COMPARISON OF GRADE PERFORMANCE BETWEEN
TRADITIONAL LEARNERS
AND
WORLD WIDE WEB BASED DISTANCE LEARNERS

CED 670 RESEARCH PROJECT

Submitted in Partial Fulfillment of the Requirements
For the Degree of
Masters of Arts in Education
(Concentration in Instruction)
Central Michigan University

Submitted by
Thomas J. Zakrzewski

Submitted To:
Monitor

March 21, 2002
# TABLE OF CONTENTS

## CHAPTER I: DEFINITION OF THE PROBLEM

- Background ........................................................................................................ 4
- Personal Statement ............................................................................................ 5
- Purpose of the Study ......................................................................................... 6
- Statement of the Problem .................................................................................. 7
- Definition of Terms ............................................................................................ 7
- Limitations of the Study ..................................................................................... 9

## CHAPTER II: REVIEW OF THE LITERATURE

- Introduction ........................................................................................................ 11
- A Similar Study ................................................................................................... 12
- Differences Between Distance Learning and Traditional Learning .................. 12
- The Social Nature of Distance Learning ............................................................. 14
- Distance Learning on the Internet and World Wide Web .................................. 15
- Student Development in the New Environment ................................................. 17
- Self-Directed Learners ...................................................................................... 18
- Students’ Frustration with a Web-based Distance Learning Course .................. 19
- Summary ............................................................................................................. 20

## CHAPTER III: METHODOLOGY

- Introduction ........................................................................................................ 22
- Population and Sample ....................................................................................... 23
- Data Collection Methods .................................................................................... 23
- Reliability and Validity ....................................................................................... 24
CHAPTER I: DEFINITION OF THE PROBLEM

Background

Technology is opening up many new options for students. Students who wish to continue their education are no longer limited to a traditional classroom setting. To accommodate students, colleges and universities now commonly offer classes in a variety of formats, from television classes to classes via the Internet. Gubernick and Ebeling (1997) estimated that 55% of U.S. colleges and universities now offer courses off site. Even universities with prestigious academic reputations are adding distance-learning options (Gubernick & Ebeling, 1997).

The World Wide Web provides new opportunities for distance education over the Internet. World Wide Web-based distance learning is defined as a planned teaching/learning experience that uses a wide spectrum of technologies to teach learners at a distance and it is designed to teach students who do not have easy access to a traditional classroom. This new instruction and learning method has posed many new questions about the effectiveness of Web-based distance learning as compared to learning in a traditional setting.

A new national report raises questions about the effectiveness of the increasingly-popular use of "distance learning" in higher education and whether it is on par with traditional classroom-based instruction. The report reviews a broad array of research and articles about technology-based distance education and finds that there are significant gaps in the research and important flaws in the methodology of many studies.
These findings refute the evidence often cited by policy leaders and distance education advocates that suggests there is no significant difference in the educational effectiveness of Web-based distance learning as compared to traditional classroom-based instruction. Most of the studies conclude that distance learning compares favorably with classroom-based instruction in terms of student grades, test scores, and overall satisfaction.

**Personal Statement**

The implementation of distance learning courses is becoming almost commonplace at the college level. Oakland Community College is no exception to this educational practice. Implementation of distance learning courses at Oakland Community College is done in order to offer the students a non-traditional and possibly a more convenient approach to completing their coursework. Currently the researcher instructs a hybrid distance-learning course in which the student does a large portion of work from home and attends a classroom lecture every third week. Several questions have been raised since the implementation of distance learning courses

How do we as educators know which students are best suited for these self-directed courses?

What type of learner is most likely to benefit from a course that is self-directed?

What strategies does the instructor have to use for the students to be successful in a self-directed distance-learning course?

Do students receive similar results in distance learning courses as compared to a course in a traditional setting?
The Computer Information Systems Department at Oakland Community College as a group has concerns about the delivery of material in an Internet based distance-learning course. The researcher is an instructor in a traditional classroom setting and would like to compare the performance of students in World Wide Web-based distance learning courses to students enrolled in traditional classroom courses.

**Purpose of the Study**

The researcher would expect to find that Web-based distance learning students do not perform as well as students attending a class in a traditional setting. The researcher believes that traditional students have a distinct advantage to perform at a higher level than a Web-based distance learner because they will have access to an instructor and other learning resources on a regular basis. Learning resources would include direct access to tutors, lab assistants and other instructors. The opportunity to collaborate with fellow colleagues could also provide an advantage for the traditional classroom student to perform at a higher level than a Web-based learner. Studies also conclude that similar factors determine successful learning whether the students are distant or traditional. These factors include:

- Willingness to initiate calls to instructors for assistance.
- Possessing a more serious attitude toward the courses.
- Employment in a field where career advances can be readily "achieved through academic upgrading in a distance education environment" (Ross & Powell, 1990).
- Previous completion of a college degree (Bernt & Bugbee, 1993).
It is common for students in many on-line courses to work alone, often at home in the evenings or weekends. However, it is hard for students who work under these conditions to resolve some of the kinds of potentially frustrating problems that can typically be discussed and resolved more readily in a face-to-face class meeting.

The purpose of this study is to evaluate Web-based distance learning as an effective mode of course delivery and to show that there is no significant difference between grade results of Web-based students and students who learn in a traditional setting.

**Statement of the Problem**

The researcher is going to examine success and failure rates of students who enroll in World Wide Web-based distance-learning courses and compare these rates to students who enroll in traditional classes. The researcher will use the students’ final letter grade as the comparison measurement. This study will also show a comparison of students who are enrolled in World Wide Web-based distance learning courses and students enrolled in traditional courses. Comparison of the number of students who complete a traditional course and a Web-based distance-learning course will also be researched.

**Definition of Terms**

Internet - The global network of computers constantly connected to each other using standardized communications protocols, specifically TCP/IP.
**Multimedia** - This refers to any use of audio or video in a computer. In simplest terms, this refers to the basic functions of sound cards and video cards. In addition the term also covers television and video integration in computers.

**World Wide Web** - This is basically a particular means of communicating text, graphics and other multimedia objects over the Internet. Think of the Internet as a 100-lane highway, and the Web as one of those lanes. Of course, traffic in the Web lane is probably very high compared to traffic in most other lanes.

**Distance Education** is instructional delivery that does not constrain the student to be physically present in the same location as the instructor. Historically, Distance Education meant correspondence study. Today, audio, video, and computer technologies are more common delivery modes.

**Distance Learning** is institutions/instructors control educational delivery while the student is responsible for learning. Distance Learning is the result of Distance Education.

**Distributed Learning** says that information can be anywhere and that the teacher and students can find and use it to create and transmit knowledge in non-traditional and arguably better ways (and, no, the students and teachers need not be in the same physical location, but that is secondary and may even be irrelevant.) Explosive growth of the Web is the breakthrough that makes distributed learning possible.

**FirstSearch** is an interactive, online information system that provides access to over 60 databases, some of which make the full-text of journal articles available online.

**Self-Efficacy** in academic learning refers to one’s convictions to perform successfully at designated levels.
**Self-Directed Learning** When you take on the responsibility for your own continuous learning, having control over your learning becomes very important. Self-directed learning is a strategy that provides you with that control. Through self-directed learning you control: what you want to learn, how you want to learn, and when you want to learn. (Knowles, 1975)

**Distance Education Defining Elements**

- The separation of teacher and learner during at least a majority of each instructional process.
- The use of educational media to unite teacher and learner and carry course content.

The provision of two-way communication between teacher, tutor, or educational agency and learner

**Limitations of the Study**

A proper sample size may be difficult to achieve based on class offerings and cancellation of courses. I believe that the type of course may be more conducive to distance learning. Many distance education courses have relatively small class sizes with students from various backgrounds. These small, stratified populations typically defy relevant statistical analysis.

The research does not take into account differences among students. A substantial portion of research on distance learning has been conducted to demonstrate no significant difference in achievement levels between groups of distance and traditional learners. However, there is wide variance of achievement and attitudes within the groups, which indicates that learners have a variety of different characteristics. The factors influencing
these differences could include gender, age, educational experience, motivation, and others. Gathering samples of students and amalgamating them into averages produces an illusory “typical learner,” which masks the enormous variability of the student population. Further research needs to focus on how individuals learn, rather than how groups learn. (Phipps, R. & Merisotis, J. 1999)

The research does not take into consideration how the different learning styles of students relate to the use of particular technologies. Understanding of how the learner, the learning task, and a particular technology interact is limited. Learner characteristics are a major factor in the achievement and satisfaction levels of the distance learner. Information regarding a student’s preferred learning style will influence how the course is designed and the type of technology to be used. Additional research could result in more information regarding why different technologies might be better suited for specific learning tasks.
CHAPTER II: REVIEW OF THE LITERATURE

Introduction

Relevant literature was obtained through several different methods. The following process was used to locate appropriate research materials.

The first research tool was the use of the msn.com search engine on the Internet. A search containing the text “Web-based distance learning versus traditional learning” was submitted and found 5996 hits. A review of the first 60 Web sites found that two sources appear to have relevant information for this research topic. The first site was titled Distance Education Primer Master Index. The second site was titled Evaluation of Online Learning.

A second Internet query was a search for “Web-based distance learning versus traditional learning” on yahoo.com. The yahoo site provided 5502 hits. After reviewing the first one hundred hits one site appeared to have useful information. There were many hits that overlapped from the search on msn.com. The title of the site found on yahoo.com is Internet and Teaching.

Research material was also obtained via access to Central Michigan Universities Off Campus Library Service. A search of the ERIC database was done and the following key word search string was entered: “distance learning Internet assess”, 42 documents 25 returned. One relevant article that relates to this research topic was found, the title is as follows: How Is Assessment Being Done in Distance Learning?

Many other sources of information on Web-based distance learning have been accumulated throughout the researchers graduate studies. There are thirty-one Web sites from this list of which twenty have had pertinent information for use in this thesis. These
Web sites were obtained from the following search engines: Ask.com, Yahoo.com, Msn.com, Excite.com, and Lycos.com.

Several books and articles on Distance Learning have been reviewed from the Oakland Community College Library.

**A Similar Study**

A new study at the California State University Northridge shows that students learning in a virtual classroom tested 20 percent better across the board than their counterparts who learned in a traditional classroom.

This study was conducted by the instructor, who randomly selected half of the students to be taught through traditional methods and the other half were taught in a distance learning setting. Students were assessed by giving identical tests under the same conditions for both groups.

The results of this study provided the first quantitative data to be collected on World Wide Web-based learning. This study also found that students in the World Wide Web class spent about 50 percent more time working with each other than those in the traditional classroom setting.

**Differences Between Distance Learning and Traditional Learning**

In the last decade, distance education has changed significantly with the use of computer-mediated learning, two-way interactive video, and a variety of other technologies. Colleges and universities are forging ahead to provide learning at a
distance, and many institutions are making substantial investments in new technologies for teaching.

What impact is all of this technology having on the educational effectiveness of colleges and universities? The amount of written material devoted to distance education is extensive, and includes policy papers, "how to" articles, and essays, as well as a limited amount of original research. With few exceptions, the bulk of these writings suggest that the learning outcomes of students using technology at a distance are similar to the learning outcomes of students who participate in traditional classroom instruction. The attitudes and satisfaction of students using distance learning also are characterized as generally positive. Thomas Russell, in his recently published annotated bibliography entitled *The No Significant Difference Phenomenon*, lists hundreds of sources that seem to bolster these arguments. However, a closer look at the evidence suggests a more cautious view of the effectiveness of distance education. The purpose of this analysis is to examine the research on distance learning more closely so that public policy may be better informed. What are the findings of the research on the effectiveness of distance education? Are these findings valid? Are there gaps in the research that require further investigation and information? What does the literature suggest for the future of distance learning?

These questions are becoming more important as pressure grows—both from within and outside the academy—to use technology as a primary method for delivering higher education. To explore these issues in more detail, the American Federation of Teachers and the National Education Association commissioned The Institute for Higher
Education Policy to conduct a review of the current research on distance education. Specifically, this report:

- Reviews the findings of the original research and assesses the overall quality of the analysis;
- Identifies gaps or omissions in the body of original research; and Discusses the implications of the research.

The scope of this review is limited to written material published during the 1990s, and particular attention is focused on those types of technologies currently being used by the majority of institutions. This paper concentrates primarily on an evaluation of the original research—including experimental, descriptive, correlational, and case studies—and summarizes the key information and findings of the other policy papers, articles, and essays that dominate the literature. While this review of original research does not encompass every study published since 1990, it does capture the most important and salient of these works. (Phipps 1999)

**The Social Nature of Distance Learning**

A common stereotype is "the loneliness of the long distance learner" (Eastmond 1995, p. 46). Learning at a distance can be both isolating and highly interactive, and electronic connectedness is a different kind of interaction than what takes place in traditional classrooms; some learners are not comfortable with it. Lack of nonverbal cues can create misunderstanding, but communications protocols can be established and relationships among learners developed. Because humans are involved, social norms do develop in cyberspace, but they require new communications competencies. Online
courses often feature consensus building and group projects, through which learners can
develop skills in collaborating with distant colleagues and cooperating with diverse
individuals. Such skills are increasingly needed in the global workplace (Dede 1996).

Answering charges that computer learning environments cannot duplicate the
community of the classroom, Cook (1995) argues that the assumption of a sense of
community in traditional classrooms may be false. If community is defined as shared
interests, not geographic space, electronic communities are possible. Wiesenbergl
and Hutton (1995) conclude that building a learning community is of critical importance to
the creation of a successful virtual classroom. Dede (1996) agrees that "to succeed,
distributed learning must balance virtual and direct interaction in sustaining communion
among people" (p. 199).

**Distance Learning on the Internet and World Wide Web**

Perhaps more than any other distance media, the Internet and the Web help
overcome the barriers of time and space in teaching and learning. Educational uses of the
Internet are burgeoning. The University of Wisconsin-Extension's Distance Education
Clearinghouse lists numerous institutions offering online instruction and corporate
training is featured on AT&T's Center for Excellence in Distance Learning website.
Internet World's October 1995 issue gives examples of "The Internet in Education,"
including online degree programs offered by traditional institutions such as Penn State
and Indiana University as well as nontraditional entities such as University Online and
the Global Network Academy. DL on the Internet usually takes one of the following
forms (Wulf 1996): (1) electronic mail (delivery of course materials, sending in
assignments, getting/giving feedback, using a course listserv, i.e., electronic discussion group); (2) bulletin boards/newsgroups for discussion of special topics; (3) downloading of course materials or tutorials; (4) interactive tutorials on the Web; (5) real-time, interactive conferencing using MOO (Multi-user Object Oriented) systems or Internet Relay Chat; (6) "intranets," corporate websites protected from outside access that distribute training for employees; and (7) informatics, the use of online databases, library catalogs, and gopher and websites to acquire information and pursue research related to study.

Advantages of delivering distance learning on the Internet include the following (Bates 1995; Eastmond 1995; Wulf 1996): (1) time and place flexibility; (2) potential to reach a global audience; (3) no concern about compatibility of computer equipment and operating systems; (4) quick development time, compared to videos and CD-ROMs; (5) easy updating of content, as well as archival capabilities; and (6) usually lower development and operating costs, compared to satellite broadcasting, for example. Carefully designed Internet courses can enhance interactivity between instructors and learners and among learners, which is a serious limitation of some distance learning formats. Equity is often mentioned as a benefit of online learning; the relative anonymity of computer communication has the potential to give voice to those reluctant to speak in face-to-face situations and to allow learner contributions to be judged on their own merit, unaffected by "any obvious visual cultural markers" (Bates 1995, p. 209). The medium also supports self-directed learning--computer conferencing requires learner motivation, self-discipline, and responsibility.
Student Development in the New Environment

Simply providing well-designed curriculum and interaction opportunities is not enough to ensure students' success in a Web-based learning environment. Though the technology enhances knowledge construction and communication, this is worthless if the student does not understand and use it. Providing students with an introduction to distance learning is of primary importance, and they must be shown more than a "how to" of hardware and software. An introduction needs to include how to learn in the Internet/distance environment. This environment is very different for both students and teachers; if that fact is omitted or glossed over, chances of failure increase drastically.

Educational institutions have developed a number of ways to provide this introduction: online instruction, videotapes, and textbooks, among others. For example, Franklin University has chosen to provide this orientation through a seven-week, one-credit course, which provides (McVay 1998):

1. A CD-ROM containing tutorials on all the software the student may be expected to use (e.g., Netscape browser and e-mail, Microsoft Word, chat room, bulletin boards, electronic whiteboards).

2. Interactive practice with the instructor and classmates, using each of the expected interaction mechanisms (e.g., e-mail, bulletin boards, chat rooms, shared critiques, and shared Web pages).

3. Self-surveys focusing on suitability for distance learning, computer skills, and learning styles. Students complete the surveys online and receive scored comparative results immediately posted to their e-mail. In this way students may
evaluate their skills and style preferences in reference to other students and to their individual learning processes.

4. A companion textbook that includes information on adult learning theory and reflections on the students' ownership of the learning process.

**Self-Directed Learners**

Web-based distance learning involves a higher level of self-direction than a traditional course. Gerald Grow introduces the Staged Self-Directed Learning Model (Table 1). The main points of this model are as follows: different students have different abilities to be self-directed, teachers must adapt their methods in response, and self-direction can be taught.

**Table 2.1 – Gerald Grow**

**Staged Self-Directed Learning Model**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Student</th>
<th>Teacher</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Dependent</td>
<td>Authority, Coach</td>
<td>Coaching with immediate feedback. Drill. Informational lecture. Overcoming deficiencies and resistance</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Interested</td>
<td>Motivator, Guide</td>
<td>Inspiring lecture plus guided discussion. Goal-setting and learning strategies.</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Involved</td>
<td>Facilitator</td>
<td>Discussion facilitated by teacher who participates as equal. Seminar. Group projects.</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Self-directed</td>
<td>Consultant, Delegator</td>
<td>Internship, dissertation, individual work or self-directed study-group</td>
</tr>
</tbody>
</table>
Grows model lacks a method for reliably determining a student's level of self-direction. Grow does recommend some clues to look for when estimating a student's degree of self-direction. The following is a list of some of the clues:

- Notice the student's level of motivation
- How well does the student perform when asked to take the initiative in an assignment.
- Does the student participate when in class discussions.
- How much detailed direction does this student require?
- How well does this student work with others on group projects?
- How much pressure does this student put on the instructor to be an authority figure who dictates the learning cycle?
- Can this student practice on his own to assimilate the skills necessary to the subject?

**Students' Frustration with a Web-based Distance Learning Course**

A study of a Web-based distance education course at a major U.S. university examines the topic of common frustrations from students who take these courses. The two main questions that arise from this study are as follows: Why are these frustrations not found in other related studies? Does students' frustrations in their course inhibit their educational opportunity? In this study, students' frustrations were found in three interrelated sources: lack of prompt feedback, ambiguous instructions on the Web, and technical problems.
Everyone who teaches an on-line course has to start with his or her first on-line course. This study did not find any widely publicized articles that encourage faculty who are starting to teach an on-line course to prepare in special ways. In this era when the number of on-line course offerings is growing rapidly, it is likely that a notable fraction of these offerings are taught by "first-time instructors."

According to Hara and Kling the students' concerns about receiving "prompt unambiguous feedback" continued throughout the term. They believed that "prompt unambiguous feedback" is much more difficult in text-based asynchronous courses than in face-to-face conditions. The researchers also noted that many of the students worked on the course during the late evenings and weekends. "Instant feedback" would require the instructor to be available at these hours, thus turning an "anytime convenience" into an "all the time" workload! This issue could be even more significant in larger classes. What is needed is for the students and instructors to learn how to manage their expectations about when they should be able to have reliable, fast communicative responses (Hara, N., & Kling, R., 1999).

**Summary**

The review of the literature strongly supports the background information presented in the first chapter of this paper. The research supports the idea that Web-based distance learning has enormous potential. Research also indicates that Web-based distance learning may not always attain the same quality standards as in a traditional classroom setting.
A common theme throughout the literature review is whether or not grade results are different between Web-based distance learning students and those in a traditional setting. Many instructors are compelled to teach Web-based distance learning courses. They are encouraged by the institutions administration. Research has indicated that many new online course instructors are not properly prepared to effectively present their course material in a non-traditional setting such as the World Wide Web. This not only becomes frustrating for the instructor but also for the student.

Some studies have also shown that students who possess a higher level of self-direction in learning may be better suited for Web-based distance learning courses. Many institutions that offer Web-based distance learning courses offer short self-evaluation tests. These tests try to evaluate the level of technological background as well as self-direction a student may have. When a student attains a high level on these tests they would be more likely to succeed in a web based distance-learning course than a student who does not score well.
CHAPTER III: METHODOLOGY

Introduction

The thesis topic, The Comparison of Grade Performance Between Traditional Learners and World Wide Web Based Distance Learners is a qualitative research study. Qualitative research is an effort to understand situations in their uniqueness as part of a particular context and the interactions there. This understanding is an end in itself, so that it is not attempting to predict what may happen in the future necessarily, but to understand the nature of that setting-what it means for participants to be in that setting, what their lives are like, what’s going on for them, what their meanings are, what the world looks like in that particular setting-and in the analysis to be able to communicate that faithfully to others who are interested in that setting...The analysis strives for depth of understanding. (Merriam 1998)

The researcher will use case studies as a method of qualitative research. Many scholars have defined case study research. Yin (1994), for example, defines case study in terms of the research process. “A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p.13). Stake (1995), however, focuses on trying to pinpoint the unit of study – the case. In the first edition of Merriam’s book she defines case study in terms of its end product: A qualitative case study is an intensive, holistic description and analysis of a single instance, phenomenon, or social unit.

The researcher will also use secondary data. Secondary data is defined as any data used from historical journals, articles, or references. Other secondary data has been
acquired through Oakland Community Colleges institutional research department. The Institutional Research Department at OCC has been accumulating data on Web-based distance learning since the Fall semester of 1999.

**Population and Sample**

The target group for this research project is students who have taken Web-based distance learning courses. Research with traditional classroom learners will also be introduced. Data from the 1994 to present will be used.

Two basic types of sampling are probability and nonprobability sampling. Probability sampling allows the investigator to generalize results of the study from the sample to the population from which it is drawn. Since generalization in a statistical sense is not the goal of qualitative research, probabilistic sampling is not necessary or even justifiable in qualitative research. Nonprobability sampling does not try to answer quantitative problems, but attempts to solve qualitative problems, such as discovering what occurs and any implications of what occurs and the relationship linking occurrences. (Merriam 1998) Thus nonprobability sampling is the method of choice for this qualitative research project.

**Data Collection Methods**

The timeframe for the collection of data was from 2000 to 2002. Interviewing, observation, and mining data from documents are the three types of data collection methods used for qualitative research. Mining data from documents will be the method that is used by the researcher. The Internet was a source of several articles for this
research paper. The researcher used the Central Michigan University Libraries off-campus library service website. Using the research database link and the FirstSearch option a search was conducted on Web-based distance learning. Three databases were selected. They were: ECO, Education Abs, and ERIC. The results of this search provided the researcher with over one thousand titles to mine through. Several other articles were collected by use of search engines on the Internet. Search engines used were as follows: msn.com, yahoo.com, google.com, ask.com.

The researcher also used textbooks and Internet articles. These sources provided both background information and foundation information on the history of Web-based distance learning.

**Reliability and Validity**

The reliability of this research topic will remain consistent since most of the data has been mined from similar research. According to Merriam reliability refers to the extent to which research findings can be replicated. In other words, if the study is repeated will it yield the same results?

According to face validity, this is the only group that needs to be observed for this research project.

**Ethics**

The research will be performed without the use of any personal data. Human subjects will not be used in this researchers study. Ethical standards would be taken into consideration if the researcher were studying human subjects.
The data for this research will be mined from a variety of sources. These sources will be carefully cited.

I will submit the proper authorization forms to Central Michigan University for final approval of my thesis topic.

**Variables and Measures**

The method of measurement will be derived from the mining of data from several different sources. More than 15 articles and additional books and Web sites will be used to review this research topic. The research material has produced many references that will assist in accurately portraying current findings in the field of Web-based distance learning.

**Data Analysis Methods**

The research data will be analyzed based on observation of secondary data. Once the data is analyzed it will be verified to conclude if it supports or does not support the hypotheses made by the researcher.

The researcher will use the constant comparative method of data analysis. The basic strategy of the method is to do what its name implies – constantly compare. The researcher will categorize the data based on how they can answer the hypotheses posed in this study.
Hypotheses

1. There is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course.

2. Students enrolled in Web-based distance learning courses have a lower course completion rate than students enrolled in traditional courses.

3. There is a direct correlation between students who are self-directed and grade performance in Web-based distance-learning course.

4. There is no correlation between a student's computer skills and the successful completion of a Web-based distance-learning course.

5. Web-based instruction is as effective as classroom instruction.

6. There is significant student frustration when taking a Web-based distance-learning course.
CHAPTER IV: ANALYSIS OF THE DATA

Introduction

The fourth chapter will consolidate and analyze the data that has been obtained for this study. Several themes have emerged during this process that will give rise to a better understanding of the complexities involved with Web-based distance learning. During the research process each piece of information was assigned a category and each category was molded into a theme.

The researcher used qualitative methods for analysis of the data. Identifying the method of data analysis on the study of Web-based distance learners is comprised of several steps. These steps are as follows:

1. Acquiring the data
2. Analyzing and interpreting the data
3. Categorizing the data
4. Purging and consolidating of the data
5. Identifying the most relevant data and how it communicates an understanding of the research.

The development of categories, properties, and tentative hypotheses through the constant comparative method is a process whereby the data gradually evolve into a core of emerging theory (Merriam, 1998, p.191). The researcher uses this process continually throughout the study to pinpoint the central themes that are the most relevant.

Upon completion of the steps for the data analysis the researcher identified several hypotheses. These six hypotheses are presented and supported in the following sections of this chapter.
Data Analysis

Data analysis is the process of making sense out of the data. And making sense out of data involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read – it is the process of making meaning. Data analysis is a complex process that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation. These meanings or understandings or insights constitute the findings of the study (Merriam, 1998, p.178).

Several themes evolved from the review of the literature. The researcher categorized these themes. Throughout the research process the themes were molded into the six hypotheses identified in Chapter 3. The researcher then attempted to refine the data in a way that would illustrate the interrelationships between the categories of information.

Another key component of data analysis is that the researcher has to compare all the pieces of information that have been gathered. The task is to compare one unit of information with the next in looking for recurring regularities in the data. The process is one of breaking data down into bits of information and then assigning “these bits to categories or classes which brings these bits together again if in a novel way...In the process we begin to discriminate more clearly between the criteria for allocating data to one category or another. Then some categories may be subdivided, and others subsumed under more abstract categories” (Dey, 1993, p.44).

Several sources are used for data collection. Using several sources allows for the researcher to accumulate a variety of data and also maximizes the number of similarities
and differences that are pertinent to the research. The collection of data was sorted via examining, categorizing and associating it with the themes that were established throughout the research. Once the data was sorted it was then categorized based on its relationship to a theme and then the data was refined to specifically answer a portion of the theme.

The data analysis was a continually evolving process. Categories were constantly being created and changed. Once the researcher refined the themes, relationships were formed to particular hypotheses.

The researcher found that the data points to the notion that there is no significant difference between grade results of Web-based distance learners and those students who attend a face-to-face course. Thomas Russell, in his recently published annotated bibliography entitled *The No Significant Difference Phenomenon*, lists hundreds of sources that seem to bolster this argument. The data also indicates that more studies need to be done in the area of Web-based distance learning. The Institute for Higher Education conducted a review of the current research on distance education. They concentrated on three key areas. The first objective of the institute was to review the findings of the original research. The second objective was to assess the overall quality of the analysis. Their final objective was to identify gaps or omissions in the body of original research; and discuss the implications of the research.

The researcher found that many institutions provide a self-assessment survey for students who are about to enroll in a Web-based distance-learning course. Many of the questions on these surveys emphasized the importance of self-regulation and prior computing skills. Studies performed on the importance of self-direction and success in a
Web-based distance-learning course is limited. The research showed that a student's level of self-direction is not one of the most important characteristics they need to perform well in a Web-based distance-learning course.

Many institutions stress the importance of having prior computing skills before enrolling in a Web-based distance-learning course. Providing students with an introduction to distance learning is of primary importance, and they must be shown more than a "how to" of hardware and software. An introduction needs to include how to learn in the Internet/distance environment. This environment is very different for both students and teachers; if that fact is omitted or glossed over, chances of failure increase drastically. The researcher found information that shows that prior computing skills are not that relevant for a student be successful in a Web-based distance-learning course.

The many Advantages of delivering distance learning on the Internet include the following (Bates 1995; Eastmond 1995; Wulf 1996): (1) time and place flexibility; (2) potential to reach a global audience; (3) no concern about compatibility of computer equipment and operating systems; (4) quick development time, compared to videos and CD-ROMs; (5) easy updating of content, as well as archival capabilities; and (6) usually lower development and operating costs, compared to satellite broadcasting, for example.

The researcher found that there are many proponents of Web-based distance learning. These proponents are not just institution administrators looking to earn more revenue. Students and instructors are also fueling the demand for Web-based distance learning courses. With this onslaught of a new course delivery method many analysts want to know if this method of delivery is effective. The analysis of the data seems to
point toward the fact that Web-based distance learning is as effective as traditional learning.

The amount of written material devoted to distance education is extensive, and includes policy papers, “how to” articles, and essays, as well as a limited amount of original research. With few exceptions, the bulk of these writings suggest that the learning outcomes of students using technology at a distance are similar to the learning outcomes of students who participate in traditional classroom instruction.

Finally the researcher found another reoccurring theme throughout this study. Students experience a significant amount of frustration when taking a Web-based distance-learning course. The emphasis of their frustrations often revolved around problems with technology. Web-based distance learning students often experience problems with the logistics part of this type of course. Many students that enroll in a Web-based distance-learning course fail to read the guidelines of what is required of them before the course begins. In some cases a student will have a computer but not realize that they need to have an Internet service provider in order to interact with the instructor and other students.

**Hypotheses Analysis**

**Hypothesis 1:** There is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course.

Comparing the achievement of learners (as measured by grades, test scores, retention, job performance) who are taught at a distance and those taught in face-to-face
classes is a line of research going back more than 50 years. The usual finding in these comparison studies is that there are no significant differences between learning in the two different environments, regardless of the nature of the content, the educational level of the students, or the media involved. (Moore & Kearsky 1996).

In a case study done in 1999 at the University of Akron the researcher studied the performance of students enrolled in Web-based distance learning course and compared the performance of students enrolled in a traditional classroom setting. The course used for this case study was called Communication Technology & Change. The study consisted of forty students. Sixteen students were from the Web-based course and twenty-four were from the traditional classroom course. All students took exams in the classroom at the same time.

The author surmised that if Web-based instruction is an adequate substitute for classroom instruction, then student performance on graded assignments should not differ. A 2 way Analysis of Variance was performed using Instructional section and gender as independent variables and mid-term and final exam grades (both tests combined multiple choice and essay questions) and the final grade point average for the course (GPA reflected exam grades, web page assignments and Internet exercises) as dependent variables. No significant interactions were found between instructional condition and gender. Females had significantly higher overall GPA's than did males but there were no significant differences between males and females in mid-term and final exam scores. In all cases the classroom section performed slightly better than the Internet section, but in no case did the differences achieve statistical significance. At least as far as graded
assignments are concerned, taking the class via the Internet did not seem to affect performance either for the better or for the worse (White 1999).

The National Education Association has prepared a review on the effectiveness of distance learning in Higher Education. The authors Ronald Phipps and Jaime Merisotis reiterate the fact that there are large amounts of material on distance learning but the amount of relative research in this area is small.

Most of these studies conclude that, regardless of the technology used, distance-learning courses compare favorably with classroom-based instruction and enjoy high student satisfaction. For example, many experimental studies indicate that students participating in distance learning courses perform as well as their counterparts in a traditional classroom setting. These studies suggest that the distance-learning students have similar grades or test scores, or have the same attitudes toward the course. The descriptive analysis and case studies focus on student and faculty attitudes and perceptions of distance learning. The purpose of many of these types of research is to develop recommendations to improve distance learning. These studies typically conclude that students and faculty have a positive view toward distance learning (Phipps & Merisotis 1999).

Data obtained from the Office of Institutional Research at Oakland Community College illustrates that there is no significant difference in grade results between students enrolled in a Web-based distance learning course and students enrolled in a traditional classroom setting. This study compared grade results of students enrolled in an Introduction to Shakespeare course. This study was done during the Fall 2000 semester at Oakland Community College. The results showed that sixty-nine percent of online
students received a “D” or higher in the course while sixty-five percent of traditional classroom students received a “D” or higher in the course.

Results for students enrolled in English Composition 2 courses were similar to the Introduction to Shakespeare course. The results for this course showed that sixty-one percent of online students received a “D” or higher in the course while sixty-five percent of traditional classroom students received a “D” or higher in the course. The results of this data show that there is no significant difference in grade results between students enrolled in a Web-based distance learning course and students enrolled in a traditional classroom setting.

Therefore, according to the researchers collection of information, the data supports the hypothesis that there is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course.

**Hypothesis 2**: Students enrolled in Web-based distance learning courses have a lower course completion rate than students enrolled in traditional courses.

In an article in the Chronicle of Higher Education the writer interviews several people from various colleges and universities about completion rates in Web-based courses. The consensus throughout the article is that traditional courses have a significantly higher completion rate that Web-based courses.

Examples from the article are as follows:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Online Completion Rate</th>
<th>Traditional Completion Rate</th>
<th>Number of Web-Based Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyler Community College</td>
<td>58%</td>
<td>71%</td>
<td>35</td>
</tr>
<tr>
<td>University of Central Florida</td>
<td>91%</td>
<td>95%</td>
<td>47</td>
</tr>
</tbody>
</table>
No national statistics exist yet about how many students complete distance programs or courses, but anecdotal evidence and studies by individual institutions suggest that course-completion and program-retention rates are generally lower in distance-education courses than in their face-to-face counterparts (Carr 2000).

Although there is significant variation among institutions -- with some reporting course-completion rates of more than 80 percent and others finding that fewer than 50 percent of distance-education students finish their courses -- several administrators concur that course-completion rates are often 10 to 20 percentage points higher in traditional courses than in distance offerings. (Carr 2000).

A sociology professor at California State University at Northridge did a study for the fall semester, Jerald G. Schutte randomly divided his statistics class into two groups. One attended class as usual, listening to lectures, handing in homework assignments, and taking examinations. The other took an on-line version of the course, completing assignments on a World-Wide Web site, posting questions and comments to an electronic discussion list, and meeting with their professor in an Internet "chat room"(McCullum 1997).

After an orientation session, students in the virtual class went to Dr. Schutte's classroom only for their mid-term and final exams. Dr. Schutte says he was surprised that none of the virtual students dropped the class under the increased workload (McCullum 1997).

In a number of studies, there was evidence that a higher percentage of students participating in a Web-based distance-learning course tended to drop out before the
course was completed compared to students in a conventional classroom. For instance, in one study, while the mean pass mark was 81 percent, only 40 percent of the students successfully completed the course. In another study comparing an engineering course taught in a conventional classroom to one taught through computer-mediated learning, 95 percent of the resident students finished the course, compared to 64 percent of the computer-mediated learning students. One other study found that students participating in computer-mediated learning had significantly higher incompletion (Phipps & Merisotis 1999).

Fayetteville Technical Community College in North Carolina requires Web-based distance learning students to be counseled and advised concerning the special demands of the a Web-based curriculum. The success of this advisement is reflected in the growth of distance learning at FTCC as well as in the grade results and completion rates for distance learning classes, which mirror those for traditional courses, with no significant differences (Ervin 2001).

The study of completion rates at Fayetteville Technical Community College claimed that there was no significant difference in completion rates in online courses versus face-to-face traditional courses. However, the data that they have compiled shows that in two comparison ranges (Spring/Summer 1996-97 and Fall 1998) there is a significant difference in completion rates for that period. Fayetteville Technical Community Colleges data shows higher completion rates for face-to-face traditional classroom learners in these two time periods.

For online courses and their face-to-face course counterparts compiled from the spring quarter 1996 through fall semester 1997, the comparisons involve only those
online classes which had face-to-face counterparts taught the same session by the same instructor. The data also shows similar Spring 1998 results for all distance learning courses and the select face-to-face course equivalents for the same distance learning instructors that session. Fall semester 98 face-to-face course results include all courses taught face-to-face by those distance-learning instructors that session, whether or not there was a distance-learning counterpart for the course. Spring 99 results follow a similar formula; however, three distance-learning instructors taught no traditional classes (Ervin 2001).

Completion rates were as follows for this particular study:

<table>
<thead>
<tr>
<th>Term</th>
<th>Online Completion Rate</th>
<th>Face to Face Completion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring/Summer 1996-97</td>
<td>78%</td>
<td>91.8%</td>
</tr>
<tr>
<td>Fall 1997</td>
<td>85.9%</td>
<td>86.1%</td>
</tr>
<tr>
<td>Spring 1998</td>
<td>79.4%</td>
<td>82.6%</td>
</tr>
<tr>
<td><strong>Fall 1998</strong></td>
<td><strong>78.4%</strong></td>
<td><strong>88.35%</strong></td>
</tr>
<tr>
<td>Spring 1999</td>
<td>80.54%</td>
<td>84.5%</td>
</tr>
<tr>
<td>Fall 1999</td>
<td>78%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Data obtained from the Office of Institutional Research at Oakland Community College illustrates that there is significant difference in completion rates between students enrolled in a Web-based distance learning course and students enrolled in a traditional classroom setting. This study compared completion rates of students enrolled in a Composition I course. This study was done during the Fall 2000 semester at Oakland Community College. The results showed that fifty-one percent of online students
successfully completed the course while seventy-four percent of traditional classroom students successfully completed the course. Successful completion of the course is defined by any student receiving a passing grade of “D” or higher. An important observation should be noted. Many other online courses at Oakland Community College had an insignificant difference in completion rates.

Therefore, according to the researchers collection of information, the data supports the hypothesis that Students enrolled in Web-based distance learning courses have a lower course completion rate than students enrolled in traditional courses.

**Hypothesis 3:** There is a direct correlation between students who are self-directed and grade performance in web based distance-learning courses.

When you take on the responsibility for your own continuous learning, having control over your learning becomes very important. Self-directed learning is a strategy that provides you with that control. Through self-directed learning you control: **what** you want to learn, **how** you want to learn, and **when** you want to learn. (Knowles, 1975) Self-Efficacy in academic learning refers to one’s convictions to perform successfully at designated levels.

In an article on the role of self-efficacy for self-regulated learning in Web-based instruction, the author researched the role of self-direction and success in a Web-based course. Compared with traditional didactic instruction where learners expect most of the necessary information to be conveyed by the instructor in an orderly fashion, computer-based instruction, particularly Web-based instruction, expects learners to take more initiatives in actively seeking and sifting through available information. Joo, for example, found that learners with superior self-regulatory capabilities performed better in learner-
controlled computer based instruction than in program-controlled instruction. However, those with poor self-regulatory capabilities were at considerable disadvantage in learner-controlled computer based instruction, which permitted and even required substantial control from the learners over the pace and content of their learning. In the present research, self-efficacy for self-regulated learning was predicted to relate positively to the two performance outcomes through its direct links to academic and Internet self-efficacy. (Joo, Bong, Choi, 2000)

According to Pachnowski’s research there are two established instruments that measure self-directedness. The SDLRS (Self-Directed Learning Readiness Scale) was developed in 1977 is the measure that was used in Pachnowski’s study.

The SDLRS is a 58-item Likert scale that produces one score and has a reliability coefficient of .87. A factor analysis of the instrument by the developer determined the following eight factors:

- Love of learning
- Self-concept as an effective, independent learner
- Tolerance of risk, ambiguity, and complexity in learning
- Creativity
- View of learning as a lifelong, beneficial process
- Initiative in learning
- Self-understanding
- Acceptance of responsibility for one’s own learning

The results of the data analysis of this study suggests the SDLRS instrument is not a good indicator of success in distance learning courses when success is defined by the
final course grade. Data obtained by the instructors seemed to indicate that the students’ habits and attitudes were the best indicator of academic success in the course Pachnowski & Jurczyk, 2000).

Therefore, according to the researchers collection of information, the data is inconclusive that there is a direct correlation between students who are self-directed and grade performance in web based distance-learning courses. Thus, the data neither supports nor refutes the hypothesis.

**Hypothesis 4:** There is no correlation between a students computer skills and the successful completion of a Web-based distance-learning course.

The majority of institutions that offer Web-based courses recommend that a potential student assess their computer/technical skills before they consider enrolling in a Web-based course. It is often stated by these institutions that to be successful in a Web-based course the student should have certain basic computer and Internet skills. Data that is also important in this area is a student’s level of apprehension toward computers and the Internet.

A study conducted by Sylvia White at the University of Akron tested for student’s apprehension level. The study used the Computer Apprehension Scale. Students opting for the Internet section would have access to lectures, ask and answer questions, etc. via computers. It seemed likely that students with high levels of computer “phobia” would be unlikely to opt for Web-based instruction. The Computer Apprehension Scale measures Anxiety, Confidence and Liking for computers. The ANOVA test on this scale indicated that students opting to remain in the classroom had significantly higher levels
of computer anxiety and that females were significantly more apprehensive than were males.

White also analyzed an inventory of computer and Internet usage. As with the previous scale, it seemed likely that students opting for the Web-based environment would have had more experience with computers and the Internet. An inventory of computer and Internet activities was given. Students opting for the Internet section had engaged in significantly more general computer activities than the classroom section, but there was no significant difference in prior Internet usage (White, 1999).

In a study on correlating self-directed learning with distance learning success research was done on a students technical skills and if these highly skilled students perform better than those with low or no technical skills. The results of this study also revealed that while the technical skills of students who obtain a good course grade appear to be adequate, that correlation dissipates as the range of student grades increases to include lower grades. Therefore, students who may be evaluated by the instructor as having good technical skills may not have necessarily obtained a good grade. This data emphasizes that the softer skills associated with a student’s attitudes and habit play a stronger role in the student’s success in the course (Pachnowski, & Jurczyk, 2000).

The data would appear to support the hypothesis that there is no correlation between a students computer skills and the successful completion of a Web-based distance-learning course.

**Hypothesis 5:** Web-based instruction is as effective as classroom instruction.

There are many studies that have been done on the effectiveness of Web-based distance learning. The main question is: What constitutes effective Web-based
instruction? The majority of the studies use grade comparison to determine if Web-based instruction is as effective as classroom instruction. In the majority of the studies the course delivery was done via the web and all testing was done in the classroom.

In a study by Phipps & Merisotis (1999) they stated the following about the effectiveness of distance learning: It should be emphasized that the review provided striking evidence of the fact that there is a relative paucity of true, original research dedicated to explaining or predicting phenomena related to distance learning. The more limited group of original research on the effectiveness of distance learning addresses a variety of issues. Three broad measures of the effectiveness of distance education are usually examined in the original research. These include:

- Student outcomes, such as grades and test scores;
- Student attitudes about learning through distance education; and
- Overall student satisfaction toward distance learning.

Most of these studies conclude that, regardless of the technology used, distance-learning courses compare favorably with classroom-based instruction and enjoy high student satisfaction. Several examples illustrate this point. (Phipps & Merisotis, 1999)

According to Dutton, Dutton, & Perry, (1999) from North Carolina State University, online students can perform at least as well as traditional students. However, their results show that not any student, randomly selected, can do as well in an online class. Undoubtedly self-selection means that students with greater computer skills and/or greater maturity are more likely to opt for an online course. Goldberg (1998) compliments this idea with the statement "Jack Wilson, faculty dean at Renssleear Polytechnic Institute, where almost one-third of graduate students are taking courses at a
distance, said the off-campus students perform just as well as their on-campus counterparts in the same courses."

In another article in the Chronicle of Higher Education the writer interviewed Thomas Russell who has published a book titled *The No Significant Difference Phenomenon.*

Mr. Russell, who is director emeritus of instructional telecommunications at North Carolina State University, had hoped to find scientific backing for his initial hunch that distance education is superior to traditional methods. Though a few studies showed just that, the majority found that the results were about equal, no matter what kind of gadgets or tools were used to teach students. (Young, 2000)

Russell also states "There is so much research on this matter that I find it incomprehensible that any reasonable, knowledgeable, unbiased, and professional person could deny the fact that technology can deliver instruction as well as traditional modes -- at least when we look at student populations as large groups."

In a research study at the University of Illinois the research team did a comparison of online versus face-to-face learning. The comparisons included the following items:

- Student ratings of instructor and course quality
- Assessment of course interaction, structure and support
- Learning outcomes in the form of course grade.

According to the researchers the ultimate question surrounding online instruction is whether or not it is as effective as traditional face-to-face modes. The findings of this study show that online learning can be as effective as face-to-face learning in spite of the fact that students in online programs are not as satisfied with their experience as students
in more traditional learning environments. In view of these findings, several implications emerge pertaining to future online programs.

First, this analysis suggests that the development and use of online programs should continue. Further examination of feedback and student progress are needed to improve overall student/instructor communication. This includes identifying and implementing new communication measures to facilitate student/instructor communication at appropriate points in the course. Second, a better understanding of why online learners report lower levels of comfort with their learning is needed so specific strategies for improving delivery of online programs that increase student confidence levels can be developed. Finally, educational practitioners who may enroll in or develop online courses need to be familiar with the limitations of online programs. Such an awareness will ensure that the expectations of learners are met and the intended course goals can be attained. For instance, the findings in this study suggest that online instruction may not be suitable for courses that require high degrees of student instructor interaction and feedback, such as performance-based training methods courses that rely on considerable mentoring and coaching. Until the technologies for online instruction better simulate real-time interaction, program developers need to avoid courses that require frequent socialization between students and the instructor (Aragon, Johnson, Palma-Rivas, Shaik, 1999).

Therefore, according to the data presented in this research the information supports the hypothesis that Web-based instruction is as effective as classroom instruction.
**Hypothesis 6:** There is significant student frustration when taking a Web-based distance-learning course.

Web-based distance learning requires that a student be self-motivated. In a Web-based distance learning environment frustration can be a major obstacle. Many of the frustrations that students have with Web-based courses revolve around the technology. However, there are also similar frustrations that are seen in traditional classroom settings as well. Frustrations with technology in a Web-based distance-learning course have always been persistent. The researcher found that the specific nature of technical and logistic problems changes.

Many students that enroll in a Web-based distance-learning course fail to read the guidelines of what is required of them before the course begins. In one study a student indicated that access to a computer was a serious problem for them. The guidelines state that students who enroll in a Web-based distance-learning course must have access to a personal computer and have a modem for Internet access.

Another common frustration was with access problems to the course web site. Many Universities cannot keep up such the hardware demands as modem ports for on campus students. Students that do not live on campus and have connection problems have similar network connectivity issues. These students are at the mercy of their Internet service provider. Many providers do not have the capability to handle a large amount of users, especially at peak times.

The following is an excerpt from a study done on students’ frustrations with distance education:
During the interviews, some students reported frustration with technological problems and the absence of personnel to provide technical support. Unlike the other students, the following informant was taking the course from a distant site. She indicated three areas of frustration, the biggest of which were with the technology and the inflexibility of the course schedule. The following is an actual response from a student:

First of all, inappropriate prerequisite statement. For example, there is nothing to say that you should know HTML, but our first assignment was creating a web site. Fortunately, I knew it. I'd explored learning how to do HTML by myself. If I didn't know, I just cannot imagine how to get through. Secondly, this course is very time specific. The course I took before, I could go in anytime and finish anytime. However, this course is very specific in terms of time. For example, I got into the class a week late and the instructor sent me e-mail saying that they had already started. As an old learner, I felt so intimidated. I felt pressure to catch up. Third, accessibility to technology. This is related to the prerequisite. There is nothing that says we should have access to a web server. However, when we developed the web site as an assignment, we had to have the server access. Since I work for a school, one of the technical people helped me to connect to the web server. If I didn't have these resources here, I would have dropped this course.

I don't have any access to the wonderful computer labs in the university. I don't have a [electronic] student locker and software that are
available on campus (personal communication, October, 31) (Hara &
Kling, September 1999).

The researcher found that throughout this study technological difficulties were the
most prevalent frustration amongst Web-based distance learning students. In many
instances their lack of the prerequisite skills was the main reason for their frustration.
The students in the study by Hara and Kling noted several other frustrations.
These problems were:

1. Instructions for the assignments were too vague. Sometimes students did not
   understand what the instructor's expectations were.

2. The Web site was developed for the same course offered in summer, and the
   summer course was offered in a traditional classroom, not by the Web-based
distance education form. Therefore, some instructions for activities were for the
   course in summer. For example, one of the activities instructed students to make
teams. However, in the Web-based distance education course, students had to
   work individually, so the instructions confused them.

3. Because the Web site was developed earlier, some hyperlinks to the other Web
   sites were no longer accessible.

   In addition, it seemed that students did not understand the instructor's
   expectations. The instructor knew that the instructions on the Web were too ambiguous,
   and she tried to make them clear. For the final project, she sent out an e-mail message: "I
   think we need a set of very clear criteria so that you and I know exactly what you are
   expected to do and how your project will be judged." (personal communication,
   November 10). However, this attempt did not succeed. A few students posted questions
about her "clear criteria." Not all the students were familiar with technology, and some were already overwhelmed. Therefore, the ambiguous expectations for this course might have increased students' anxiety (Hara & Kling, December 1999).

Therefore, according to the researchers' collection of information, the data supports the hypothesis that there is significant student frustration when taking a Web-based distance-learning course.

**Summary**

This research project compared Web-based instruction to traditional classroom instruction. The project emphasized that Web-based instruction can be an effective mode of course delivery. The researcher also presents material that validates the idea that Web-based distance learning isn't perfect and can always be improved on.

The **first hypothesis** of the research found that there is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course. The data suggests test scores and final grades in both courses are usually about the same. Much of the research done in this area is by instructors who have delivered the same course as both Web-based and in a traditional setting.

The **second hypothesis** of the research found that students enrolled in Web-based distance learning courses have a lower course completion rate than students enrolled in traditional courses. Many of the research documents suggest that lower completion rates in Web-based courses in colleges and universities is due to the relative inexperience of both the instructor and the student in the Web-based course environment.
The **third hypothesis** of the research found that there is an inconclusive amount of data that shows a direct correlation between students who are self-directed and grade performance in web based distance-learning courses. The Self-Directed Learning Readiness Scale was used for this study and was not a good indicator of success in Web-based courses when success is defined by final course grade.

The **fourth hypothesis** of the research found that there is no correlation between a students computer skills and the successful completion of a Web-based distance-learning course. Many institutions suggest that students have certain computer skills before enrolling in a Web-based distance-learning course. The lack of these skills does not seem to hinder successful completion of a Web-based course.

The **fifth hypothesis** of the research found that Web-based instruction is as effective as classroom instruction. There are numerous studies that have produced strong data that supports the fact the Web-based instruction is as effective as face-to-face instruction. Most of the research documents suggest that constant evaluation of Web-based instruction is essential.

The **sixth hypothesis** of the research found that there is significant student frustration when taking a Web-based distance-learning course. The most common frustrations revolve around the technological end of Web-based instruction. Course delivery methods and access to a computer as well as Internet access are other common frustrations for students who enroll in Web-based courses.

The research concluded that Web-based distance learning is an effective mode of course delivery. Even though it will never be problem free the research shows us that
Web-based learning is here to stay. Web-based distance learning is constantly changing with technology and with these changes more research will have to done.
CHAPTER V: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The improvements of the telecommunications infrastructure has made Web-based delivery more reliable and has allowed for faster access and download speeds. With these infrastructure enhancements Web-based distance education has become an integral part of the higher education system. Institutions are face with a key problem with Web-based distance learning. This mode of educational delivery enables other institutions to compete for students outside of their normal geographical area. Many institutions hastily put together Web-based curriculum in order to keep up with the competition. The research indicates that institutions that use Web-based distance learning have a lot to learn about how to effectively use technology in the teaching and learning process.

This new instruction and learning method has posed many new questions about the effectiveness of Web-based distance learning as compared to learning in a traditional setting. Much of the research and articles about technology-based distance education finds that there are significant gaps in the research and important flaws in the methodology of many studies.

The researchers purpose of the study was to evaluate Web-based distance learning as an effective mode of course delivery and to show that there is no significant difference between grade results of Web-based students and students who learn in a traditional setting. The researcher expected to find that Web-based distance learning students do not perform as well as students attending a class in a traditional setting. The researcher thought that traditional students have a distinct advantage to perform at a higher level.
than a Web-based distance learner because they will have access to an instructor and other learning resources on a regular basis. This did not prove to be the case.

The literature review showed several articles that showed there is no significant difference between the grade results of Web-based distance learners and traditional learners. The data suggested that Web-based distance learning is an effective method of course delivery. There are also several shortcomings in many of the studies. Proper statistical reporting techniques were not always adhered to. Many of the articles listed administrative issues related to Web-based distance learning courses and how these decisions could affect the quality of the distance-learning curriculum. Many of the studies on the effectiveness of Web-based distance learning also concentrated only on an individual course and not a complete academic program.

The literature review appeared to support that there is significant student frustration with Web-based distance learning courses. The most prevalent problem revolved around the technology itself. Common issues were lack of understanding of the computer terminology, poor or no Internet connectivity, and lack of technical support when these problems arose.

The literature suggested that there might be some deficiencies in a Web-based curriculum. However, these deficiencies are not statistically significant to dispel the effectiveness of Web-based distance learning as an alternative mode of delivery. The research also showed that certain courses might be better suited for Web-based delivery.

The researcher used case studies as a method of qualitative research. The researcher also used secondary data. The case studies were mined from many different sources. These sources included the following: journal articles, textbooks, and several
online sources. Secondary data was gathered through several research databases. Research studies done at a local community college were also used to verify some hypothesis results. The hypotheses were chosen to determine if there was a significant performance difference between Web-based distance learners and traditional learners.

Six hypotheses were chosen in this study. Five of the hypotheses were accepted. Hypothesis three was not accepted. This hypothesis proved to be inconclusive. The third hypothesis examined the correlation between students who are self-directed and grade performance in web based distance-learning courses. Although self-direction could be a factor in the successful completion of a Web-based course there was insufficient research to prove or disprove this hypothesis. The research found that there were other characteristics of a Web-based learner that would have a more significant affect on grade performance.

**Conclusions**

Hypothesis one asked if there is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course. The data shows that there is no significant difference between final grades of students enrolled in a Web-based distance-learning course and final grades of students enrolled in a traditional course. This question could have also included grade comparisons of students who are enrolled in the same curriculum. It would seem that students who take a course that is part of their desired curriculum may be more motivated than someone who takes a course because they have no choice. For example, a mathematics major would be more motivated in a mathematics course than an English major who has to take a mathematics course to graduate. Most of the studies
compared Web-based students to traditional students without narrowing down the study to look at a students desired curriculum.

Hypothesis two asked if students enrolled in Web-based distance learning courses have a lower course completion rate than students enrolled in traditional courses. Again, the data found that there was a significantly lower course completion rate for Web-based distance learning students than students enrolled in a traditional course. The literature suggests that a thorough orientation to the Web-based course material would be beneficial to the students enrolled in a Web-based distance-learning course. Furthermore, the research also suggests that completion rates may improve because of such an orientation. There also seems to be a correlation between withdrawal rates and student frustrations with a Web-based distance-learning course.

Hypothesis three asked if there is a direct correlation between students who are self-directed and grade performance in web based distance-learning courses. The data is inconclusive that there is a direct correlation between students who are self-directed and grade performance in web based distance-learning courses. Thus, the data neither supports nor refutes the hypothesis. In one study the SDLRS (Self-Directed Learning Readiness Scale) was used to test for a direct correlation between students who are self-directed and grade performance in web based distance-learning courses. Many institutions that provide a self guided assessment for potential Web-based distance learning students include questions regarding an individual’s level of self-direction and self-motivation.

Hypothesis four stated that there is no correlation between a students computer skills and the successful completion of a Web-based distance-learning course. The data
supported the hypothesis that there is no correlation between a students computer skills and the successful completion of a Web-based distance-learning course. Some studies suggested that students who have a higher use of computers and the Internet would be more likely to enroll in a Web-based distance learning than students who have little or no Internet or computer background. It appears that students who do need help with the computer skills portion of a Web-based distance-learning course are able to obtain this help from another source. This computer assistance may include the information obtained from an orientation session, technical support staff or from a friend or classmate.

Hypothesis five states that Web-based instruction is as effective as classroom instruction. The data presented in this research supports the hypothesis that Web-based instruction is as effective as classroom instruction. Before this hypothesis could be reviewed the researcher had to decide what constitutes effective Web-based instruction. The researcher found that three broad measures of the effectiveness of distance education are usually examined. They include: student outcomes, such as grades and test scores; student attitudes about learning through distance education; and overall student satisfaction toward distance learning. Most of the data compared grades results as the determining factor of whether or not a Web-based course was an effective method of course delivery.

The sixth hypothesis asked if there is significant student frustration when taking a Web-based distance-learning course. The data showed that there was significant student frustration when participating in a Web-based distance-learning course. The researcher found that throughout this study technological difficulties were the most prevalent
frustration amongst Web-based distance learning students. In many instances a student’s lack of the prerequisite computing skills was a reason for their frustration. Students were also frustrated with the fact that they were not properly counseled before enrolling in a Web-based distance-learning course. This usually meant that the student felt unprepared for a Web-based distance-learning course.

**Recommendations**

Recommendation One involves a more significant orientation process for students who have never taken or are not comfortable with a Web-based distance learning methodology. An orientation should allow for students to try out a simulated session such as a chat room, so that they can experience this new mode of communication. The instructor should be present at the orientation as well as any support staff so that the students can familiarize themselves with these key individuals. Basic computing skills that are needed for a Web-based distance-learning course should also be covered in this orientation class.

Recommendation Two is that institutions should have a series of staff development seminars for instructors who are teaching a Web-based distance-learning course. These seminars should include the following: How to host a web site, a blackboard.com course, and a course that emphasizes common concerns that occur in a Web-based distance-learning course. Support staff should also go through a similar set of seminars. Quality is also an issue and with proper training of instructors the quality of the Web-based course should be enhanced by such training. Instructors should first teach an augmented Web-based course before they do a Web-based distance-learning course.
Recommendation three is that institutions have a proper amount of technical support staff for students that enroll in a Web-based distance-learning course. Ideally this support should be twenty-four hours a day. Not only should support staff be available online and on the phone, but also on campus. Often the only support a student receives is via e-mail or chat from an instructor. This lack of timely help often leads to student frustration and possibly withdrawing from the course. Tutors and/or mentors could also be made available for students that are enrolled in a Web-based distance-learning course. If a student has the proper hardware a distance tutoring session is a feasible method of support.

Recommendation four is that institutions should produce a more thorough process of assessing the ability of a student to perform successfully in a Web-based distance-learning course. Most institutions have short self-tests that give some indication of a student’s ability to succeed in a Web-based distance-learning course. I believe that a counseling session should be used to determine if a student possesses the necessary skills to succeed in a Web-based distance-learning course. Ideally this counselor should be working closely with the Web-based distance-learning instructors so that this process can be enhanced.

Recommendation five is that a research study be done to measure the effectiveness of a complete academic program that is taught via Web-based distance learning. Most of the studies done on the effectiveness of Web-based distance learning pertain only to an individual course and not to a whole program. This poses some other important questions. Do the outcomes of a Web-based distance-learning program compare favorably to those of a traditional academic program? Do Web-based distance
learning students achieve the same level of critical thinking skills as do traditional learners? Are Web-based distance learning students’ lacking the proper social skills to work together with on a team project? These are just a few of the many questions that arise when such a study is discussed.
REFERENCES


Carr, S. “As Distance Education Comes of Age, the Challenge Is Keeping the Students” The Chronicle of Higher Education (February 11, 2000).


Dede, C. "Emerging Technologies in Distance Education for Business." JOURNAL OF EDUCATION FOR BUSINESS 71, no. 4 (March-April 1996): 197-204.


Dutton, J., Dutton, M., & Perry, J. (1999). Do online students perform as well as traditional students?


Wulf, K. "Training via the Internet: Where Are We?" TRAINING AND DEVELOPMENT 50, no. 5 (May 1996): 50-55.


Young, J. "Scholar Concludes That Distance Ed Is as Effective as Traditional Instruction" The Chronicle of higher Education (February 10, 2000).
APPLICATION COVER SHEET FOR REVIEW OF
RESEARCH INVOLVING THE USE OF HUMAN SUBJECTS
Central Michigan University — MA in Ed. Version

NOTE: Do not begin your research (including contacting potential research subjects) until you receive notification that your application has been approved by the MA in Ed. Director. This will take at least 5 weeks.

Name of investigator: Thomas J Zakrzewski

Address: [Redacted]

Soc. Sec. No.: [Redacted]

Phone: [Redacted]

Faculty monitor: [Redacted]

Program center: TROY

Faculty monitor’s signature: [Redacted]

Monitor’s phone: [Redacted]

Project title: Comparison of Grade Performance Between Traditional Learners and Web Wide Web Based Distance Learners

Proposed project dates: from 1/1/01 to [Redacted] (when contact will be made with subjects)

For instructor’s/monitor’s use only
☐ IRB review is not required because:
☐ Questions are programmatic (factual) in nature

☐ IRB review is required and this project falls under the category of:
☐ Exempt from board review
☐ Expedited (2 board members must review)
☐ Full board review

Research exempt from board review:
Action taken: ☒ approved as submitted
☐ approved pending submission of revisions and/or additional information
☐ received ___________________ (date)
☐ requires expedited review
☐ requires full IRB review

Research requiring expedited board review:
Action taken: ☐ approved as submitted
☐ approved pending submission of revisions and/or additional information
☐ received ___________________ (date)
☐ requires full IRB review

Research requiring full board review:
Action taken: ☐ approved as submitted
☐ approved pending submission of revisions and/or additional information
☐ received ___________________ (date)
☐ disapproved

[Full Name] 2/20/01
MA in Ed. Director’s Signature

[Full Name] 11/20/01
IRB Member’s Signature

[Full Name] 1/20/01
IRB Member’s Signature

[Full Name] 2/20/01
IRB Chairperson’s Signature