average	home phone	Emergency #	parent work pl
71663	95	7372851	7372968	7372211
71455	91	8534057	8539532	8537532
71663	94	7377055	7375154	7378770

Adjusting Column Widths

- Place the cursor on the line between field names. The cursor will change into a crossbar.
- Double click. Access will automatically adjust the column width when you double click.

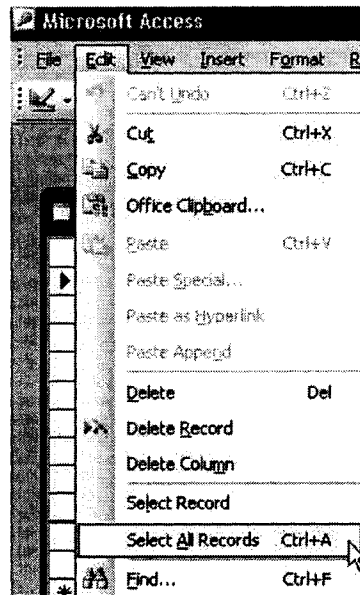


Parent Last	Parent First	
Arnesman	Don	12
Botsford	Leo	45
Boyd	Billy	78
Bozeman	Jim	15
Cunningham	Hayden	35
Gaye	Jake	25
Johnson	Bessie	45
LaGrone	Pam	85
Lassitter	Charlotte	65
Newcome	Joel	45
Oldham	Joan	45

This is the cursor changed into a crossbar

Sorting Database Records

- Go to Edit on the menu bar and choose Select All Records. Your table will be highlighted.



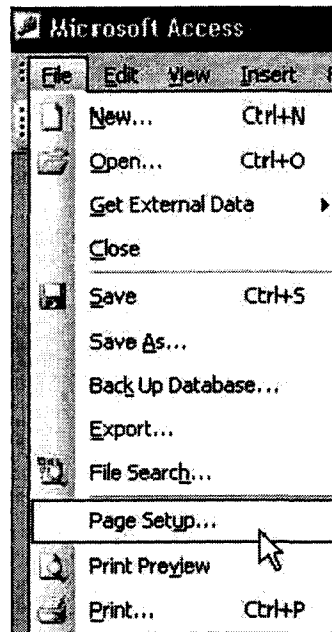
nilly : Table							
	Student Last	Student First	Prefix	Parent Last	Parent First	Street	
▶	Amesman	Joseph	Mr	Amesman	Don	123 Scool	M
	Botstond	Nicole	Mr	Botstond	Leo	456 Pine	Fe
	Boyd	Laura	Mr	Boyd	Billy	789 Ashley	Fe
	Bozeman	Astin	Mr	Bozeman	Jim	100 Oak	Fe
	Cunningham	Benjamin	Mr	Cunningham	Hayden	357 North Main	M
	Drew	William	Mr	Gaye	Jake	258 Elm	M
	Johnson	Clay	Mrs	Johnson	Bessie	456 Lake	M
	Smith	John	Ms	LaStone	Pam	852 Wilcoxin	M
	Lassitter	Brooke	Mr	Lassitter	Charlotte	654 Hwy 169	Fe
	Newcome	Rebecca	Mr	Newcome	Joel	484 Hwy 169	Fe
	Oldham	Emily	Mrs	Oldham	Joan	462 Hwy 169	Fe

- Click Sort Ascending button on the toolbar (AZ button).

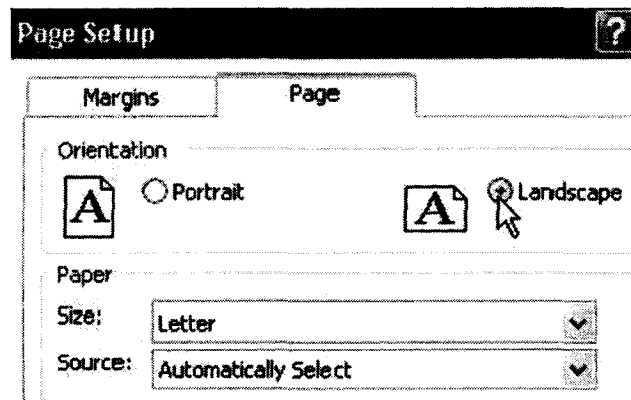


Printing Your Database

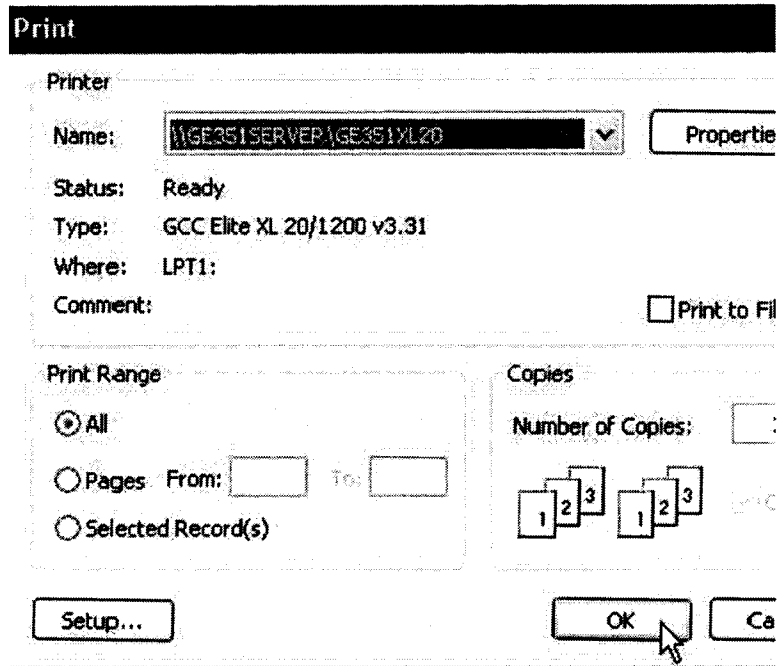
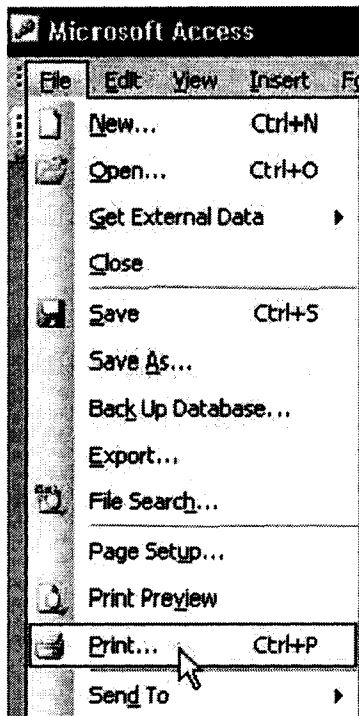
- Go to File and click on Page Setup.



- Click on the Page tab.
- Click the button beside Landscape and then click the OK button.

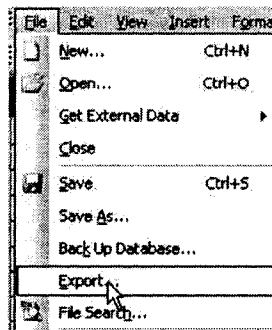


- Go back to File and click Print.
- Click the OK button when the Print dialogbox appears. This will print a copy of your database.

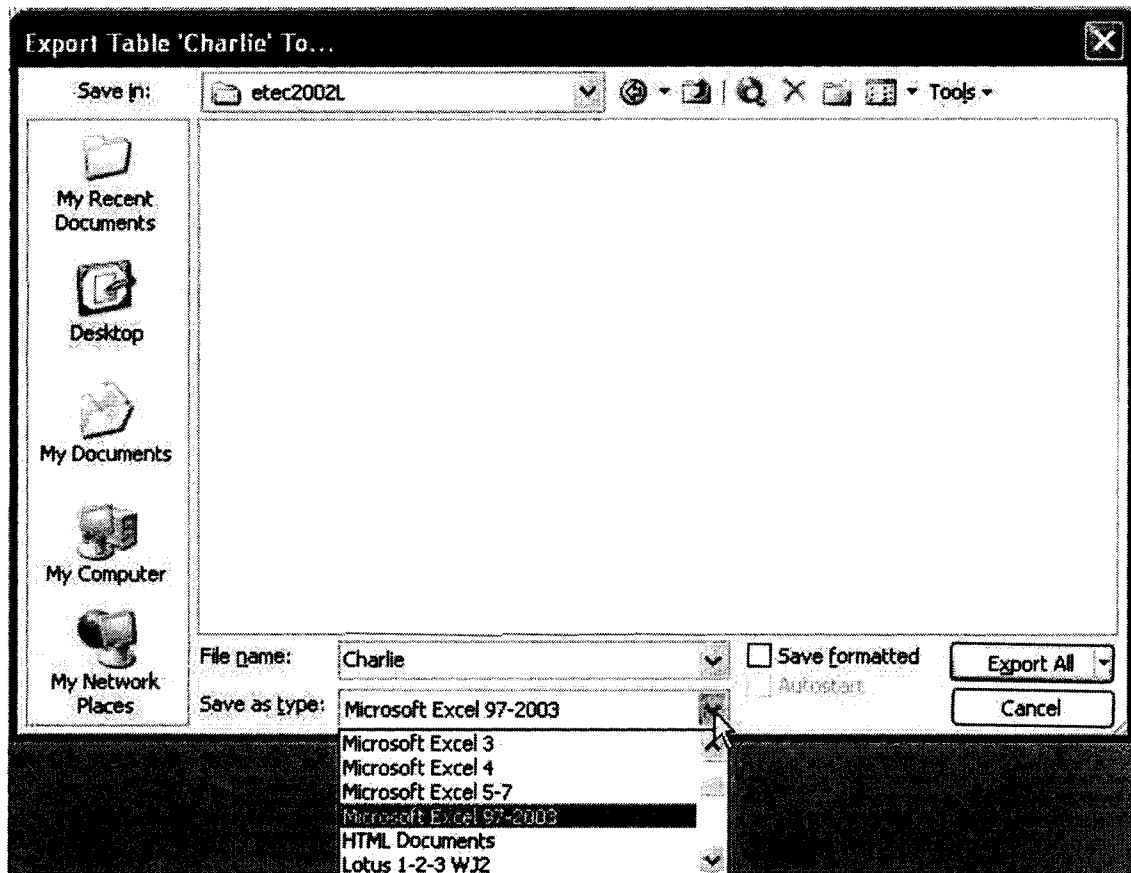


Exporting data from Access to Excel

- Open your access data file.
- Click on File.
- Click Export.



- Choose the folder where you want to export your data set.
- Click on the drop down menu Save as type:
- Select Microsoft 97-2003 as the file type.
- Click Export All and your file will be exported as an Excel file.



Appendix D

Instructional Unit for Creating Mail Merge

Mail Merge from Microsoft Access to Microsoft Word

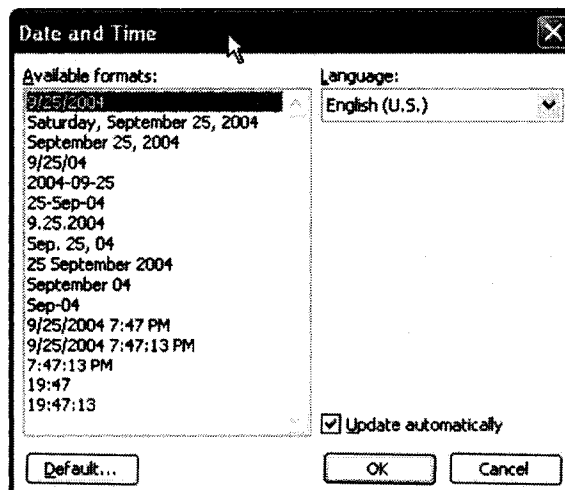
Objectives: In this lesson you will learn how to:

- Create a form letter in Microsoft Word
- Select an Access Database to merge
- Insert an address block
- Insert a greeting line
- Add a field to the body of the letter
- Preview and print form letters

The mail merge operation consists of two parts, a database and a document; the merge just brings the two together. You should have a clean database ready to use before you proceed. Your database contains your student records fields such as: names, addresses, and grades that Access will pull into a Word document. The Microsoft Word document is a form letter, but you can also add the fields from your database to an envelope (address label), telephone book, or address book.

Create A Form Letter In Microsoft Word

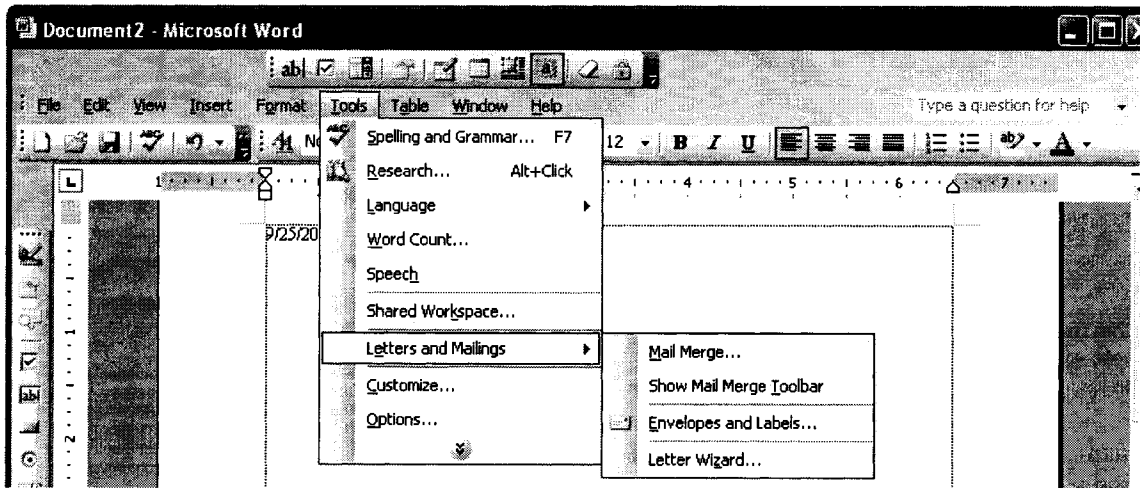
- Launch Word.
- Choose Insert then select Date and Time and today's date.



- Press Enter Key three (3) times to make some space.

Select An Access Database To Merge

- Click on Tools and then Letters and Mailings.
- Select Mail Merge from the Letters and Mailings menu.

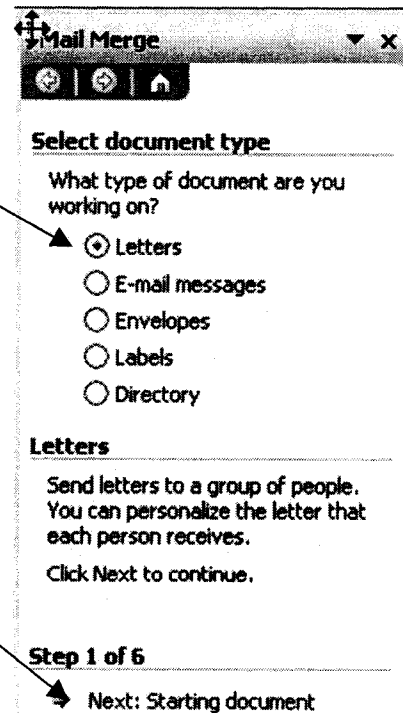


- Click the Letters button to create the static part of the form letter – the part that doesn't change from data record to record.

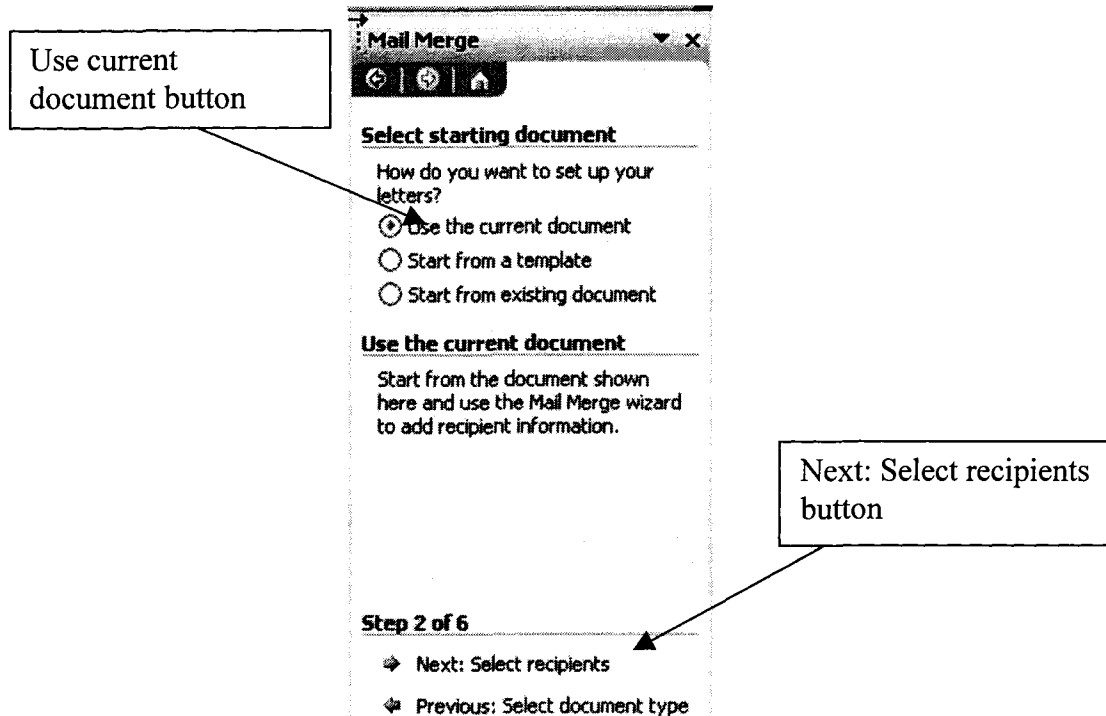
Letters button

- Click Next: Starting Document.

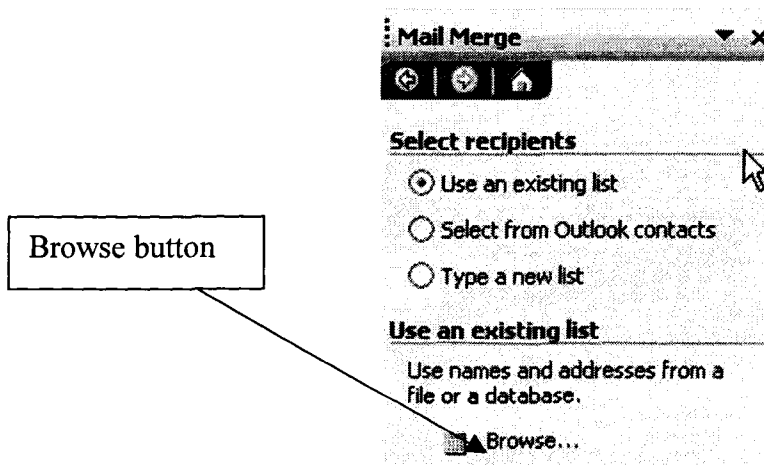
Next: Starting document button



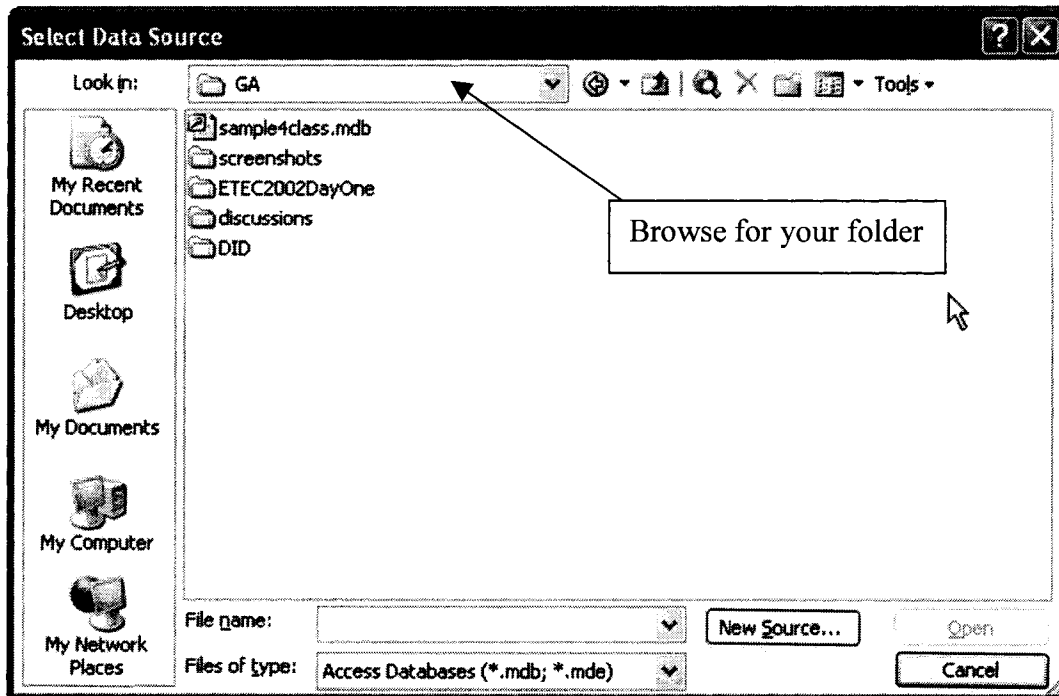
- Choose Use the current document instead of creating a new one.
- Then click on Next: Select recipients.



- Click Use an existing list and then click the Browse button.

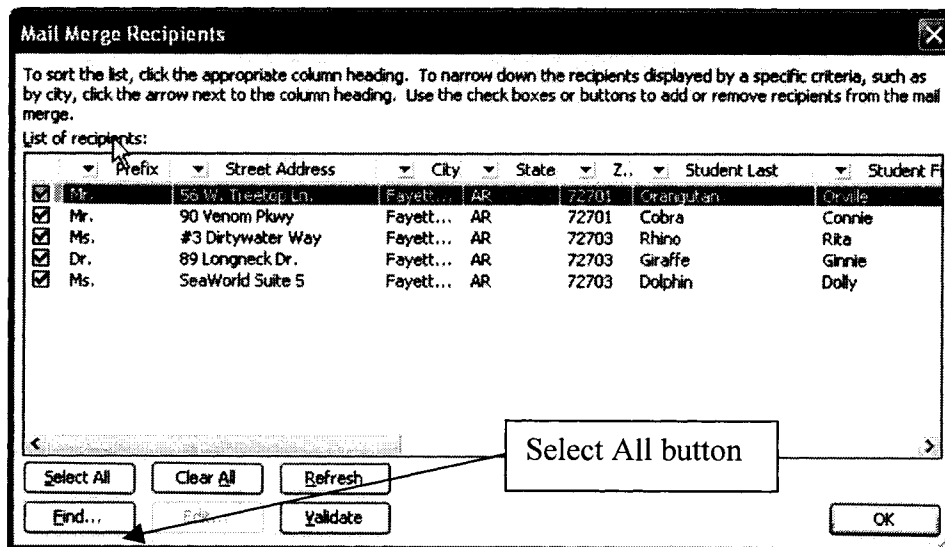


- Browse to locate your folder, change the file type to “Access Databases”. Here you should be able to locate and open your Access database file.



Microsoft Word will launch Access (unless it is already running). This may take a few minutes.

- Click on Select All when the dialog box appears. Make sure that there is a check mark beside all entries.



- Click OK.

Insert An Address Block

- Click on Next: Write your letter. (See figure 1).
- Click on the Address block to create your address line (See figure 2).

To add recipient information to your letter, click a location in the document, and then click one of the items below.

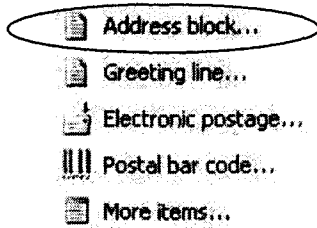


Figure 2

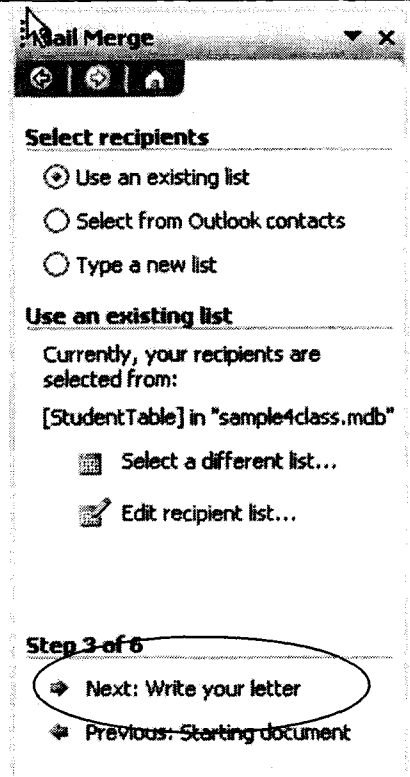
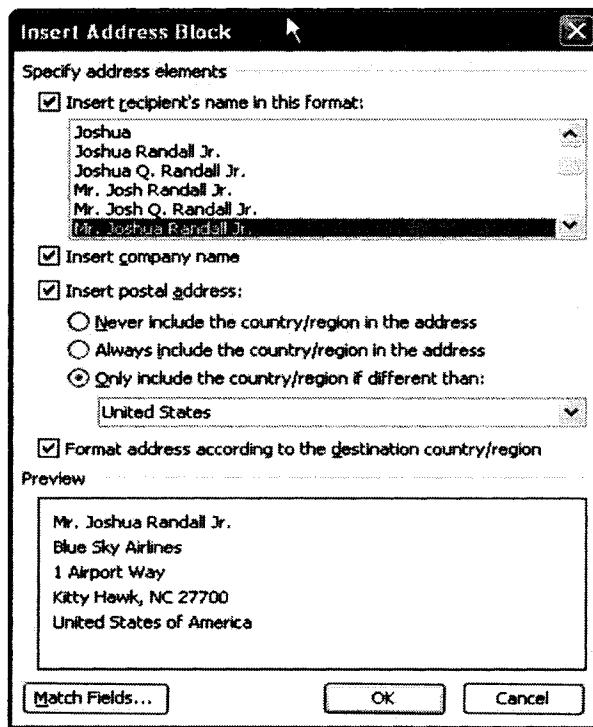
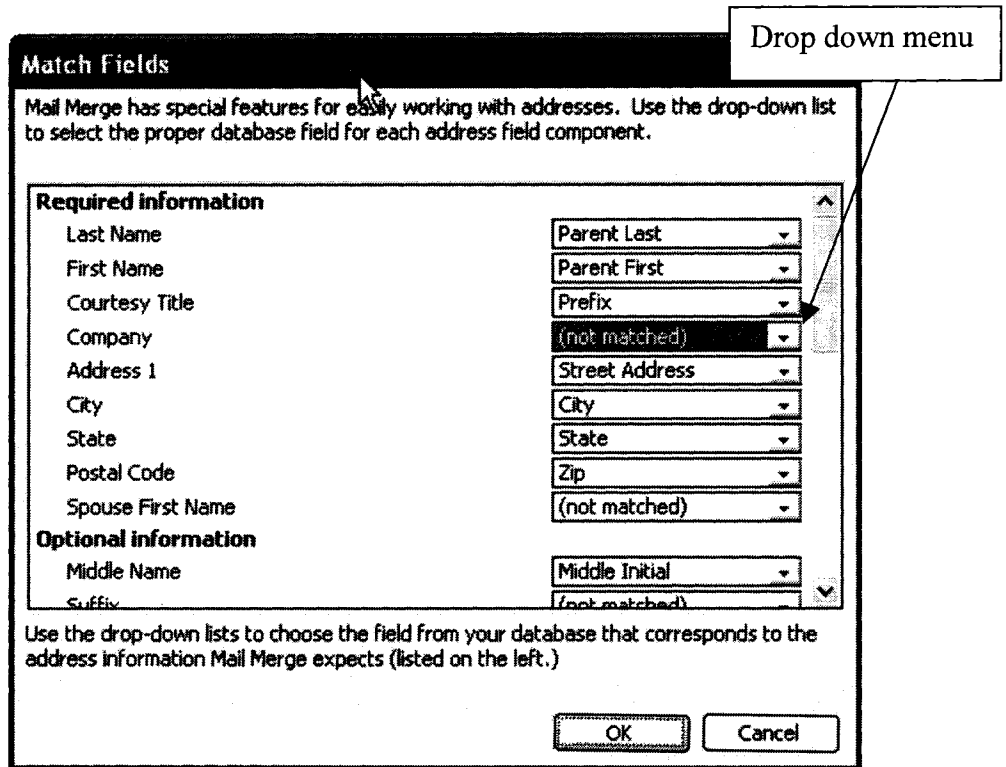


Figure 1



- Insert Address Block window should appear (See figure 3).
- Click on Match Fields to set up the address.

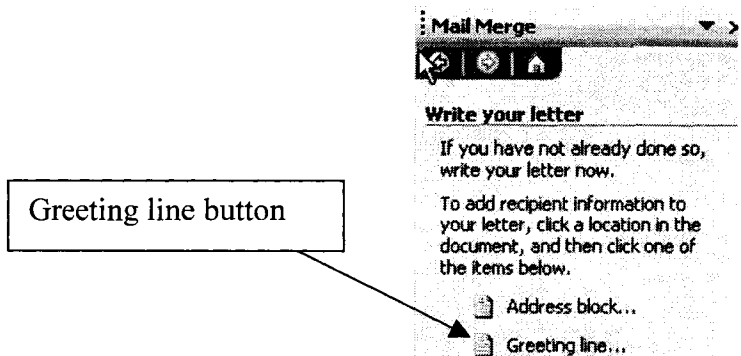
- To set up the address, use the drop down menus to set up the required information. For example, Last Name should be “Parent Last”.



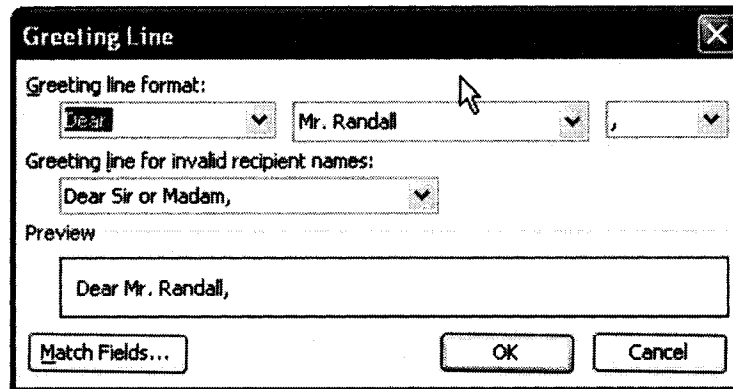
- Change the remaining drop down menus for: First Name, Courtesy Title, Address 1, City, State, and Postal Code.

Insert Greeting Line

- Enter down three (3) times and click on Greeting Line to create a greeting.



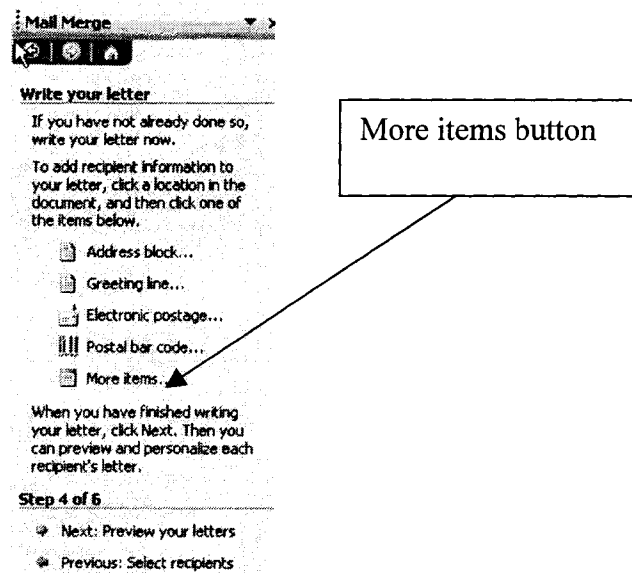
- The Greeting Line box will appear.



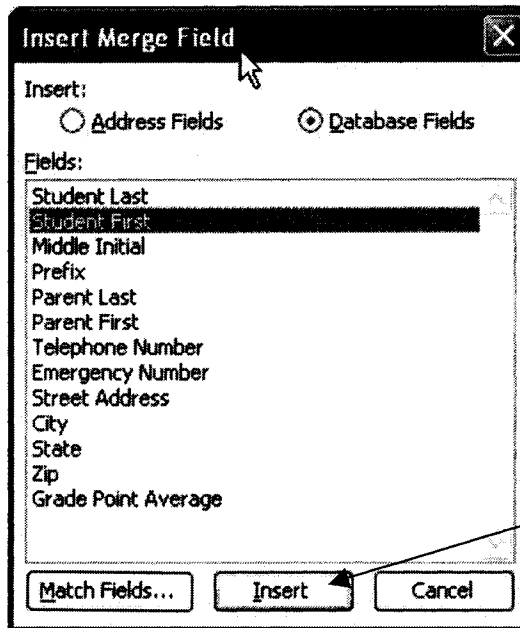
- Click OK to continue.

Adding Fields To The Body Of The Letter

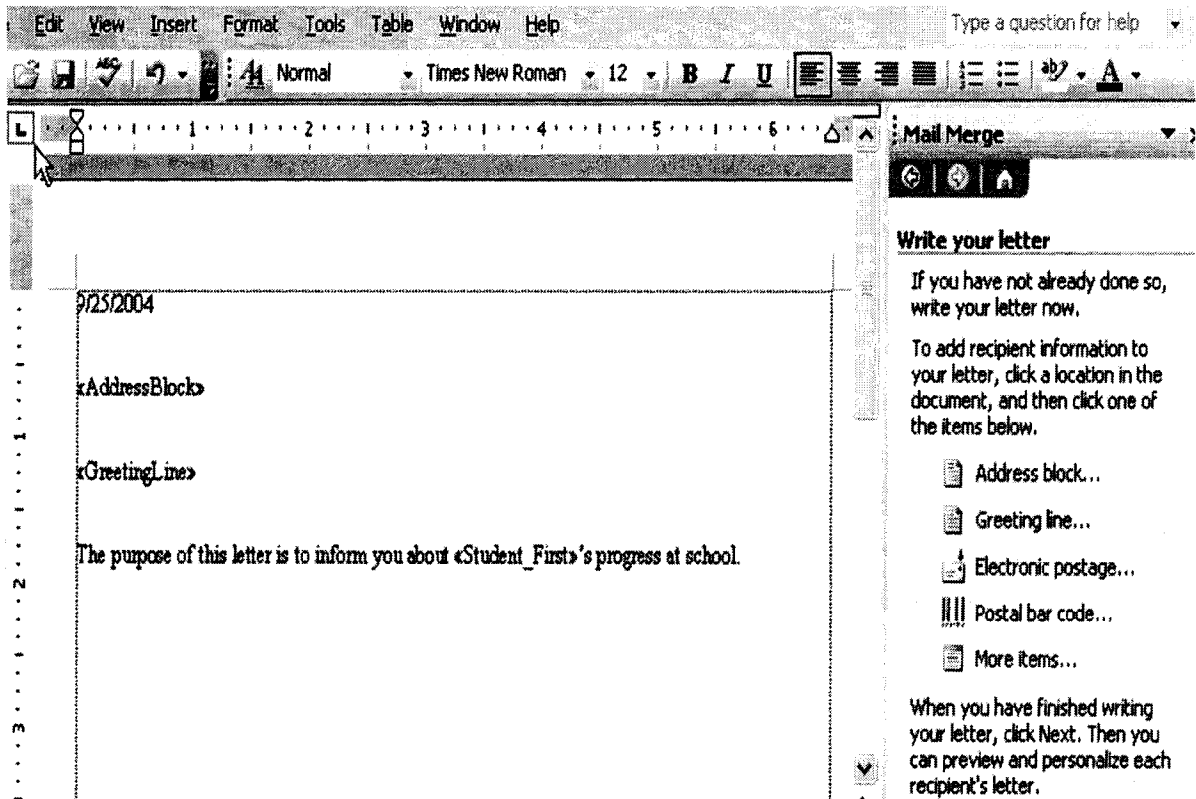
- To add a field to the body of your letter, you will need to click on More items.
- Next you will choose the field that you want, for example, “Student First”.



- Click on Insert.

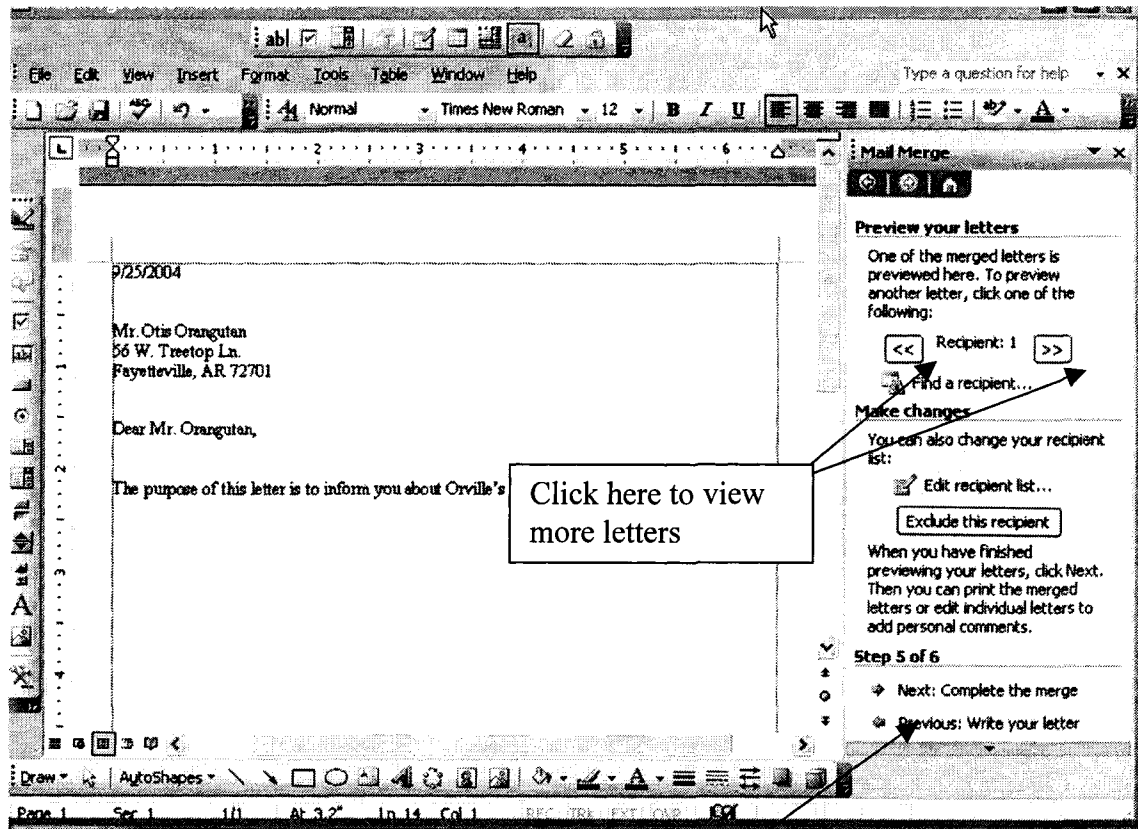


- Your form letter will look like the example below.

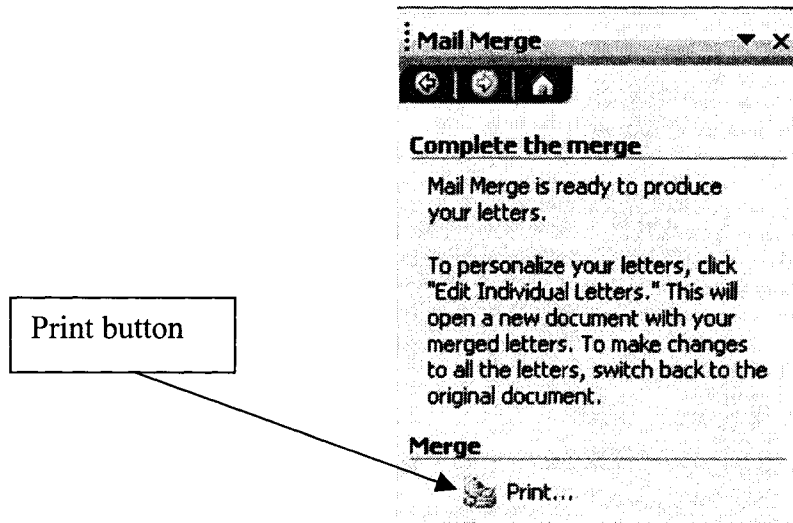


Preview And Print Form Letters

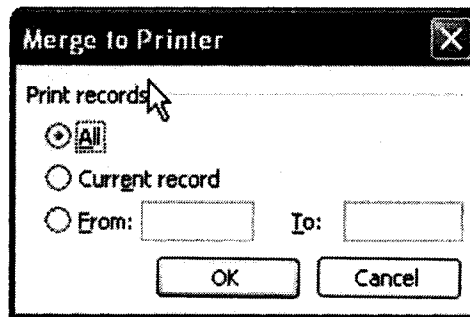
- To preview your letter, click on Next: Preview your letter.
- Below is an example of what your letter will look like. To view information for different people, click on the buttons to the right.

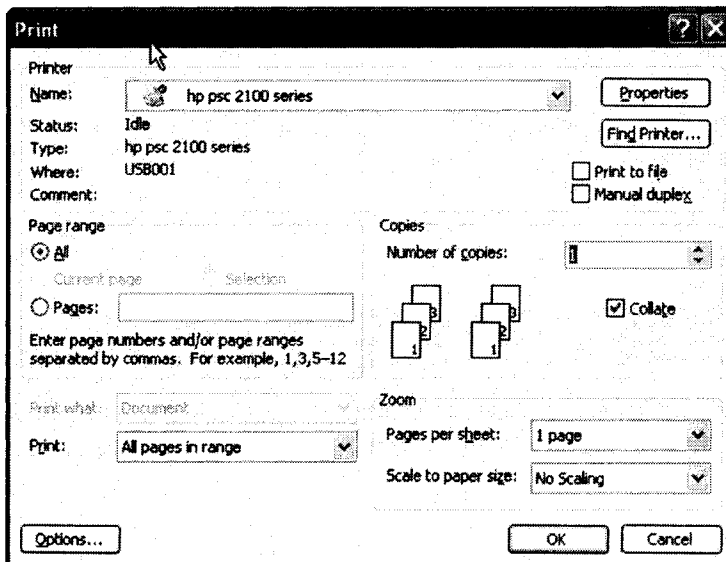


- To finish writing your letter, click on Previous: Write your letter. After you finish writing the letter and have previewed it, click on Next: Complete the merge to print the letters.
- To print the letter, click Print.



- Determine if you want to print All records, Current record, or a range of records.
- Click OK.





- Click OK when the printwindow pops up.

Appendix E

Instructional Unit for Creating Grade Book Using MS Excel

Creating a Grade Book Using Excel

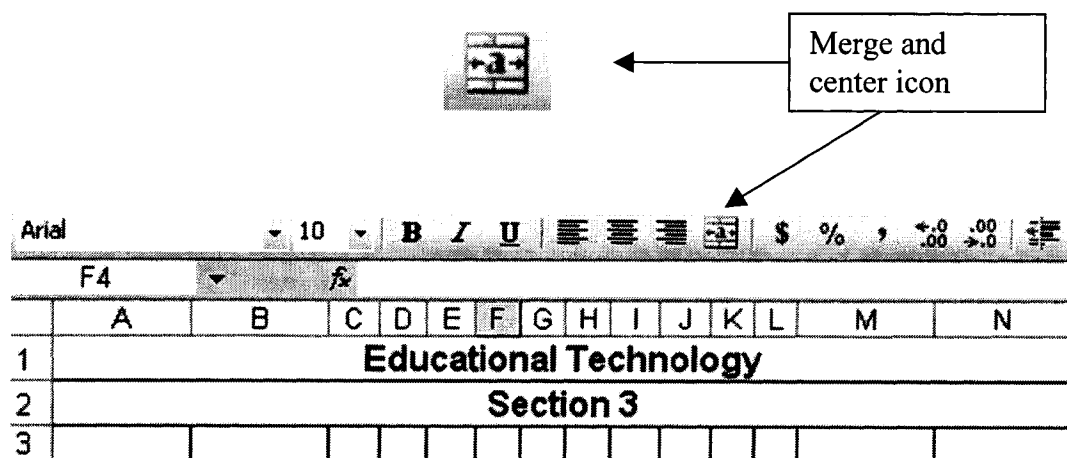
Objectives: After this lesson you will be able to:

- Set up a grade book in Microsoft Excel
- Calculate the total number of points for each student
- Calculate the grade percentage for each student
- Sort data.
- Create a chart (graph) of your student data
- Name and print your grade book (spreadsheet) and graph

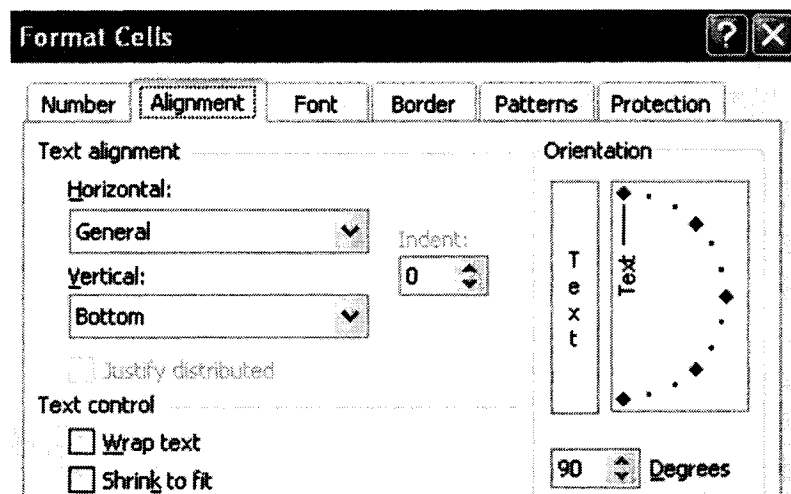
The first thing you need to do before entering data is to set up the structure of your grade book.

Setting Up a Grade Book

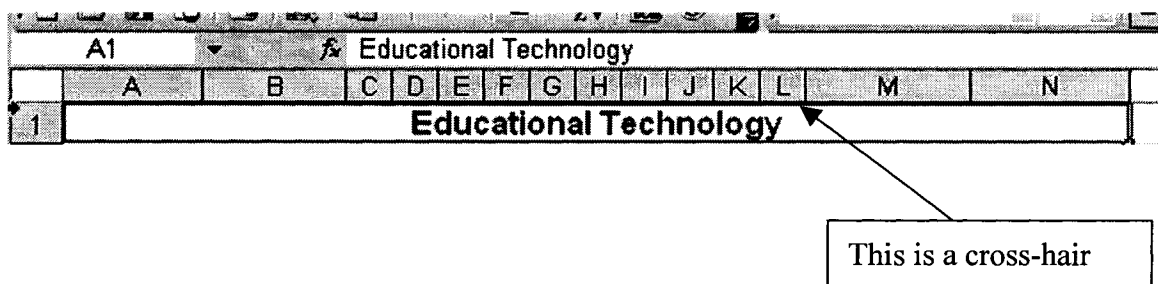
- Open Microsoft Excel.
- Save your file. Be sure to save often!
- Type a title at the top of Sheet 1 with the name of the class and the semester of the class that is being taught; use a larger font for the title.
- To center the title across columns, highlight the number of columns you want your title to spread across and locate and click on the Merge and Center icon.



- In Column A, row 4, type Last Name
- Tab to B4 and type First Name
- Tab to C4 and begin typing names of homework assignments (at least 10). For each homework assignment, use a different cell.
- The last two columns will be named Total Points and Percentage.
- Rotate the text of the homework assignments to 90 degrees:
- Highlight the desired cells.
- Right click using your mouse.
- Choose Format Cells (third from bottom) on menu.
- Choose the tab named Alignment.



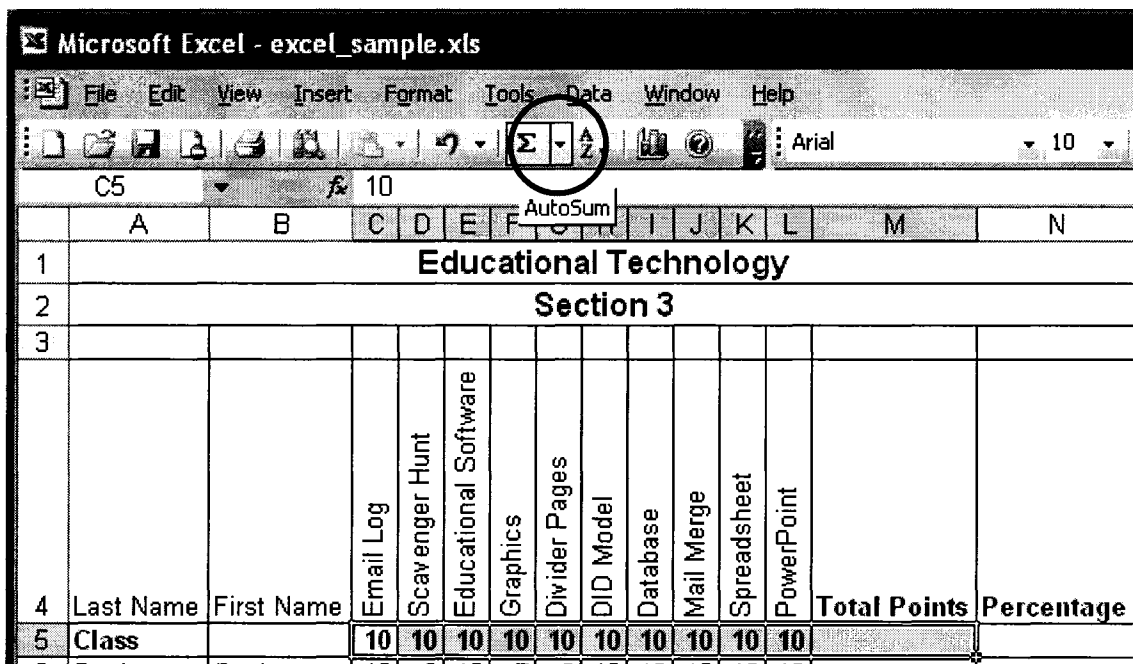
- Move over to the Orientation section of the Format Cells box and use the mouse to move the Text line to “90 degrees” (or type “90” in the box next to Degrees).
- Highlight the letters at the top of each column and drag your mouse over to the last row in your spreadsheet.



- Put your cursor on one of the cross-hair lines between two letters (columns) and double click. This will expand your columns to fit your data.
- After you have fixed the size of your cells, begin to fill in the total points possible for each assignment. This will give you a standard by which your students will be graded against.

Calculating Total Points for Each Student

- Fill in 10 rows worth of data (use fictional information).
- Sum each row, using the AutoSum calculation icon. This is done by highlighting the cells to be calculated and the Total Points cell in that row.

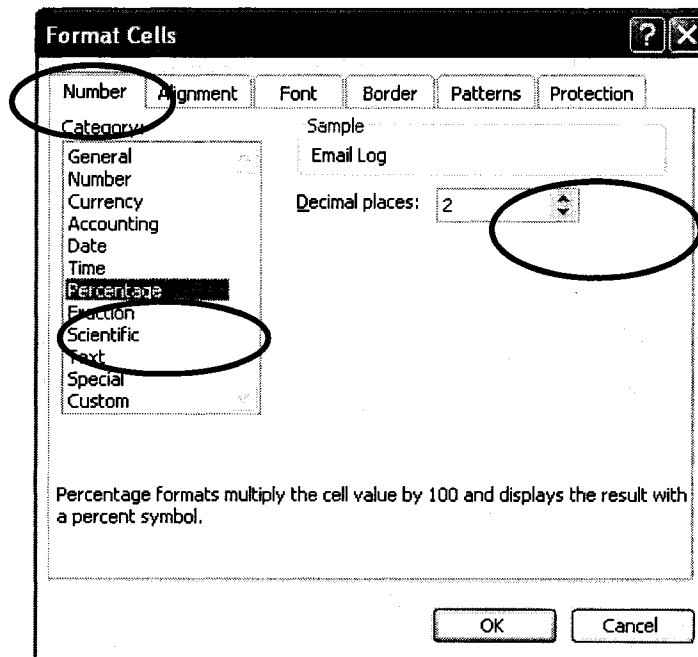


Calculating Percentages for Each Student

- In the first cell underneath “Percentage” type =XY/Z, where X is the letter of the column for “Total Points”, Y is the row number for the student, and Z is the number of Total Points. For this example, X= M, Y= 5, and Z= 100, so you will type: =M5/100 in cell N5.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Educational Technology													
2	Section 3													
3														
4	Last Name	First Name	Email Log	Scavenger Hunt	Educational Software	Graphics	Divider Pages	DID Model	Database	Mail Merge	Spreadsheet	PowerPoint	Total Points	Percentage
5	Class		10	10	10	10	10	10	10	10	10	10	100	=M5/100

- To format your Percentage column into an actual percentage, click on the letter at the top of the Percentage column. In this example, click on the letter “N” to highlight the column.
- Using the mouse, right click and choose Format Cells.
- Click on the tab for Number and then choose Percentage. (The “Decimal Places” should have a default value of 2.)



- Click OK.
- Copy the formula to the student data rows. Click in the cell of the Class Percentage, click on the copy icon (using the key sequence Ctrl-c does the same as copy). Highlight the cells below the Class Percentage and click on the paste icon (or ctrl-v).

Sorting Data

- Highlight all the student data, EXCEPT any columns containing formulas. Also, there is no need to sort the class points possible row.
- Move your cursor to the menu bar, select Data, and select Sort.
- Choose column A, Ascending order (A to Z), Click OK. This will sort your information by Student's Last Name in ascending order; if you want descending order; choose Descending (Z to A).

4	Last Name	First Name	Email Log	Scavenger Hunt	Educational Software	Graphics	Divider Pages	DID Model	Database	Mail Merge	Spreadsheet	PowerPoint	Total Points	Percentage
5	Class		10	10	10	10	10	10	10	10	10	10	100	100.00%
6	Student	Suzie	10	8	10	7	9	10	10	10	10	10	94	94.00%
7	Rooter	Roscoe	10	10	10	10	10	8	10	10	10	5	93	93.00%
8	Island	Nomanisan	7	10	10	10	10	9	10	10	10	10	96	96.00%
9	Masu	Teera	10	10	10	10	10	10	10	10	10	10	100	100.00%
10	Eenspays	Lahst	10	10	10	10	10	8	10	10	10	5	93	93.00%
11	Haags	Goh	10	10	10	10	10	10	10	10	10	10	100	100.00%
12	Lamm	Lyti	10	10	10	10	10	10	10	10	10	10	100	100.00%
13	Yurmny	Cher	10	10	10	10	10	10	6	10	10	5	91	91.00%
14	Chance	Lass	10	10	10	10	10	10	10	10	10	10	100	100.00%
15														

Changing Cell Color

- Highlight the Total Points column all the way down to the last record.
- Select the arrow next to the paintcan for the color drop down menu.
- Select a color. The column you have selected, will change to that color
- Repeat step and select a different color for **Percentage** column

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Educational Technology															
2	Section 3															
3																
4	Last Name	First Name	Email Log	Scavenger Hunt	Educational Software	Graphics	Divider Pages	DID Model	Database	Mail Merge	Spreadsheet	PowerPoint	Total Points	Percentage		
5	Class		10	10	10	7	9	10	10	10	10	10	100	100.00%		
6	Student	Suzie	10	8	7	10	10	10	10	10	10	10	94	94.00%		
7	Rooter	Roscoe	10	10	10	10	10	8	10	10	10	5	93	93.00%		
8	Island	Nomanisan	7	10	10	10	10	9	10	10	10	10	96	96.00%		
9	Masu	Teera	10	10	10	10	10	10	10	10	10	10	100	100.00%		
10	Eenspays	Lahst	10	10	10	10	10	8	10	10	10	5	93	93.00%		
11	Haags	Goh	10	10	10	10	10	10	10	10	10	10	100	100.00%		
12	Lamm	LytI	10	10	10	10	10	10	10	10	10	10	100	100.00%		
13	Yummy	Cher	10	10	10	10	10	10	6	10	10	5	91	91.00%		
14	Chance	Lass	10	10	10	10	10	10	10	10	10	10	100	100.00%		
15																

Student Data Charts

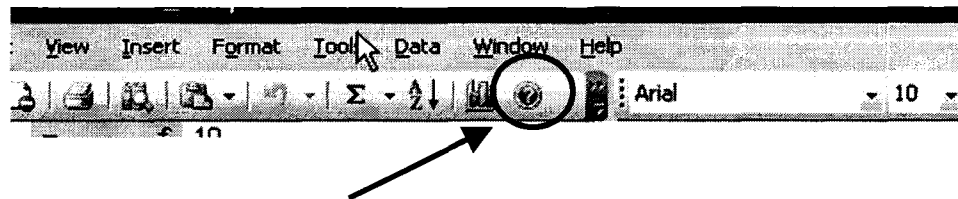
- Highlight the information you wish to be included in your Chart. First select the items you want to be in the X axis.

4	Last Name	First Name	Email	Scav	Educ	Graph	Divid	DID N	Datab	Mail I	Spre	Power	Total Points	Percentage
5	Class		10	10	10	10	10	10	10	10	10	10	100	100.00%
6	Student	Suzie	10	8	10	7	9	10	10	10	10	10	94	94.00%
7	Rooter	Roscoe	10	10	10	10	10	8	10	10	10	5	93	93.00%
8	Island	Nomanisan	7	10	10	10	10	9	10	10	10	10	96	96.00%
9	Masu	Teera	10	10	10	10	10	10	10	10	10	10	100	100.00%
10	Eenspays	Lahst	10	10	10	10	10	8	10	10	10	5	93	93.00%
11	Haags	Goh	10	10	10	10	10	10	10	10	10	10	100	100.00%
12	Lamm	LytI	10	10	10	10	10	10	10	10	10	10	100	100.00%
13	Yurmny	Cher	10	10	10	10	10	10	6	10	10	5	91	91.00%
14	Chance	Lass	10	10	10	10	10	10	10	10	10	10	100	100.00%

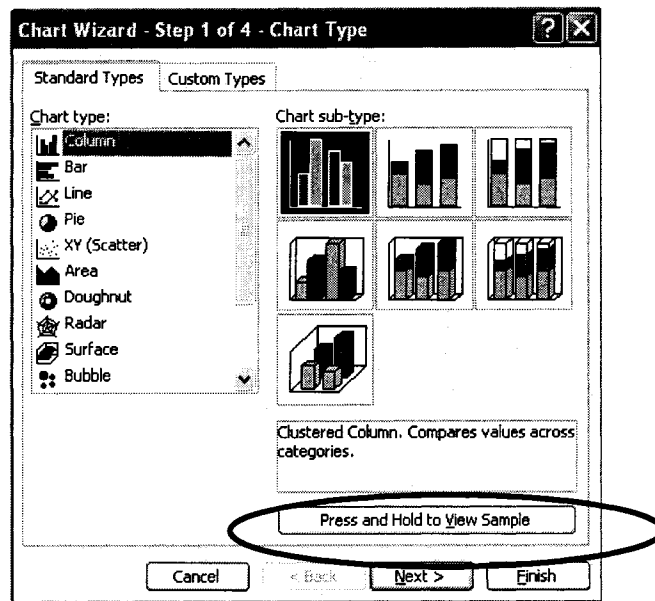
- Press and hold the "Ctrl" key. Then select the information you want in the Y axis.

4	Last Name	First Name	Email Log	Scavenger	Education	Graphics	Divider Pa	DID Model	Database	Mail Merg	Spreadshe	PowerPoir	Total Points	Percentage
5	Class		10	10	10	10	10	10	10	10	10	10	100	100.00%
6	Student	Suzie	10	8	10	7	9	10	10	10	10	10	94	94.00%
7	Rooter	Roscoe	10	10	10	10	10	8	10	10	10	5	93	93.00%
8	Island	Nomanisan	7	10	10	10	10	9	10	10	10	10	96	96.00%
9	Masu	Teera	10	10	10	10	10	10	10	10	10	10	100	100.00%
10	Eenspays	Lahst	10	10	10	10	10	8	10	10	10	5	93	93.00%
11	Haags	Goh	10	10	10	10	10	10	10	10	10	10	100	100.00%
12	Lamm	LytI	10	10	10	10	10	10	10	10	10	10	100	100.00%
13	Yurmny	Cher	10	10	10	10	10	10	6	10	10	5	91	91.00%
14	Chance	Lass	10	10	10	10	10	10	10	10	10	10	100	100.00%

- Press the Chart Wizard.



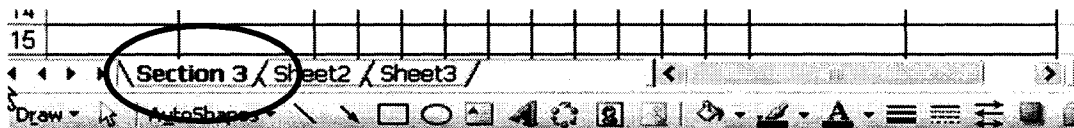
- Choose the type of Chart you wish to be created.



- To preview the look of your Chart, click Press and Hold to View Sample.
- Click Next, and Next again
- Give your Chart a title and name the axis
- Click Finish for your chart to be placed on your worksheet.
- Manipulate the data in your worksheet to see how your chart will change automatically.

Naming Worksheets

- There are 3 tabs at the bottom named Sheet 1, Sheet 2, and Sheet 3.
- Right click on Sheet 1 (the sheet you are working in currently).
- A menu will appear, choose Rename and type in the name you want to call your worksheet (must be something other than Sheet 1).



Naming and Printing Spreadsheet and Graph

- Make sure that your file is saved.
- Starting at the lower right-hand corner of your data, highlight the information in your worksheet.
- Move the cursor from the lower right-hand corner up to the top left-hand corner.

Microsoft Excel - excel_sample.xls

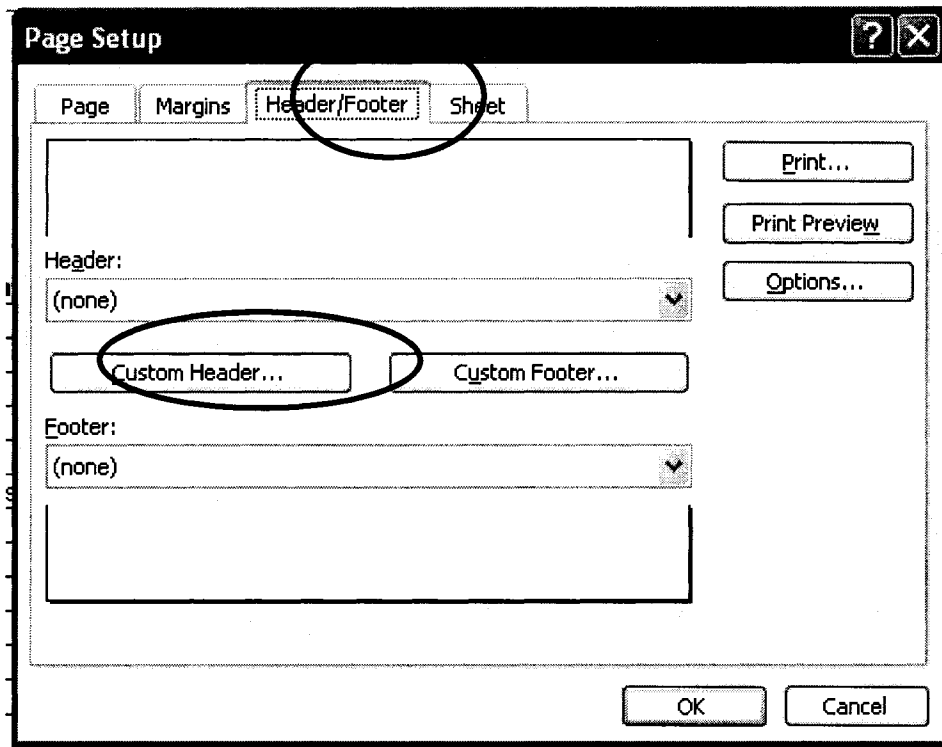
File Edit View Insert Format Tools Data Window Help

Σ - 10 B

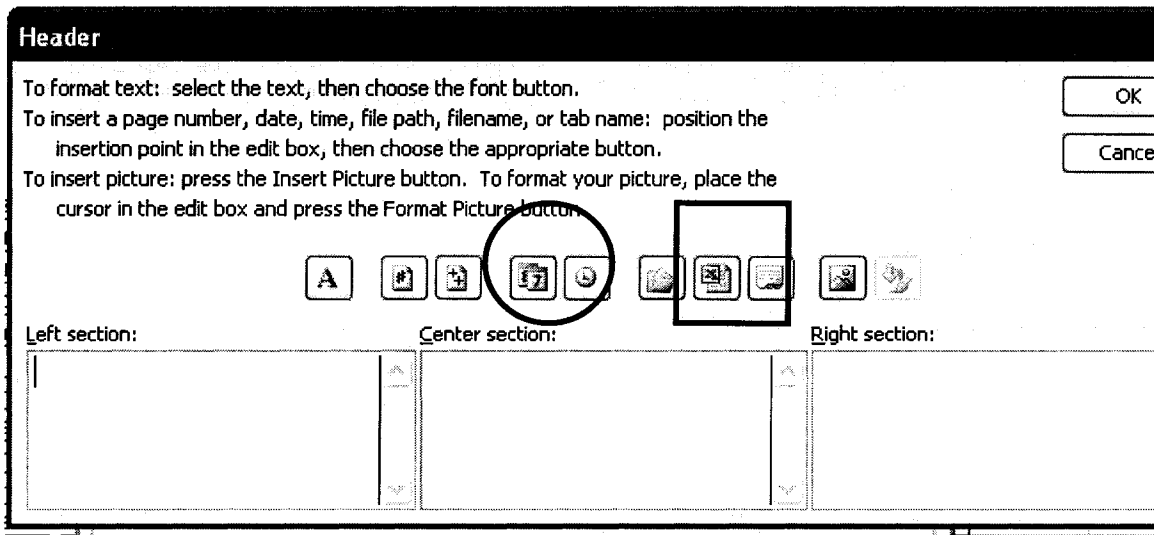
N14 =M14/100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
4	Last Name	First Name	Email Log	Scavenger Hunt	Educational Software	Graphics	Divider Pages	Word Model	Database	Mail Merge	Spreadsheet	PowerPoint	Total Points	Percentage
5	Class		10	10	10	10	10	10	10	10	10	10	100	100.00%
6	Student	Suzie	10	8	10	7	9	10	10	10	10	10	94	94.00%
7	Rooter	Roscoe	10	10	10	10	10	8	10	10	10	5	93	93.00%
8	Island	Nomanisan	7	10	10	10	10	9	10	10	10	10	96	96.00%
9	Masu	Teera	10	10	10	10	10	10	10	10	10	10	100	100.00%
10	Eenspays	Lahst	10	10	10	10	10	8	10	10	10	5	93	93.00%
11	Haags	Goh	10	10	10	10	10	10	10	10	10	10	100	100.00%
12	Lamm	LytI	10	10	10	10	10	10	10	10	10	10	100	100.00%
13	Yurmny	Cher	10	10	10	10	10	10	6	10	10	5	91	91.00%
14	Chance	Lass	10	10	10	10	10	10	10	10	10	10	100	100.00%
15														
16														

- Go to the Menu, File, Print Area, Set Print Area (this will be the only information printed).
- If you did not include the chart in the “Set Print Area”, you can click on the chart and then print.
- Now go to File, Page Setup, choose Landscape.
- Click on the Header/Footer Tab and choose Custom Header.



- By choosing Custom Header you can add your own information into the printed headers and footers of your document.
- You will need to add your Name, Section Number, Worksheet Name, and Date. The left section refers to the Left Section of your printed document; Center Section refers to the center of the printed document and the same for Right Section.
- Decide where you want your name to appear on the document and type your name.



- The buttons above the section areas will automatically add information from the document into your printed document for you.
- The circled buttons will add the date and time
- The buttons that have a square around them will add the name of the file and the name of the worksheet into the document for you.
- When you are finished click OK, and then OK again.
- Make sure your document looks the way you want it to look before printing it by going to File, Print Preview.
- If everything looks good, click Print.

Appendix F
Assignments Rubrics

Database Rubric

Name: _____ Section: _____ Date: _____

10 students	4 points	_____
15 fields Student Last Name, Student First Name, Parent Prefix, Parent Last Name, Parent First Name, Street Address, City, State, Zip Code, Telephone Number, plus 5 of your own choosing	3 points	_____
Alphabetize the student list	1 point	_____
Capitalize and punctuate where necessary	1 point	_____
Appropriate column width	1 point	_____
Total Points Possible for Database	10 points	_____

“Please save the final version of this assignment in your Portfolio folder”

Mail Merge Rubric

Name: _____ Section: _____ Date: _____

Using the database previously created:

Form has date field and merged letters have corresponding text	1 points	_____
Form has Parent Address field and merged letters have corresponding text	1 point	_____
Form has Salutation field and merged letters have corresponding text	1 points	_____
Body of letter is at least 3 paragraphs	3 point	_____
Merged letters contain a Complimentary Closing	1 point	_____
Signature (sign the merged letters)	1 point	_____
Submit the Form to the assignment drop box in Blackboard. The form should include at least 2 different fields in the body of letter (merged letters will have the corresponding text).	2 point	_____
Total points possible for Mail Mege documents	10 points	_____

“Please save the final version of this assignment in your Portfolio folder”

Excel Grade Book Rubric (1)

Name: _____ Section: _____ Date: _____

Grade book contains 10 students records 2.5 pts _____

Grade book contains 14 fields including:
Last Name, First Name, ten homework assignments, Total Points,
and Percentage 2.5 pts _____

Fictitious course name merged and centered across grade book 1 pt _____

Homework names cells oriented to "90 degrees" 1 pt _____

Column width adjusted to fit data 1 pt _____

Total points calculated for each student in the grade book 1 pt _____

Percentage is calculated for each student in the grade book 1 pt _____

Total points possible for Spreadsheet (1) 10 pts _____

"Please save this file and use it for the second part of the lesson"

Excel Grade Book Rubric (2)

Name: _____ Section: _____ Date: _____

Use the file created in Spreadsheet (1) 1 pt _____

Records are sorted by Last Name 1 pt _____

At least two columns in the grade book have different colors 2 pts _____

Students data is presented in a Chart 4 pts _____

Rename your spreadsheet 1 pt _____

Header and Footer (with name and date) 1 pt _____

Total points possible for Spreadsheet (2) 10 pts _____

“Please save the final version of this assignment in your portfolio folder”