A COMPARISON OF DELIVERY SYSTEMS FOR A RESEARCH DESIGN COURSE

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CHAPTER I

INTRODUCTION

Instruction in research design and methodology is included in many post-secondary programs throughout the United States and the world. These courses are not restricted to any specific department or even restricted to just graduate students. In contrast, courses in research design are taught in numerous fields throughout a university, including communications, biological sciences, library science, and various categories of education. These classes have been designed both for undergraduate and graduate students. One major problem has been the lack of empirical assessment of the effectiveness of these introductory research design courses taught at any level (Monahan, 1994).

The research design class in the Agricultural Education, Communications, and 4-H Youth Development Department at Oklahoma State University is currently being taught by three different delivery systems: traditional classroom delivery, electronic distance education delivery, and condensed time-frame delivery. When this course is being offered by electronic distance education delivery, students are located both on-site and off-site. The use of these different delivery systems introduces other variables (situations) that must be addressed. Teaching any course by distance education involves much more than simply teaching with a camera recording or broadcasting the class.

Thorough planning and development of course syllabi, class assignments, class handouts, and interaction must be conducted before a course is presented by distance education. The professor of a distance education course is not able to "just wing it."

Problem

Evaluation of the effectiveness of the different delivery systems had not been conducted to determine if the systems accomplish the objectives of the research design course. The course objectives were to: (1) increase research knowledge of students, (2) increase statistical knowledge as a tool of research, (3) increase computer knowledge as a tool of research and statistics, and (4) prepare and assist students in writing the first three chapters of their thesis, report, or dissertation. Research needs to be conducted to determine the effectiveness of the three systems at accomplishing the course objectives.

Purpose

The purpose of this study was to compare perceived knowledge, perceived value, and academic achievement of graduate students receiving Research Design by delivery system (traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery) and study location of students receiving Research Design by electronic distance education delivery (on-site or off-site).

Objectives

The following objectives were established to achieve the purpose of the study:

1. To compare the perceived research, statistical, and computer knowledge of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.
2. To compare the perceived value of the individual components of Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.
3. To describe the perceptions of the most and least effective aspects of Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery.
4. To compare the academic achievement in Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.

Scope and Limitations

The scope of this study consisted of all graduate students completing AGED 5980 Research Design at Oklahoma State University from Fall 1995 through Summer 1997. However, this limits the generalizability of the study, since the results were generalizable

only to future graduate students taking this research design course at Oklahoma State University. Further limitations were realized when the questionnaire also asked respondents to remember and report their own level of knowledge both before and after completing the course (Anastasi, 1968; Wiersma, 1995).

Assumptions

It was assumed that the students answered the questionnaire as accurately as possible and the perceptions given were honest expressions of their opinions.

Definitions

Delivery Systems - The total approach of delivery method, teaching methods, and class instruction. This includes the physical location of the instructor and students, the use of various types of lectures, group discussions, and presentations, and the length of the course.

Traditional Classroom Delivery - This type of delivery system involves the use of more common, standard instructional techniques in the presentation of the course. Included is extensive class discussion, in-depth questioning, and some multi-media applications.

Electronic Distance Education Delivery - This type of delivery system involves the use of satellite, compressed video, and fiber optics in the presentation of the course. More multi-media applications are used.

Condensed Time-Frame Delivery - This type of delivery system involves the same type of instructional techniques as the traditional classroom delivery system but is taught in three weeks instead of a full semester (16 weeks).

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this chapter was to provide an overview of the available literature on research design instruction and distance education instruction. A compilation of journal articles, books, and ERIC documents was obtained to give a broad representation of the review of literature for this study. Chapter II was divided into the following sections: (1) Introduction, (2) Research Design, (3) Distance Education, and (4) Summary.

Research Design

Instruction in research design and methodology is included in many post-secondary programs throughout the United States and the world. These courses are not restricted to any specific department or even restricted to just graduate students. In contrast, courses in research design are taught in numerous fields throughout a university, including communications, biological sciences, library science, and various categories of education. These classes have been designed both for undergraduate and graduate students. One major problem has been the lack of empirical assessment of the

effectiveness of these introductory research design courses taught at any level (Monahan, 1994).

Most research design courses are organized in a similar fashion and attempt to accomplish similar objectives, regardless of department of origin or student interest. Courses are primarily directed at ensuring a level of research competence and familiarity with research topics to meet student needs. These needs are considered both in relation to the creation of a thesis or project and in relation to further research to be conducted by the student (Nunan, 1990). The course should include an understanding of the process of scientific inquiry (Rothenberg & Harrington, 1994).

The School of Education and Related Professional Studies at Rowan College (NJ) designed a graduate level research methods course to help teachers pay more attention to articles about research and to increase the frequency of their use of professional literature. It was designed for the teachers to apply new research to their professional roles and responsibilities. This was considered a novel idea because research skills are not generally considered to be among the survival techniques that teacher education students needed to learn. This course at Rowan College was required for all graduate students in school administration, supervision, curriculum development, and community college education. In addition, it was recommended for graduate students in learning disabilities, special education, and environmental education and conservation (Monahan, 1994).

An empirical study conducted by the School of Education and Related Professional Studies at Rowan College attempted to determine the effectiveness of this required research methods course. Former students agreed that the content was useful, but they were not motivated to take additional courses in research or statistics, to learn

more about research methodology, or to engage in research on their own. Only 20% reported engaging in any type of research, and only one individual (of a sample of 81) reported publishing research (Monahan, 1994).

A graduate research design course in education included topics related to the process of doing research, some statistics, basic types of research, and critiquing literature. It was taught using primarily lecture, small group activities, and individual hands-on experience (Rothenberg & Harrington, 1994).

The Department of Education at Syracuse University developed a required course in research methods that encompassed two complete semesters and was designed for beginning students. The primary assignment required in these courses was the completion of a research study from near beginning to the end. In addition to the weekly class hours, each student was required to attend a one hour discussion group led by faculty from the department who are not the course instructors. This group discussion facilitated problem solving and group discussions of problems encountered during the research process. The only step the students were not required to complete on their own is the determination of the problem to be researched. Through prior experience with students not being able to develop a viable problem soon enough to adequately research or "problem homesteading", the course instructors developed the problems to be researched. This allowed the student to focus on the more difficult aspects of conducting the research. Often, the papers were of publishable quality and contributed to the body of knowledge (Krathwohl, 1986).

Many communications departments across the country have included research methods classes as undergraduate requirements (Pavitt, 1994). These courses have

included numerous skills, techniques, and procedures being taught (Martin, 1990). The overall purpose of these courses was to provide an introduction to the nature of the social scientific research process involved in investigating communications (Sims, 1994). The students explored differences between the purposes, methods, and uses of qualitative and quantitative research as it is related to the communications field. Also studied were the concept of measurement, the scientific method, collection of various types of data, statistical methods, and the use of computers in research and statistics (Martin, 1990). These topics were presented with lecture, discourse, in-class exercises, library exercises, guest speakers, videos, integration of computer skills, and tests designed to promote critical and creative thinking (Sims, 1994). Formative evaluation of these communications research methods courses revealed that these courses were best designed for small classes of juniors and seniors (Pavitt, 1994).

Research determined that the most effective method in teaching communication research students was to provide the opportunity to conduct an actual research study by themselves. This method meant the students were active rather than passive learners. The students indicated they developed a strong understanding of the research process, the major concepts associated with research, and the importance of ethics in research (Sims, 1994). "Although tempting to put students into teams, the [research] course should be conducted solo. The team approach typically ends up with students doing only what they enjoy. To become a well-rounded researcher and to understand the research process, the student must tackle each part of the process" (Stack & Hickson, 1991, p. 353).

Rutgers University determined that public relations students needed both a statistics class and a survey research class. Three levels of research methods instruction

for public relations were developed, a generic course, a dedicated course, and a hybrid course. Generic courses were developed around the premise that research methods are research methods, regardless of the discipline. A major drawback of this theory is the research design class is isolated from the specific body of knowledge the students have. The dedicated course would concentrate on the methods used in the specific discipline. This type of course can easier meet market needs and business needs. The hybrid course combined the best of the generic research methods available and the specific discipline information available. Another factor the Rutgers Public Relations Department considered when developing their research design course was the differences between basic and applied research. The theories and premises behind basic and applied research addressed different issues. The course must address the fact that public relations is a much more applied, evaluative research area (Belyin & Botan, 1989).

Bruce Rideout investigated a research methods course in Psychology. He discovered that there were four goals of the course, which was required of all Psychology students immediately following the Introductory Psychology course. The course was developed to develop students' understanding of major non-experimental approaches to research, including observational, survey, and correlational research; to develop an understanding of statistical applications and uses; to help students develop expertise and confidence in the use of computers and statistical packages for data analysis; and to develop rudimentary skills in scientific report writing. It was determined that no single text contained all these objectives. The course was organized around three approaches with different methodologies, statistics, and computer use scattered throughout each section (Rideout, 1991).

A required graduate level research methods course at Bowling Green State University (Ohio) was taught jointly with the Department of Biological Science and the Science Library. It primarily emphasized library use, with both computerized bibliographic searching and end-use computer searching. Library searching consisted of half manual searching and half computerized searching (Miko, 1986).

Master of Library Science students at the University of Nigeria were required to complete a research methods course which emphasized two points. The students learned how to engage in independent study (research) with a certain degree of confidence and master elementary statistical techniques. The statistical component of a research methods course should expose the students to the appropriate statistics within their discipline and out of their discipline. The objective of the course was "to inculcate in students a clear understanding of what is and what is not research, and the ability to do a small piece of original study at the end of the course" (Aiyepeku, 1987, p. 25).

A research methods course in Australia contained four weeks of introductory material, eleven weeks of research skills, and eleven weeks of research issues. The introduction included analysis of key research articles. This was done to clarify the concept of research, establish the range of types of research projects, and highlight the skills required for planning and funding a research project. The research skills covered included analysis of research methodologies and an examination of their characteristics, advantages and disadvantages, validity, reliability, utility, and data collection and analysis. The research issues covered included two specific research case studies and guest research presentations with outside readings. This was used to critically examine

assumptions concerning epistemology, ideology, ethics, and politics of research methodologies (Nunan, 1990).

An Introduction to Inquiry course taught at Ohio State University focused on the students being able to define and understand basic research vocabulary and concepts. The students were also required to critique and design a research study. James Morrison's Logic of Inquiry course at the University of North Carolina focused on the three basic modes of inquiry, experimental, quasi-experimental, and non-experimental. Students were also required to develop a formal research proposal. The research design course at the University of Michigan focused on the logic of the research process and the issues addressed. This course was designed for both students who need to know how to interpret research studies or to phrase problems as researchable questions and students who intend to be researchers. The former group took a final examination, while the researchers developed a research proposal (Morrison, 1986).

Students in the Teachers College at Columbia University had the opportunity to take a team taught Research Methods in Postsecondary Education. This course introduced students to a range of methodologies and their application to higher education. The students better understood what research is, what methods suit their interests and abilities, and what courses are needed to prepare for their dissertations. The students were exposed to experiments, interviews, case studies, surveys, and meta research techniques. Students did not write a research proposal but had a take-home final. Larry Leslie's Research in Higher Education Administration course at the University of Arizona was designed to provide experience with various research methods and data

collection techniques. This course gave the students a head start on a dissertation proposal (Morrison, 1986).

Perhaps the most intensive and comprehensive research methods course may be the one taught at Penn State University. The course began with a large amount of reading in the philosophy of science. It moved through the problem definition, conceptual frameworks, measurement, instrumentation, data collection and the three modes of inquiry. Students worked in small groups to develop, present, and defend research designs. Finally, the students prepared a research proposal (Morrison, 1986).

AGED 5980 Research Design at Oklahoma State University

Research Design at Oklahoma State University is a graduate level course open to students from any major. The students are typically from Agricultural Education, Occupational and Adult Education, and Aviation and Space Education with some from other colleges and departments across campus and are working on both Masters and Doctoral Degrees. The course is taught all three semesters, Fall, Spring, and Summer, but by different delivery systems each semester. Students enrolled in the course during the Fall have the option to take the course at a distant site or on campus. Students enrolled in the course during the Spring are taught by traditional classroom delivery. Students enrolled in the course during the Summer are taught during a three week period by the same techniques as in the Spring but in a condensed time-frame.

The objectives of the course have been selected and refined by the students over the past 30 years. They include to: (1) increase research knowledge; (2) increase statistical knowledge as a tool of research; (3) increase computer knowledge as a tool of

research and statistics; (4) prepare and assist students in writing the first three chapters of their thesis, report, or dissertation; and (5) read and interpret research literature. Several methods have been utilized to accomplish these objectives. These include:

> 1. Studying the procedures, content, and format and preparing the first three chapters of a report, thesis, or dissertation to be submitted to your advisor and/or committee by the end of class.
> 2. Studying the tools and procedures of research, discussing them in class, and using them in preparing the first three chapters of your study.
> 3. Reading studies from the research literature and submitting a minimum of three and a maximum of six critiques of these research reports to aid in interpreting research.
> 4. Studying the more common statistical methods, discussing them in class, and using them in analyzing the data for your study.
> 5. Using the computer to help you analyze the data in your study (Key, 1996, p. 3).

The course is roughly divided into two major and one minor sections, research, statistics, and computer, respectively. Sections are further delineated by various modules that cover different aspects of research, statistics, and the computer. Initial research components include the library module, an orientation to the library at Oklahoma State University, and CD-ROM searching. Other topics include the use of logic, sampling, the questionnaire and interview, other data gathering tools, and reliability and validity. However, the most important modules include the information on writing the introductory, review of literature, and procedures chapters of the thesis, report, or dissertation. Also covered during the research portion are the various types of research, historical, descriptive, experimental, and qualitative (Key, 1996).

Statistical components include the formula method of using statistics and are used to provide an introduction and explanation of "why" to use various statistics. Research

design covers descriptive statistics, correlation, linear regression, inferential statistics, "t" test, analysis of variance, chi square, and a statistics selection chart (Key, 1996).

The computer module is a minor section that is included in the Research Design course. This module provides an introduction to the hardware and peripherals of the computer in addition to various software and capabilities of the computer.

Assignments due in Research Design are spread throughout the semester. They include three critiques, the mini-proposal, a rough draft of the first three chapters of a thesis, report, or dissertation, and a final draft of the first three chapters of a thesis, report, or dissertation. Assignments are evaluated for content, theory, and grammar by both the professor and graduate teaching assistant. In addition, a comprehensive, take-home final exam is provided for the students in the back of the module textbook or is given out during the first class sessions. The students must receive an A on the final exam to receive an A in the course or receive at least a B on the final exam to receive a B in the course (Key, 1996).

The student textbook is an anthology of research primarily from three sources. These include: (1) Kerlinger's Foundations of behavioral research; (2) Leedy's Practical research: Planning and design; and (3) Spatz' Basic statistics: Tales of distributions (Key, 1996). It provides the information in modular form and has been developed since the course was begun in 1969. Various graduate students and the professor have created and edited the modules as needed throughout the years. These modules provide helpful hints, examples, and problems for each research, statistical, and computer topic.

Distance Education

Definitions

Simply defined, distance education is a form of study where the teachers and students are physically separated and technologies (i.e., voice, video, data, and/or print) are used to bridge the instructional gap (Willis, 1994). However, that may not entirely convey the broad nature of distance education. Concern was that if distance education is defined it will be limited in scope (Willis, 1994). Moore (1973, as cited in Keegan, 1990, p. 37) stated:

> Distance teaching may be defined as the family of instructional methods in which the teaching behaviours are executed apart from the learning behaviours, including those that in a contiguous situation would be performed in the learner's presence, so that communication between the teacher and the learner must be facilitated by print, electronic, mechanical, or other devices.

Holmberg (1977, as cited in Keegan, 1990, p. 38) stated:

> The term 'distance education' covers the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition of a tutorial organisation.

Keegan (1990) attempted to consolidate the many definitions and elements concerning distance education. He defined distance education as a form of education characterized by:

- the quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education);
- the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student

support services (this distinguishes it from private study and teach-yourself programmes);
- the use of technical media - print, audio, video or computer - to unite teacher and learner and carry the content of the course;
- the provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education); and
- the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialization purposes (p. 44).

Garrison (1989) reported Keegan's definition was surprisingly narrow. "The basic difficulty with Keegan's definition is that in his enthusiasm to show that distance education is a unique and distinct field of practice he views it largely as a private, print based form of study" (Garrison & Shale, 1987, p. 9, as cited in Garrison, 1989, p. 5).

It has been suggested that a more realistic approach, instead of spending time developing a definition, would be to utilize a minimum set of criteria. This would not restrict any activities or processes that are yet to be developed or utilized as forms of distance education and learning. Garrison and Shale (1987, p.11, cited in Garrison, 1989, p. 6) developed the following three criteria for use:

- Distance education implies that the majority of educational communication between (among) teacher and student(s) occurs noncontiguously.
- Distance education must involve two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process.
- Distance education uses technology to mediate the necessary two-way communication.

Distance Education Delivery Methods

Distance education has been around in some form for over 100 years, both in the United States and throughout the world. Correspondence study has been available for many years and is still the most common form of distance education (Wilson, 1991). This distance education method provides the student with all course materials in printed form. Students complete the materials at their own pace and return the responses to the instructor for feedback. The instructor gives the student a grade, returns the materials for corrections, prepares a test, or forwards the next stage of instruction to the student for completion. This method is inexpensive; materials are well organized; and students can work at their own pace. However, completion rates are low; time is delayed in postage; interaction between teachers and students is limited; and the testing process is slow. Students with time constraints or topics that do not require audio or motion video for instruction are good candidates for this type of low-tech approach (Schlais, Igo, & Sleezer, 1996; Smaldino, 1995).

Audiocassettes and videocassettes added another dimension to the use of correspondence study. Students could listen or view the televised broadcast for the instructional lesson. Print based lessons completed the remainder of the lesson materials. Advantages of this method include students can listen to or see the instructor's presentation, can work at their own pace, can review audio and video materials, and can listen to materials in various settings, and the materials are well organized. Disadvantages include the use of lecture style presentations, low completion rates, time

delay in postage, and limited interaction between the instructor and students (Smaldino, 1995).

The information presented on tapes is limited to locations where playback machines are located, while the text is much less restricted. The text is presented visually and the videotape is presented orally. The text allows the reader to access information at random while the videotape presents the information in a constant stream of auditory sounds and visual motion (Cennanno, Chung, Leuck, Mount, & Turner-Vorbeck, 1995).

The use of radio became more widespread and used. This method has primarily been used in developing countries, especially Central America and Africa. However, radio has been an effective method used in the United States. The University of Wisconsin developed and broadcast its "University of the Air" program which allowed students to listen to college courses broadcast over the university's radio station (Schlais, Igo, & Sleezer, 1996). Students listened to the teacher's presentation, worked at their own pace on written materials, and reviewed audio materials, and the presentation was similar to the on-site lecture experience. However, students must have access to a radio; only the lecture format is possible; unless taped, students cannot work at their own pace; time delay may occur for written materials; and communication between the instructor and the student is limited (Smaldino, 1995).

The use of cable television (CATV) and microwave television offered another delivery method. Students taking courses by cable use televisions wired in their own homes or businesses. Both the students and the instructors must have access to CATV systems. Microwave broadcasting has often been called wireless cable because it can broadcast programs within a twenty mile radius. Microwave broadcasting has been a

viable alternative for schools because it is cost-effective and easy to install. Also, because the broadcasts are often pre-recorded, the lessons can be rebroadcast several times. Both systems have no direct interaction between the instructor and the student, but telephone conferencing can be used between the students and the instructor if the course is broadcast real-time (Schlais, Igo, & Sleezer, 1996; Smaldino, 1995).

Researchers at the University of Nebraska determined that cable TV was an acceptable mode of delivery of urban Extension education. Respondents felt multiple viewing times were important as long as they were contained within one week and to evening hours. Pennsylvania and Ohio have used cable broadcasting to transmit information. In fact, Pennsylvania State University reserves one channel solely for its use. However, problems have developed with using cable for distance education purposes. Many cable systems are "pass-through" systems and do not have equipment for local programming, so programming must be produced somewhere else. Many cable companies have cumbersome access procedures, and the degree of interest in local programming varies with different cable companies (Cable Television, 1983).

Additional methods have developed that incorporate interaction with new distance education technology methods. One of the most commonly known methods is the use of satellite broadcasting. This method utilizes one-way video/two-way audio systems. Students can see and hear the instructor's presentation and can speak to the instructor during the lesson via telephone; however, numerous disadvantages exist. Students must have access to the facilities or a satellite dish; instructors cannot see the students at the distant site; telephone access is limited; and the entire delivery is expensive (Smaldino, 1995). Many land grant universities have used satellite technology to telecast Extension

and informal and formal educational programs. These include Oklahoma State University, Kansas State University, Ohio State University, University of Nebraska, and Iowa State University. "Satellites have transformed the earth into a global village" (Eckles & Miller, 1987, p. 1).

Compressed video may be one of the fastest growing methods of delivering distance education. It provides two-way video/two-way audio via telephone lines and utilizes a digital television signal that takes up less space than the traditional analog signal, allowing for faster transmission of information and the use of conventional phone lines. Wilson (1991) believed compressed video would replace the current telecommunication systems as technology continued to develop and the price became more affordable. Students must have access to specific classrooms; the quality of video signal depends on the band-width choice; and greater band-width raises costs (Schlais, Igo, & Sleezer, 1996; Smaldino, 1995).

Fiber optic networks are being established for use in interactive delivery education. The signal is carried using tiny strands of glass. Fiber optic connections allow the video and audio signals to be distributed quickly with little loss of signal integrity. The quality of video and audio signal is considered the best with the use of fiber optic networks. Numerous advantages and disadvantages exist for the use of fiber optics. The student can see and hear the instructor's presentation, and the instructor can see and hear the students at the distant sites. The signal is transmitted fast and is capable of transmitting multiple types of signals simultaneously (video, data, voice). However, students must have access to specific classrooms with specific equipment, and the initial establishment of the system and the periphery equipment necessary is still extremely

expensive (Smaldino, 1995). Today's digital videoconference systems typically use the equivalent of six digital phone lines (384K) (Murphy, 1996).

Gunawardena (1988) found that non-interactive open-broadcast television, cable television, and videocassettes were used to a much greater extent than other distance education delivery methods, including correspondence courses, audiocassettes, teleconferencing and videoconferencing, computers, and radio. The videocassettes were used primarily to record television broadcasts. Television was thought to be an effective delivery medium in all subject areas used and the most popular delivery medium among students.

However, interactive television had no significant intrusion on the flow of lessons. Few students even commented on the technology. There was much less interaction between students and teachers in several remote sites with small numbers of students (McClelland, 1987).

> Television-based courses are flexible learning systems that can be used in any number of learning environments to meet diverse programmatic needs. By fulfilling repetitive lecture tasks, telecourses provide instructors with the time to respond to individual student needs and to pursue research and development projects. In today's competitive educational climate, the use of telecommunications increases an institution's enrollment potential; it opens doors to a community of people who cannot fit their lives into traditional campus schedules. By introducing individuals to the skills necessary to assessing and evaluating information in the telecommunications age, educators can use telecourses to encourage independent study and lifelong learning. Television expands the walls of traditional classrooms, introducing students to international subject experts and exposing them to places and events they would not otherwise see. Computer graphics and animation can illustrate experiments, demonstrations, concepts and processes which are impossible to duplicate in words or in print (p. 30-31).

Computers have become widely used in distance education. The computer can connect people and resources around the world. The instructor and students can be connected by simple means, primarily by using modems. One of the most common uses of computer based telecommunications is the use of electronic mail, or e-mail. Other uses include the use of a chat function in which two or more computer users can log onto the network and "meet" on-line to discuss issues or exchange ideas. Electronic bulletin boards are also used in a similar manner to transmit information to a large number of users (Smaldino, 1995).

The Internet is the most expansive computer network in the world and is accessible from many computers throughout the world. It began in the 1960s as a U.S. government project designed to link computers together in the event of a nuclear attack. It developed into a collection of government, educational, military, and commercial computer networks joined by high-speed fiber optic lines and other communication lines that connect the world. There is no single computer controlling the Internet (Talbert, 1995). This technology has resulted in new ways to access and disseminate information by simply posting the information on the Internet for anyone to read. Courses have been developed for use strictly on the Internet (Schlais, Igo, & Sleezer, 1996). The World Wide Web (WWW) has helped increase the use of the Internet. It allows full integration of full-color graphics, text of varying typefaces, animation, and sound (Seguin & Seguin, 1995). WWW traffic surpassed all other forms of data transmission in April, 1995 (Murphy, 1996). In addition, computer based communications (e-mail and computer networks) are a feasible approach to increased communication between instructors and distance education students (Hezel & Dirr, 1990).

Adult Learners and Distance Education Learners

Adult learning in the past often meant remedial education to cure illiteracy. This paradigm has shifted to the modern concept of lifelong learning. This shift was a reflection of the aging of America and the popularity of educational programs among older adults (Wilson, 1991). By the year 2000, older students will be the majority of undergraduate students in the United States and baccalaureate recipients. These changes will involve organizational and delivery changes in education (Brazziel, 1993). One of the important issues in adult education is the ability of existing educational institutions to keep up with the changing world. Distance education is one popular and successful method utilized to provide this lifelong learning (Wilson, 1991).

Distance education has been viewed as a step-child, a caste system, or a "mail-order outfit". Distance education "(1) has potential for substantially broadening access to higher learning and fostering greater equality of educational opportunity, and (2) places a major emphasis on self-instruction, active study methods, and students' assumption of responsibility for their own learning" (Wilson, 1991, p. 7).

Distance education learners are typically older, between the ages of 20 and 40. Most attend school part-time, are white, and are married. Many are professionals, and in developed countries, most are women. These characteristics influence the reasons adults choose distance education over traditional education. Often, on-campus classes conflict with work or leisure. Distance education courses minimize travel time and expense. Social, economic, and geographical reasons also exist for choosing distance education courses (Wilson, 1991). Time rather than distance was the major barrier to completion.

The students' greatest challenge was managing their limited time in view of competing demands from jobs, families, and other responsibilities (Hezel & Dirr, 1990).

Many instructors felt distant students performed the same as face-to-face students, while some instructors felt distant education students were more prepared on tests and assignments (Burnham, 1988). Lehtola and Boyd (1992) described agricultural distant learners as self-motivated and self-disciplined, while Gulliver and Wright (1989) noted that distant learners did not place a high degree of value on interacting with other students.

Three factors, access, receptivity, and desirability, were key to understanding a student's orientation toward technology and distance education. Gulliver and Wright (1989) reported that students were receptive to videotape with desirability indicators including flexibility, self-pacing, costs, reduced need to travel, ability to review materials, and course content not available elsewhere.

Examples of Distance Education Programs

One of the most widely known programs offering distance degrees in the United States was the National Technological University (NTU). NTU was a cooperative effort of forty-five major engineering colleges (Murphy, 1996; Sarchet & Baldwin, 1989; Schlais, Igo, & Sleezer, 1996) and offered an engineering master's degree to engineers at 400 corporations, government agencies, and colleges. Students never came to class. Curriculum and exams were downloaded to computers, VCRs, and live television via satellite (Brazziel, 1993). Over 5400 technical professionals completed graduate courses in the first three years of operation of NTU, and 45,000 people participated in short

courses and tutorials in 1988-89. Annually NTU offered 10,000 hours of graduate instruction and 1200 hours of interactive continuing education and research teleconferences (Sarchet & Baldwin, 1989).

The British Open University was established in 1971 primarily as a print based educational format. The British Open University began extensively using television as the broadcast medium and merged its print material with the electronic media (Holmburg, 1986; Jackson, Raven, & Threadgill, 1995).

Mind Extension University (MEU) was launched in 1987 as the first U.S. institution offering a 24 hour cable education channel which uses cable television networks to take courses into students' homes. In 1992 MEU broadcast courses taught at 21 universities over 600 cable systems with an estimated audience of 18 million homes (Murphy, 1996). TI-IN Network in San Antonio, Texas provided programming aimed primarily at kindergarten through high school in partnership with MEU. TI-IN offered two channels of simultaneous programming using two-way audio and one-way video to present 17 courses and 200 hours of programming a year. TI-IN also offered 200 hours of staff development programming each year (Smith, 1990; Task Force, 1993).

Various corporations have established, singly and jointly, distance education programs. AT&T established the Center for Excellence in Distance Learning (CEDL) to investigate, develop, and demonstrate innovative applications of telecommunication technologies. CEDL faculty also worked with various university faculty, nationally recognized experts, and AT&T Bell Laboratories in research and development. IBM and NEC jointly developed an Interactive Satellite Education Network (ISEN) in the 1980s

primarily for corporate training through the use of compressed video and response terminals (Schlais, Igo, & Sleezer, 1996).

The Washington Higher Education Telecommunication System (WHETS) linked four sites in Washington and two in Idaho for distance educational programming. WHETS was a land-based microwave system which utilizes analog video radios. There was two-way audio and two-way video to the linked sites and one-way video and two-way audio to Instruction Television Fixed Service in industries. This system was being used more for inservice in addition to formal graduate and undergraduate coursework (Nelson, Cvancara, & Peter, 1989).

Consortiums developed among educational institutions, government agencies, corporations, and technological communities to provide high quality and economical distance education programming. A*DEC Distance Learning Consortium (formerly Agricultural Satellite Corporation or AG*SAT) was a national consortium of state universities and land grant institutions to provide distance education, offering educational and informational programs and services regarding food and agriculture; children, youth, and families; community/economic development; distance education and technology; nutrition and health; and natural resources and environment (A*DEC, 1997). Another example of a consortium established to develop cooperation between the entities providing distance education was the independent, non-profit, Utah-based International Network for Education and Technology (INET). The Globewide Network Academy (GNA) was a larger consortium which created a central marketplace for courses and offered administrative and technical services to support on-line programs (Schlais, Igo, & Sleezer, 1996).

Off-campus degree programs were becoming more common and popular within universities, especially land grant institutions. The College of Agriculture at Iowa State University recognized this need and began offering an off-campus master of agriculture degree in 1979 and a bachelor of science degree in 1991 (Miller, 1995). The purpose of the off-campus degree program was to provide post-secondary agricultural education opportunities to persons who are unable or prefer not to study on campus. The primary delivery method used for agriculture courses at Iowa State University was videotaped courses due to their low cost and convenience to students (Miller & Honeyman, 1993). However, other methods such as uplink satellite broadcasts, audiotaped classes, and teleconferencing had been used in the off-campus degree program (Eckles & Miller, 1987; Miller, 1992).

North Dakota was linked by the North Dakota Interactive Video Network (ND IVN) which provides both audio and video for distance education and meetings involving persons in numerous locations. Over 30 specially equipment telecommunications classrooms and conference rooms linked the eleven North Dakota University System campuses, the state capitol, and the tribal colleges. It was estimated that over 50% of K-12 schools have access to an IVN room within their school district. Students learned to develop effective delivery techniques while using computers, the Internet, CD-ROMs, videotapes, slides, cameras, and televisions. The number of sites enabled current teachers to complete graduate degrees without physically returning to a central campus (Swan, 1996).

In addition to entire programs, various courses and Extension programming have been offered via distance education methods at various institutions. One example was a

course completed on-line entitled *E-Mail: A Step Beyond the Basic*, which attempts to build on the participant's basic knowledge of e-mail by addressing topics concerning mailing lists and file retrieval and exploring the use of e-mail as a teaching tool. This course was a collaborative effort between North Carolina State University, Mississippi State University, Pennsylvania State University, West Virginia University, Cornell University, Purdue University, and CSREES, USDA and can accommodate a class size of approximately 425 students (Kirby & Owen, 1995).

Purdue University utilized distance education in delivering a six day intensive course titled "Enrichment in the Classroom: Foods and Nutrition". The instructors utilized a one-way video, two-way audio system for morning sessions. During the remainder of the day, on-site extension educators provided hands-on instruction, coordinated field trips, facilitated experiments, and demonstrated materials use (Blume & Talbert, 1996).

Montana State University utilized distance education methods to produce graduate level courses for students who cannot reach campus, teacher in-service, and student teacher supervision. Telecomputing and compressed video were the primary distance delivery methods utilized in delivering the courses (Davis & Frick, 1996).

Distance Education Instruction

> Educational media alone do not influence the achievement of students. Researchers who have attempted to demonstrate the superior influence of educational technologies on achievement have been unsuccessful. On the other hand, researchers who have attempted to identify the appropriate techniques of message organization and the correct process of instructional delivery with technology have been more in the mainstream of what is

> considered appropriate (Thompson, Simonson, & Hargrave, 1991, p. 1 as cited in Miller & Honeyman, 1994).

Agricultural educators have the ability to develop and improve the method and process of technology-mediated instruction (Newcomb, 1993). "Most instructors in adult education programs are experts in the content they teach, but they usually have little preparation in the process of helping adults learn" (Knox, 1986, p. xi). Research has been conducted regarding the importance of placing greater emphasis on how the course is taught (Martin, 1987; Martin & Odubiya, 1991; Martin & Omer, 1990; Voight, 1992). However, educators must know their audience, identify effective distance education practices, and tailor programs to meet the needs of their audiences (Miller & Honeyman, 1993).

New skills needed to be developed as instructors move from traditional classroom teaching to distance education. Many of these centered on course planning and delivery, including methods of instruction, teaching techniques, timing, teacher/student interaction, feedback, printed supplement materials, and evaluation (Kelly, 1990). Wilson (1991) summarized skills needed for distance education instructors. These included: imagines what the students need, inspires the students, encourages them, likes people, is alive, provides feedback, motivates students, skill, tolerance, cooperation, flexibility, innovation, two-way written communication, and establishes personal rapport. Burnham (1988) and Willis and Touchstone (1996) noted that faculty tended to transfer these distance education techniques to their traditional classes and incorporated more planning into their traditional classes.

Distance education instructors have three main roles: an altered traditional role (makes distance educators out of those already teaching the course); a facilitator role (assists students through well-defined educational process without having any control over the process); and a mentor role (aids students throughout a long term process). Nine teaching competencies were identified as needed for effective instruction by distance education.

1. promptness in returning lessons or assignments;
2. ability to communicate in writing;
3. knowledge of content area;
4. provision of pertinent comments on a student's work;
5. willingness to incorporate teaching techniques suitable for independent study;
6. understanding the needs of independent learners;
7. willingness to respond to students' questions or problems;
8. interaction with students to reinforce and motivate;
9. belief in and support for this method of instruction (Wilson, 1991, p. 53).

Fuller and Annis (1992) identified two elements important to the success of a distance education program, commitment and incentives. All parties must be committed to a distance education program for it to succeed. Incentives must be available to both the students and the faculty to utilize distance education programming. Willis and Touchstone (1996) stated:

> The keys to success are: faculty development and training, student development and training, technology is not the answer, "Avoid technological solutions in search of instructional problems", don't negate the importance of face-to-face communication, and distance education is more about access than about saving money (p. 9).

Instructors were motivated to teach by distance methods for several reasons. Motivators were altruistic, institutional, monetary, and traditional extension involvement (Burnham, 1988). Jackson (1994b) developed a flow chart that divided incentives for

participation in distance education into actual inputs required and anticipated outcomes. Actual inputs required were those necessary to begin the planning process, including demand for the topic, adequate staff to produce the course or program, available funding, and time to plan and deliver. Incentives should be supplied by public demand and the educational institutions. Anticipated outcomes were incentives that were rewards for effectively planning and delivering a course or program, including meeting public requests, increasing public interest, preparing more effective instruction, recognizing instructors, reaching larger audiences, and presenting additional usage of materials. Incentives should eliminate potential barriers to planning and delivering distance education courses and programs.

Major barriers existed to the effective use of distance education programming. Dillon and Walsh (1992) found faculty resistance often listed as the major barrier to implementation of distance education technologies. Other barriers included negative teacher attitudes, additional workloads, lack of funding (equipment, production, and distribution costs), lack of institutional support, reduced student interaction, lack of time, technical problems, resistance to change, fear of technology, and fear of job loss (Bruder, 1989; Dillon, 1989; Gunawardena, 1988; Hansford & Baker, 1990; Jackson & Bowen, 1993; Jurasek, 1993; Koontz, 1989; Miller & King, 1994; Swan & Brehmer, 1992; Swan & Brehmer, 1994). Murphy and Terry, Jr. (1995) identified 13 obstacles faced in the process of adopting distance education technologies. The five main categories included lack of time, lack of a formalized reward system for faculty, lack of technical support, cost of the equipment, and lack of properly designed facilities.

Distance Education Models

Wilson (1991) summarized distance education models developed by numerous researchers. The Kaye System Model was a generalized distance-learning system involving students, learning materials and teaching methods, and logical and economic features. Perraton developed 14 statements or hypotheses to build his theory of distance education. Moore's Transactional Distance Theory categorized independent study and distance education in terms of transactional distance involving dialogue and structure. Dialogue was the two-way communication between a student and teacher; structure was the objectives, study methods, and evaluation tools and how they were adapted to the needs of the student. Verduin and Clark (1991) modified Moore's model and included three dimensions instead of Moore's two. Dimensions included dialogue/support, structure/specialized competence, and general competence/self-directedness.

Wilson (1991, p. 19) developed his own model using features from many of the models he summarized (See Figure 1). He primarily utilized Shale's model of the educational process and then added bridges to the educational process for distance education students. Course content can be transmitted by numerous media; the interactive processes of education can be achieved through a combination of these media. The model described both print-driven correspondence programs and newer technologies that offer immediate feedback.

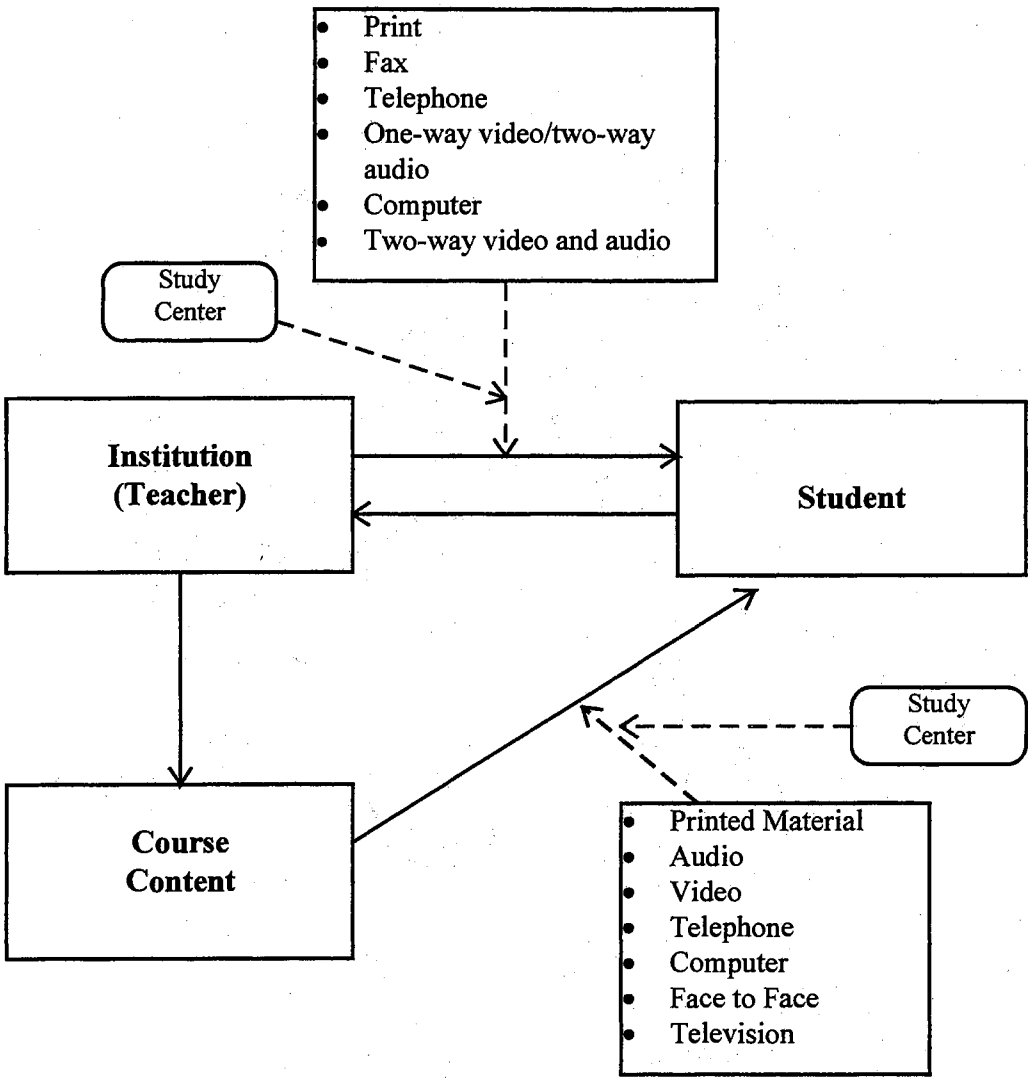

Figure 1. Wilson's Model for Distance Education

Other researchers developed conceptual models for planning and delivering distance education courses. Jackson and Bowen (1993) developed a model based upon the incentives and obstacles identified through a modified Delphi study. The most important incentive was "an efficient way to reach larger audiences" (p. 151). Obstacles included obtaining funding and acquiring the necessary time needed to plan and deliver a distance education course or program. The components of the model included incentives, planning behaviors, and delivery behaviors. Incentives were divided into actual inputs required and anticipated outcomes. Planning and delivery behaviors were the second and third components of the model. Planning behaviors requiring special emphasis included allocating instructional preparation time, planning for time constraints, identifying the prior knowledge and skill levels of the participants, developing evaluation procedures, and developing problem-solving situations for the participants. Delivery behaviors requiring special emphasis included promoting class or program discussion, immediately reinforcing participant achievement, providing remedial instruction when needed, using group learning tasks when delivering a distance education course or program by satellite, determining participant needs relative to the subject matter, using various approaches to evaluation delivery, and using individual learning tasks.

Schieman (1990) summarized general guidelines relative to planning distance education instruction. These included stating the purpose of the course or program, outlining the course content, allocating time for units, deciding on the appropriateness of the instructional plan for the intended audience, listing skills and procedures to be developed, producing instructional materials, and devising evaluation procedures. Wolcott (1991) characterized three features in the preactive planning process which

included faculty engaging in course planning as an initial activity before instruction, planning driven by content and centered on the selection and sequencing of subject matter, and focus on the development of an extended syllabus. Factors influencing instructional planning included time constraints, medium of delivery, and faculty beliefs and concerns about distance education. Jackson (1994a) further defined the planning component of the conceptual model of Jackson and Bowen (1993). Phase 1 was preplanning and included identification of subject matter content, selection of new and up-to-date information, allocation of preparation time to plan, identification of prior knowledge and skill level of participants, and familiarity with telecommunications equipment. Phase 2 was instructional/program design and included development of course/program syllabus or outline, development of program objectives, sequencing of subject matter, planning for time constraints, selection of delivery methods for various learning styles, production of printed instructional materials, preparation of course/program exercises, questions, and visuals, and production and pre-recorded segments. Phase 3 was instructional format and included development of an interest approach for each topic/session, development of problem-solving situations for participants, development of group methods of learning, planning for discussion, and development of evaluation procedures.

Summary

This chapter provided an overview of the literature available on research design instruction and distance education instruction. Research design and methodology courses were taught at many post-secondary institutions throughout the United States and the

world. However, these courses had not been assessed regarding their effectiveness. Most research design courses were organized to develop an understanding of the process of scientific inquiry and competence and familiarity with research topics. AGED 5980 Research Design at Oklahoma State University included many components that were taught at other institutions and focuses primarily on research and statistical topics.

Distance education is simply education at a distance. Various delivery methods and technologies are used to provide distance education programming throughout the world. Some of these were low-tech, including print-based correspondence courses, audiocassettes, and radio, while others were high-tech, including satellite courses, compressed video, and fiber optic networks. Distance education may be the means necessary to educate students of the future. Numerous universities, institutions, corporations, and consortiums were created to develop and produce distance education programming. Various incentives and barriers were investigated regarding their effect on the planning and delivery of distance education. From these investigations, conceptual models were developed to provide a guideline for future distance education professionals.

CHAPTER III

PROCEDURES

Purpose

The purpose of this study was to compare perceived knowledge, perceived value, and academic achievement of graduate students receiving Research Design by delivery system (traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery) and study location of students receiving Research Design by electronic distance education delivery (on-site or off-site).

Objectives

The following objectives were established to achieve the purpose of the study:

1. To compare the perceived research, statistical, and computer knowledge of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.
2. To compare the perceived value of the individual components of Research Design of students receiving traditional classroom delivery, electronic distance education

delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.

3. To describe the perceptions of the most and least effective aspects of Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery.

4. To compare the academic achievement in Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.

Institutional Review Board

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can initiate their research. The Office of University Research at Oklahoma State University and the Institutional Review Board conduct the aforementioned review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with this policy, this study received the proper surveillance and was granted permission to continue. The Institutional Review Board approval code was AG-98-004.

Scope

The scope of this study consisted of graduate students who completed AGED 5980 Research Design at Oklahoma State University since Fall 1995. The population included a total of 142 students. Forty-eight students received traditional classroom

delivery, 75 students received electronic distance education delivery (29 on-site and 46 off-site), and 19 students received condensed time-frame delivery.

Data Collection and Analysis

The comparisons of objective one were determined through a researcher-developed questionnaire (Appendix A). This questionnaire consisted of six sections. The first three sections evaluated perceived research knowledge, statistical knowledge, and computer knowledge. Response choices consisted of five-point Likert-type scales where 1 = no knowledge and 5 = very knowledgeable. The fourth section evaluated general perceptions and feelings about research design and consisted of a five-point Likert-type scale where 1 = poor and 5 = excellent. All Likert-type scales were set without absolute limits to allow the gathering of more continuous data (Remmers, 1963; Van Dalen, 1979). The next section included open-ended questions regarding the number of research, statistics, and computer courses previously taken and yes-no questions evaluating student feelings of research, statistics, and computer knowledge increases. The last section evaluated whether the students would take another course by electronic distance education delivery or condensed time-frame delivery. This questionnaire was evaluated by a panel of experts for content and face validity, and a pilot test was conducted with former graduate students who completed AGED 5980 Research Design but were not part of the survey population. A cover letter, questionnaire, and self-addressed stamped return envelope was mailed to the entire population of students who completed AGED 5980 Research Design from Fall 1995 through Summer 1997.

Analyses of variance and t-tests were conducted to determine any significant differences between the respective groups.

The comparisons of objectives two and three were determined through analysis of the evaluation questionnaire each student completed during the final class period of the semester they took Research Design (Appendix B). This questionnaire consisted of a listing of the individual components of Research Design which students rated on a ten point Likert-type scale where 1 = least important and 10 = most important. Analyses of variance and t-tests were conducted to determine any significant differences between the respective groups. Objective three was analyzed by summarizing comments and calculating frequencies.

The comparisons of objective four were determined through a review of grades received for this course. Analyses of variance and t-tests were conducted to determine any significant differences between the respective groups.

An alpha level of .05 was established a priori to determine statistical significance. All statistical analyses were conducted using the Microsoft Excel 5.0 Data Analysis Package. The t-tests were conducted using the T-test for Two Samples Assuming Unequal Variances contained in the Analysis Tools of the spreadsheet program. The analyses of variances were conducted using the ANOVA: Single Factor Test contained in the Analysis Tools of the spreadsheet program. Descriptive statistics (means, frequencies, and standard deviations) were calculated using the Descriptive Statistics Test contained in the Analysis Tools of the spreadsheet program.

The initial mailing was sent on August 15, 1997 and included a questionnaire, a cover letter explaining the purpose of the study (Appendix C), and a self-addressed

stamped return envelope. Two questionnaires were returned with no forwarding address. Seventy-five questionnaires were returned during the initial data collection period for a response rate of 53.6%. Follow-up of non-respondents was accomplished three weeks later through reminder e-mail messages for students with e-mail addresses and telephone calls for the remainder. Additional questionnaires were subsequently sent to non-respondents who indicated they had not received or could not locate their initial questionnaire. One subject was removed from the study following a telephone conversation in which he was determined not to have been a member of the population. Sixteen questionnaires were returned during the follow-up period which ended October 15, 1997. A total of 91 questionnaires were returned for a return rate of 65.0%.

A subsampling of non-respondents was done to determine if differences in respondents and non-respondents existed (Van Dalen, 1979; Warde, 1990). Five non-respondents (10% of non-respondents) were randomly selected from the listing of non-respondents and were contacted personally by telephone to provide the needed information. The information collected from the five non-respondents was compared with information from the 91 respondents. No significant differences were determined, so the data from the non-respondents was pooled with the data from the respondents, giving a total of 96 questionnaires (68.6% return rate).

CHAPTER IV

FINDINGS

Introduction

The purpose of this chapter was to provide a complete discussion of all data collected. An alpha level of .05 was established a priori to determine statistical significance. Chapter IV was divided into the following sections: (1) Introduction, (2) Respondents, (3) Perceived Student Knowledge, (4) Perceived Course Value, and (5) Academic Achievement.

Respondents

The scope of this study consisted of graduate students who completed AGED 5980 Research Design at Oklahoma State University from Fall 1995 through Summer 1997. Of the 96 respondents, 31 students received traditional classroom delivery, 50 students received electronic distance education delivery (22 on-site and 28 off-site), and 15 students received condensed time-frame delivery.

Perceived Research Knowledge

The total group of students rated their research knowledge before taking Research Design at 2.31, as noted in Table I. Students receiving traditional classroom delivery rated their research knowledge before the course at 2.43; students receiving electronic distance education delivery rated their research knowledge before the course at 2.24; and students receiving condensed time-frame delivery rated their research knowledge before the course at 2.26. Students receiving traditional classroom delivery rated their level of research knowledge before the course significantly higher than students receiving electronic distance education delivery or condensed time-frame delivery ($p = .0004$).

TABLE I

PERCEIVED RESEARCH KNOWLEDGE OF STUDENTS BY DELIVERY SYSTEM AND STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Overall	2.31	1.02		3.82	0.85		1.51	1.01	
Traditional	2.43[a]	0.98	.0004*	3.94[a]	0.79	.0000*	1.50	1.00	.8490
Distance	2.24[b]	1.05		3.76[b]	0.85		1.52	1.00	
Condensed	2.26[b]	0.95		3.74[b]	0.95		1.49	1.05	
On-site	2.22	1.09	.5343	3.70	0.94	.0255*	1.47	1.10	.2106
Off-site	2.26	1.02		3.81	0.77		1.55	0.95	

[ab]Means in the same column and section with different superscripts were statistically significant.

*Differences were statistically significant at the alpha = .05 level.

The total group of students rated their research knowledge after taking Research Design at 3.82. Students receiving traditional classroom delivery rated their research knowledge after the course at 3.94; students receiving electronic distance education delivery rated their research knowledge after the course at 3.76; and students receiving condensed time-frame delivery rated their research knowledge after the course at 3.74. Students receiving traditional classroom delivery rated their research knowledge after the course significantly higher than students receiving electronic distance education delivery or condensed time-frame delivery ($p < .0001$).

The total group of students differed in their research knowledge before and after taking Research Design by 1.51 . Students receiving traditional classroom delivery differed in their research knowledge before and after the course by 1.50; students receiving electronic distance education delivery differed in their research knowledge before and after the course by 1.52; and students receiving condensed time-frame delivery differed in their research knowledge before and after the course by 1.49. These differences were not statistically significant ($p = .8590$).

The total group of students receiving electronic distance education delivery rated their research knowledge before taking Research Design at 2.24. Students taking the course on-site rated their research knowledge before the course at 2.22, and students taking the course off-site rated their research knowledge before the course at 2.26. These differences were not statistically significant ($p = .5343$).

The total group of students receiving electronic distance education delivery rated their research knowledge after taking Research Design at 3.76. Students taking the course on-site rated their research knowledge after the course at 3.70, and students taking

the course off-site rated their research knowledge after the course at 3.81. Students taking the course on-site rated their research knowledge after the course significantly lower than students taking the course off-site ($p = .0255$).

The total group of students receiving electronic distance education delivery differed in their research knowledge before and after taking Research Design by 1.52. Students taking the course on-site differed in their research knowledge before and after the course by 1.47, and students taking the course off-site differed in their research knowledge before and after the course by 1.55. These differences were not statistically significant ($p = .2106$).

Of the total group of students, 89 students (93.68%) stated their research knowledge increased as a result of Research Design, and 6 students (6.32%) stated their research knowledge did not increase as a result of Research Design, as noted in Table II. These students had taken an average of 0.75 research courses prior to taking Research Design. All students receiving traditional classroom delivery (31), ninety-two percent of students receiving electronic distance education delivery (46), and eighty-six percent of students receiving condensed time-frame delivery (12) stated their research knowledge increased. No students receiving traditional classroom delivery (0), eight percent of students receiving electronic distance education delivery (4), and fourteen percent of students receiving condensed time-frame delivery (2) stated their research knowledge did not increase. Students receiving traditional classroom delivery had taken an average of 0.84 research courses; students receiving electronic distance education delivery had taken an average of 0.70 research courses; and students receiving condensed time-frame

delivery had taken an average of 0.71 research courses. These differences were not statistically significant (p = .8663).

TABLE II

NUMBER OF RESEARCH COURSES TAKEN AND STUDENT PERCEPTIONS OF THE INCREASE IN RESEARCH KNOWLEDGE BY DELIVERY SYSTEM

	Total		Traditional		Distance		Condensed		
Source	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Prob
Research Courses	0.75	1.15	0.84	0.97	0.70	1.27	0.71	1.14	.8663
Question	No.	%	No.	%	No.	%	No.	%	
Knowledge Increased	89	93.68	31	100.00	46	92.00	12	85.71	
Knowledge Did Not Increase	6	6.32	0	0.00	4	8.00	2	14.29	

Full-time students rated their research knowledge before taking Research Design at 2.51, as noted in Table III. Part-time students rated their research knowledge before taking Research Design at 2.11. These differences were statistically significant (p < .0001). Full-time students rated their research knowledge after taking Research Design at 3.85, while part-time students rated their research knowledge after taking Research Design at 3.79. These differences were not statistically significant (p = .1319). Full-time students and part-time students differed significantly in their research knowledge before and after taking Research Design by 1.34 and 1.67, respectively (p < .0001).

Full-time students receiving traditional classroom delivery rated their research knowledge before the course at 2.61; full-time students receiving electronic distance

education delivery rated their research knowledge before the course at 2.55; and full-time students receiving condensed time-frame delivery rated their research knowledge before the course at 2.26. Full-time students receiving traditional classroom delivery and electronic distance education delivery rated their level of research knowledge before the course significantly higher than full-time students receiving condensed time-frame delivery ($p < .0001$).

TABLE III

PERCEIVED RESEARCH KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY DELIVERY SYSTEM

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Full-time	2.51	1.00	.0000*	3.85	0.86	.1319	1.34	0.95	.0000*
Part-time	2.11	0.99		3.79	0.85		1.67	1.03	
Full-time									
Traditional	2.61[a]	0.91	.0000*	3.93[a]	0.80	.0000*	1.33	0.91	.4682
Distance	2.55[a]	1.15		3.94[a]	0.82		1.39	1.06	
Condensed	2.26[b]	0.94		3.57[b]	0.97		1.30	0.90	
Part-time									
Traditional	2.04	1.01	.1393	3.96[a]	0.79	.0000*	1.92[a]	1.02	.0000*
Distance	2.11	0.99		3.69[b]	0.85		1.57[b]	0.98	
Condensed	2.28	0.99		4.22[c]	0.72		1.93[a]	1.26	

[abc]Means in the same column and section with different superscripts were statistically significant.

*Differences were statistically significant at the alpha = .05 level.

Full-time students receiving traditional classroom delivery rated their research knowledge after the course at 3.93; full-time students receiving electronic distance education delivery rated their research knowledge after the course at 3.94; and full-time students receiving condensed time-frame delivery rated their research knowledge after the course at 3.57. Full-time students receiving traditional classroom delivery and electronic distance education delivery rated their research knowledge after the course significantly higher than students receiving condensed time-frame delivery ($p < .0001$).

Full-time students receiving traditional classroom delivery differed in their research knowledge before and after the course by 1.33; full-time students receiving electronic distance education delivery differed in their research knowledge before and after the course by 1.39; and full-time students receiving condensed time-frame delivery differed in their research knowledge before and after the course by 1.30. These differences were not statistically significant ($p = .4682$).

Part-time students receiving traditional classroom delivery rated their research knowledge before the course at 2.04; part-time students receiving electronic distance education delivery rated their research knowledge before the course at 2.11; and part-time students receiving condensed time-frame delivery rated their research knowledge before the course at 2.28. These differences were not statistically significant ($p = .1393$).

Part-time students receiving traditional classroom delivery rated their research knowledge after the course at 3.96; part-time students receiving electronic distance education delivery rated their research knowledge after the course at 3.69; and part-time students receiving condensed time-frame delivery rated their research knowledge after the course at 4.22. Part-time students receiving condensed time-frame delivery rated their

research knowledge after the course significantly higher than part-time students receiving traditional classroom delivery or electronic distance education delivery, and students receiving traditional classroom delivery rated their research knowledge after the course significantly higher than part-time students receiving electronic distance education delivery ($p < .0001$).

Part-time students receiving traditional classroom delivery differed in their research knowledge before and after the course by 1.92; part-time students receiving electronic distance education delivery differed in their research knowledge before and after the course by 1.57; and part-time students receiving condensed time-frame delivery differed in their research knowledge before and after the course by 1.93. Part-time students receiving traditional classroom delivery and condensed time-frame delivery differed in the ratings of their research knowledge significantly more than students receiving electronic distance education delivery ($p < .0001$).

On-site full-time students rated their research knowledge at 3.15, as noted in Table IV. Off-site full-time students rated their research knowledge at 3.79. These differences were statistically significant ($p < .0001$). On-site part-time students rated their research knowledge at 2.69, while off-site part-time students rated their research knowledge at 2.98. These differences were statistically significant ($p < .0001$).

On-site full-time students rated their research knowledge before taking Research Design at 2.39. Off-site full-time students rated their research knowledge before taking Research Design at 3.53. These differences were statistically significant ($p < .0001$). On-site part-time students rated their research knowledge before taking Research Design at

1.99, while off-site part-time students rated their research knowledge before taking Research Design at 2.16. These differences were statistically significant (p = .0318).

TABLE IV

PERCEIVED RESEARCH KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

Source	On-site Mean	On-site S.D.	Off-site Mean	Off-site S.D.	Prob
Full-time	3.15	1.27	3.79	0.61	.0000*
Part-time	2.69	1.21	2.98	1.21	.0000*

Source	Before Mean	Before S.D.	Before Prob	After Mean	After S.D.	After Prob	Difference Mean	Difference S.D.	Difference Prob
Full-time									
On-site	2.39	1.13	.0000*	3.92	0.86	.3461	1.52	1.07	.0000*
Off-site	3.53	0.63		4.04	0.47		1.51		
Part-time									
On-site	1.99	1.00	.0318*	3.40	0.96	.0000*	1.41	1.11	.0037*
Off-site	2.16	0.98		3.80	0.79		1.64	0.91	

*Differences were statistically significant at the alpha = .05 level.

On-site full-time students rated their research knowledge after taking Research Design at 3.92. Off-site full-time students rated their research knowledge after taking Research Design at 4.04. These differences were not statistically significant (p = .3461). On-site part-time students rated their research knowledge after taking Research Design at

3.40, while off-site part-time students rated their research knowledge after taking Research Design at 3.80. These differences were statistically significant ($p < .0001$).

On-site full-time students differed in the ratings of their research knowledge by 1.52. Off-site full-time students differed in the ratings of their research knowledge by 1.52. These differences were statistically significant ($p < .0001$). On-site part-time students differed in the ratings of their research knowledge by 1.41, while off-site part-time students differed in the ratings of their research knowledge by 1.64. These differences were statistically significant ($p = .0037$).

Perceived Statistical Knowledge

The total group of students rated their statistical knowledge before taking Research Design at 2.26, as noted in Table V. Students receiving traditional classroom delivery rated their statistical knowledge before the course at 2.51; students receiving electronic distance education delivery rated their statistical knowledge before the course at 2.07; and students receiving condensed time-frame delivery rated their statistical knowledge before the course at 2.37. Students receiving traditional classroom delivery and condensed time-frame delivery rated their statistical knowledge before taking the course significantly higher than students receiving electronic distance education delivery ($p < .0001$).

TABLE V

PERCEIVED STATISTICAL KNOWLEDGE OF STUDENTS BY DELIVERY SYSTEM AND STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Overall	2.26	1.07		3.37	0.97		1.11	0.94	
Traditional	2.51[a]	1.07	.0000*	3.53[a]	0.96	.0000*	1.01[a]	0.93	.0078*
Distance	2.07[b]	1.06		3.23[b]	0.95		1.17[b]	0.93	
Condensed	2.37[a]	0.98		3.49[a]	1.01		1.12[ab]	1.01	
On-site	2.20	1.21	.0007*	3.25	1.08	.6205	1.05	0.98	.0006*
Off-site	1.96	0.90		3.22	0.84		1.27	0.88	

[ab]Means in the same column and section with different superscripts were statistically significant.

*Differences were statistically significant at the alpha = .05 level.

The total group of students rated their statistical knowledge after taking Research Design at 3.37. Students receiving traditional classroom delivery rated their statistical knowledge after the course at 3.53; students receiving electronic distance education delivery rated their statistical knowledge after the course at 3.23; and students receiving condensed time-frame delivery rated their statistical knowledge after the course at 3.49. Students receiving traditional classroom delivery and condensed time-frame delivery rated their statistical knowledge after the course significantly higher than students receiving electronic distance education delivery ($p < .0001$).

The total group of students differed in their statistical knowledge before and after taking Research Design by 1.11. Students receiving traditional classroom delivery

differed in their statistical knowledge before and after the course by 1.01; students receiving electronic distance education delivery differed in their statistical knowledge before and after the course by 1.17; and students receiving condensed time-frame delivery differed in their statistical knowledge before and after the course by 1.12. Students receiving traditional classroom delivery differed significantly less in the ratings of their statistical knowledge than students receiving electronic distance education delivery ($p = .0078$).

The total group of students receiving electronic distance education delivery rated their statistical knowledge before taking Research Design at 2.07. Students taking the course on-site rated their statistical knowledge before the course at 2.20, and students taking the course off-site rated their statistical knowledge before the course at 1.96. Students taking the course on-site rated their statistical knowledge before the course significantly higher than students taking the course off-site ($p = .0007$).

The total group of students receiving electronic distance education delivery rated their statistical knowledge after taking Research Design at 3.23. Students taking the course on-site rated their statistical knowledge after the course at 3.25, and students taking the course off-site rated their statistical knowledge after the course at 3.22. These differences were not statistically significant ($p = .6205$).

The total group of students receiving electronic distance education delivery differed in their statistical knowledge before and after taking Research Design by 1.17. Students taking the course on-site differed in their statistical knowledge before and after the course by 1.05, and students taking the course off-site differed in their statistical knowledge before and after the course by 1.27. Students taking the course on-site

differed significantly less in the ratings of their statistical knowledge than students taking the course off-site ($p = .0006$).

Of the total group of students, 64 students (68.09%) stated their statistical knowledge increased as a result of Research Design, and 30 students (31.91%) stated their statistical knowledge did not increase as a result of Research Design, as noted in Table VI. These students had taken an average of 1.42 statistics courses prior to taking Research Design. Sixty-eight percent of students receiving traditional classroom delivery (21), sixty-nine percent of students receiving electronic distance education delivery (34), and sixty-four percent of students receiving condensed time-frame delivery (9) stated their statistical knowledge increased. Thirty-two percent of students receiving traditional classroom delivery (10), thirty-one percent of students receiving electronic distance education delivery (15), and thirty-six percent of students receiving condensed time-frame delivery (5) stated their statistical knowledge did not increase. Students receiving traditional classroom delivery had taken an average of 1.65 statistics courses; students receiving electronic distance education delivery had taken an average of 1.24 statistics courses; and students receiving condensed time-frame delivery had taken an average of 1.57 statistics courses. These differences were not statistically significant ($p = .5204$).

TABLE VI

NUMBER OF STATISTICS COURSES TAKEN AND STUDENT PERCEPTIONS OF THE INCREASE IN STATISTICAL KNOWLEDGE BY DELIVERY SYSTEM

	Total		Traditional		Distance		Condensed		
Source	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Prob
Statistics Courses	1.42	1.63	1.65	1.43	1.24	1.84	1.57	1.22	.5204
Question	No.	%	No.	%	No.	%	No.	%	
Knowledge Increased	64	68.09	21	67.74	34	69.39	9	64.29	
Knowledge Did Not Increase	30	31.91	10	32.26	15	30.61	5	35.71	

Full-time students rated their statistical knowledge before taking Research Design at 2.63, as noted in Table VII. Part-time students rated their statistical knowledge before taking Research Design at 1.91. These differences were statistically significant ($p < .0001$). Full-time students rated their statistical knowledge after taking Research Design at 3.52, while part-time students rated their statistical knowledge after taking Research Design at 3.23. These differences were statistically significant ($p < .0001$). Full-time students and part-time students differed in their statistical knowledge before and after taking Research Design by 0.89 and 1.32, respectively. These differences were statistically significant ($p < .0001$).

Full-time students receiving traditional classroom delivery rated their statistical knowledge before the course at 2.87; full-time students receiving electronic distance education delivery rated their statistical knowledge before the course at 2.42; and full-time students receiving condensed time-frame delivery rated their statistical knowledge

before the course at 2.45. Full-time students receiving traditional classroom delivery rated their level of statistical knowledge before the course significantly higher than full-time students receiving electronic distance education delivery or condensed time-frame delivery ($p < .0001$).

TABLE VII

PERCEIVED STATISTICAL KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY DELIVERY SYSTEM

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Full-time	2.63	1.10	.0000*	3.52	1.05	.0000*	0.89	0.93	.0000*
Part-time	1.91	0.91		3.23	0.87		1.32	0.91	
Full-time									
Traditional	2.87[a]	0.97	.0000*	3.63[a]	1.06	.0038*	0.75[a]	0.88	.0000*
Distance	2.42[b]	1.26		3.52[a]	1.07		1.09[b]	1.09	
Condensed	2.45[b]	1.01		3.32[b]	0.99		0.87[a]	0.77	
Part-time									
Traditional	1.77[a]	0.87	.0103*	3.32[a]	0.70	.0000*	1.55[a]	0.78	.0000*
Distance	1.92[b]	0.92		3.11[b]	0.87		1.20[b]	0.86	
Condensed	2.14[b]	0.87		3.96[c]	0.89		1.82[a]	1.26	

[abc]Means in the same column and section with different superscripts were statistically significant.

*Differences were statistically significant at the alpha = .05 level.

Full-time students receiving traditional classroom delivery rated their statistical knowledge after the course at 3.63; full-time students receiving electronic distance education delivery rated their statistical knowledge after the course at 3.52; and full-time

students receiving condensed time-frame delivery rated their statistical knowledge after the course at 3.32. Full-time students receiving traditional classroom delivery and electronic distance education delivery rated their statistical knowledge after the course significantly higher than students receiving condensed time-frame delivery ($p = .0038$).

Full-time students receiving traditional classroom delivery differed in their statistical knowledge before and after the course by 0.75; full-time students receiving electronic distance education delivery differed in their statistical knowledge before and after the course by 1.09; and full-time students receiving condensed time-frame delivery differed in their statistical knowledge before and after the course by 0.87. Full-time students receiving electronic distance education delivery differed in the rating of their statistical knowledge significantly more than full-time students receiving traditional classroom delivery or condensed time-frame delivery ($p < .0001$).

Part-time students receiving traditional classroom delivery rated their statistical knowledge before the course at 1.77; part-time students receiving electronic distance education delivery rated their statistical knowledge before the course at 1.92; and part-time students receiving condensed time-frame delivery rated their statistical knowledge before the course at 2.14. Part-time students receiving electronic distance education delivery and condensed time-frame delivery rated their statistical knowledge before the course significantly higher than part-time students receiving traditional classroom delivery ($p = .0103$).

Part-time students receiving traditional classroom delivery rated their statistical knowledge after the course at 3.32; part-time students receiving electronic distance education delivery rated their statistical knowledge after the course at 3.11; and part-time

students receiving condensed time-frame delivery rated their statistical knowledge after the course at 3.96. Part-time students receiving condensed time-frame delivery rated their statistical knowledge after the course significantly higher than part-time students receiving traditional classroom delivery or electronic distance education delivery, and students receiving traditional classroom delivery rated their statistical knowledge after the course significantly higher than part-time students receiving electronic distance education delivery ($p < .0001$).

Part-time students receiving traditional classroom delivery differed in their statistical knowledge before and after the course by 1.55; part-time students receiving electronic distance education delivery differed in their statistical knowledge before and after the course by 1.20; and part-time students receiving condensed time-frame delivery differed in their statistical knowledge before and after the course by 1.82. Part-time students receiving traditional classroom delivery and condensed time-frame delivery differed in the ratings of their statistical knowledge significantly more than students receiving electronic distance education delivery ($p < .0001$).

On-site full-time students rated their statistical knowledge at 2.96, as noted in Table VIII. Off-site full-time students rated their statistical knowledge at 3.04. These differences were not statistically significant ($p = .6013$). On-site part-time students rated their statistical knowledge at 2.42, while off-site part-time students rated their statistical knowledge at 2.55. These differences were not statistically significant ($p = .0663$).

TABLE VIII

PERCEIVED STATISTICAL KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

Source	On-site Mean	On-site S.D.	Off-site Mean	Off-site S.D.	Prob
Full-time	2.96	1.35	3.04	0.89	.6013
Part-time	2.42	1.07	2.55	1.08	.0663

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Full-time									
On-site	2.35	1.30	.0269*	3.56	0.88	.0862	1.21	1.10	.0000*
Off-site	2.86	0.88		3.23	0.88		0.37	0.65	
Part-time									
On-site	2.01	1.06	.1444	2.83	0.92	.0000*	0.82	0.76	.0000*
Off-site	1.89	0.87		3.22	0.83		1.33	0.86	

*Differences were statistically significant at the alpha = .05 level.

On-site full-time students rated their statistical knowledge before taking Research Design at 2.35. Off-site full-time students rated their statistical knowledge before taking Research Design at 2.86. These differences were statistically significant (p = .0269). On-site part-time students rated their statistical knowledge before taking Research Design at 2.01, while off-site part-time students rated their statistical knowledge before taking Research Design at 1.89. These differences were not statistically significant (p = .1444).

On-site full-time students rated their statistical knowledge after taking Research Design at 3.56. Off-site full-time students rated their statistical knowledge after taking Research Design at 3.23. These differences were not statistically significant (p = .0862).

On-site part-time students rated their statistical knowledge after taking Research Design at 2.83, while off-site part-time students rated their statistical knowledge after taking Research Design at 3.22. These differences were statistically significant ($p < .0001$).

On-site full-time students differed in the ratings of their statistical knowledge by 1.21. Off-site full-time students differed in the ratings of their statistical knowledge by 0.37. These differences were statistically significant ($p < .0001$). On-site part-time students differed in the ratings of their statistical knowledge by 0.82, while off-site part-time students differed in the ratings of their statistical knowledge by 1.33. These differences were statistically significant ($p < .0001$).

Perceived Computer Knowledge

The total group of students rated their computer knowledge before taking Research Design at 3.13, as noted in Table IX. Students receiving traditional classroom delivery rated their computer knowledge before the course at 3.40; students receiving electronic distance education delivery rated their computer knowledge before the course at 2.95; and students receiving condensed time-frame delivery rated their computer knowledge before the course at 3.17. Students receiving traditional classroom delivery rated their level of computer knowledge before the course significantly higher than students receiving electronic distance education delivery ($p < .0001$).

TABLE IX

PERCEIVED COMPUTER KNOWLEDGE OF STUDENTS BY DELIVERY SYSTEM AND STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Overall	3.13	1.29		3.78	1.03		0.77	0.94	
Traditional	3.40[a]	1.24	.0000*	3.89[a]	0.95	.0000*	0.86[a]	1.07	.0030*
Distance	2.95[b]	1.33		3.70[b]	1.10		0.77[a]	0.89	
Condensed	3.17[ab]	1.17		3.87[ab]	0.84		0.47[b]	0.77	
On-site	3.10	1.27	.0262*	3.68	1.14	.8047	0.59	0.84	.0001*
Off-site	2.83	1.36		3.71	1.07		0.91	0.90	

[ab]Means in the same column and section with different superscripts were statistically significant.
*Differences were statistically significant at the alpha = .05 level.

The total group of students rated their computer knowledge after taking Research Design at 3.78. Students receiving traditional classroom delivery rated their computer knowledge after the course at 3.89; students receiving electronic distance education delivery rated their computer knowledge after the course at 3.70; and students receiving condensed time-frame delivery rated their computer knowledge after the course at 3.87. Students receiving traditional classroom delivery rated their computer knowledge after the course significantly higher than students receiving electronic distance education delivery ($p < .0001$).

The total group of students differed in their computer knowledge before and after taking Research Design by 0.77. Students receiving traditional classroom delivery

differed in their computer knowledge before and after the course by 0.86; students receiving electronic distance education delivery differed in their computer knowledge before and after the course by 0.77; and students receiving condensed time-frame delivery differed in their computer knowledge before and after the course by 0.47. Students receiving traditional classroom delivery and electronic distance education delivery differed in their computer knowledge before and after the course significantly more than students receiving condensed time-frame delivery ($p = .0030$).

The total group of students receiving electronic distance education delivery rated their computer knowledge before taking Research Design at 2.95. Students taking the course on-site rated their computer knowledge before the course at 3.10, and students taking the course off-site rated their computer knowledge before the course at 2.83. Students taking the course on-site rated their computer knowledge significantly higher than students taking the course off-site ($p = .0262$).

The total group of students receiving electronic distance education delivery rated their computer knowledge after taking Research Design at 3.70. Students taking the course on-site rated their computer knowledge after the course at 3.68, and students taking the course off-site rated their computer knowledge after the course at 3.71. These differences were not statistically significant ($p = .8047$).

The total group of students receiving electronic distance education delivery differed in their computer knowledge before and after taking Research Design by 0.77. Students taking the course on-site differed in their computer knowledge before and after the course by 0.59, and students taking the course off-site differed in their computer knowledge before and after the course by 0.91. Students taking the course on-site

differed significantly less in the ratings of their computer knowledge before and after the course than students taking the course off-site ($p = .0001$).

Of the total group of students, 47 students (49.47%) stated their computer knowledge increased as a result of Research Design, and 48 students (50.53%) stated their computer knowledge did not increase as a result of Research Design, as noted in Table X. These students had taken an average of 3.69 computer courses prior to taking Research Design. Forty-five percent of students receiving traditional classroom delivery (14) , fifty-six percent of students receiving electronic distance education delivery (28), and thirty-six percent of students receiving condensed time-frame delivery (5) stated their computer knowledge increased. Fifty-five percent of students receiving traditional classroom delivery (17), forty-four percent of students receiving electronic distance education delivery (22), and sixty-four percent of students receiving condensed time-frame delivery (9) stated their computer knowledge did not increase. Students receiving traditional classroom delivery had taken an average of 1.81 computer courses; students receiving electronic distance education delivery had taken an average of 5.48 computer courses; and students receiving condensed time-frame delivery had taken an average of 1.71 computer courses. These differences were not statistically significant ($p = .3918$).

TABLE X

NUMBER OF COMPUTER COURSES TAKEN AND STUDENT PERCEPTIONS OF THE INCREASE IN COMPUTER KNOWLEDGE BY DELIVERY SYSTEM

	Total		Traditional		Distance		Condensed		
Source	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Prob
Computer Courses	3.69	12.96	1.81	2.51	5.48	17.81	1.71	1.44	.3918
Question	No.	%	No.	%	No.	%	No.	%	
Knowledge Increased	47	49.47	14	45.16	28	56.00	5	35.71	
Knowledge Did Not Increase	48	50.53	17	54.84	22	44.00	9	64.29	

Full-time students rated their computer knowledge before taking Research Design at 3.44, as noted in Table XI. Part-time students rated their computer knowledge before taking Research Design at 2.78. These differences were statistically significant ($p < .0001$). Full-time students rated their computer knowledge after taking Research Design at 3.98, while part-time students rated their computer knowledge after taking Research Design at 3.61. These differences were statistically significant ($p < .0001$). Full-time students and part-time students differed in their computer knowledge before and after taking Research Design by 0.67 and 1.19, respectively. These differences were statistically significant ($p < .0001$).

TABLE XI

PERCEIVED COMPUTER KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY DELIVERY SYSTEM

	Before			After			Difference		
Source	Mean	S.D.	Prob	Mean	S.D.	Prob	Mean	S.D.	Prob
Full-time	3.44	1.16	.0000*	3.98	0.93	.0000*	0.67	0.96	.0000*
Part-time	2.78	1.34		3.61	1.08		1.19	1.15	
Full-time									
Traditional	3.72[a]	1.07	.0003*	4.03	0.92	.0645	0.46	0.80	.3893
Distance	3.33[b]	1.20		3.91	0.94		0.58	0.81	
Condensed	3.25[b]	1.01		3.77	0.94		0.52	0.73	
Part-time									
Traditional	2.74	1.33	.7589	3.59[a]	0.94	.0005*	1.38[a]	1.21	.0000*
Distance	2.79	1.35		3.61[a]	1.15		0.84[b]	0.94	
Condensed	2.92	1.53		4.31[b]	0.66		1.53[a]	1.57	

[ab]Means in the same column and section with different superscripts were statistically significant.
*Differences were statistically significant at the alpha = .05 level.

Full-time students receiving traditional classroom delivery rated their computer knowledge before the course at 3.72; full-time students receiving electronic distance education delivery rated their computer knowledge before the course at 3.33; and full-time students receiving condensed time-frame delivery rated their computer knowledge before the course at 3.25. Full-time students receiving traditional classroom delivery rated their level of computer knowledge before the course significantly higher than full-time students receiving electronic distance education delivery or condensed time-frame delivery ($p = .0003$).

Full-time students receiving traditional classroom delivery rated their computer knowledge after the course at 4.03; full-time students receiving electronic distance education delivery rated their computer knowledge after the course at 3.91; and full-time students receiving condensed time-frame delivery rated their computer knowledge after the course at 3.77. These differences were not statistically significant ($p = .0645$).

Full-time students receiving traditional classroom delivery differed in their computer knowledge before and after the course by 0.46; full-time students receiving electronic distance education delivery differed in their computer knowledge before and after the course by 0.58; and full-time students receiving condensed time-frame delivery differed in their computer knowledge before and after the course by 0.52. These differences were not statistically significant ($p = .3893$).

Part-time students receiving traditional classroom delivery rated their computer knowledge before the course at 2.74; part-time students receiving electronic distance education delivery rated their computer knowledge before the course at 2.79; and part-time students receiving condensed time-frame delivery rated their computer knowledge before the course at 2.92. These differences were not statistically significant ($p = .7589$).

Part-time students receiving traditional classroom delivery rated their computer knowledge after the course at 3.59; part-time students receiving electronic distance education delivery rated their computer knowledge after the course at 3.61; and part-time students receiving condensed time-frame delivery rated their computer knowledge after the course at 4.31. Part-time students receiving condensed time-frame delivery rated their computer knowledge after the course significantly higher than part-time students

receiving traditional classroom delivery or electronic distance education delivery ($p = .0005$).

Part-time students receiving traditional classroom delivery differed in their computer knowledge before and after the course by 1.38; part-time students receiving electronic distance education delivery differed in their computer knowledge before and after the course by 0.84; and part-time students receiving condensed time-frame delivery differed in their computer knowledge before and after the course by 1.53. Part-time students receiving traditional classroom delivery and condensed time-frame delivery differed in the ratings of their computer knowledge significantly more than students receiving electronic distance education delivery ($p < .0001$).

On-site full-time students rated their computer knowledge at 3.66, as noted in Table XII. Off-site full-time students rated their computer knowledge at 3.38. These differences were not statistically significant ($p = .1292$). On-site part-time students rated their computer knowledge at 3.03, while off-site part-time students rated their computer knowledge at 3.26. These differences were statistically significant ($p = .0442$).

TABLE XII

PERCEIVED COMPUTER KNOWLEDGE OF FULL-TIME AND PART-TIME STUDENTS BY STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

Source	On-site Mean	On-site S.D.	Off-site Mean	Off-site S.D.	Prob
Full-time	3.66	1.10	3.38	1.19	.1292
Part-time	3.03	1.33	3.26	1.31	.0442*

Source	Before Mean	Before S.D.	Before Prob	After Mean	After S.D.	After Prob	Difference Mean	Difference S.D.	Difference Prob
Full-time									
On-site	3.36	1.19	.4682	3.97	0.90	.1056	0.61	0.84	.4284
Off-site	3.15	1.27		3.60	1.10		0.45	0.60	
Part-time									
On-site	2.76	1.30	.7821	3.30	1.37	.0035*	0.57	0.85	.0010*
Off-site	2.80	1.37		3.72	1.07		0.93	0.87	

*Differences were statistically significant at the alpha = .05 level.

On-site full-time students rated their computer knowledge before taking Research Design at 3.36. Off-site full-time students rated their computer knowledge before taking Research Design at 3.15. These differences were not statistically significant (p = .4682). On-site part-time students rated their computer knowledge before taking Research Design at 2.76, while off-site part-time students rated their computer knowledge before taking Research Design at 2.80. These differences were not statistically significant (p = .7821).

On-site full-time students rated their computer knowledge after taking Research Design at 3.97. Off-site full-time students rated their computer knowledge after taking Research Design at 3.60. These differences were not statistically significant (p = .1056).

On-site part-time students rated their computer knowledge after taking Research Design at 3.30, while off-site part-time students rated their computer knowledge after taking Research Design at 3.72. These differences were statistically significant ($p = .0035$).

On-site full-time students differed in the ratings of their computer knowledge by 0.61. Off-site full-time students differed in the ratings of their computer knowledge by 0.45. These differences were not statistically significant ($p = .4284$). On-site part-time students differed in the ratings of their computer knowledge by 0.57, while off-site part-time students differed in the ratings of their computer knowledge by 0.93. These differences were statistically significant ($p = .0010$).

General Perceptions

Students receiving traditional classroom delivery rated Research Design at 3.84; students receiving electronic distance education delivery rated Research Design at 3.73; and students receiving condensed time-frame delivery rated Research Design at 3.62, as noted in Table XIII. These differences were not statistically significant ($p = .1288$).

TABLE XIII

GENERAL PERCEPTIONS OF STUDENTS BY DELIVERY SYSTEM

Source	Traditional Mean	Traditional S.D.	Distance Mean	Distance S.D.	Condensed Mean	Condensed S.D.	Prob
Overall	3.84	1.02	3.73	1.05	3.62	1.24	.1288
Full-time	3.70	1.06	3.65	1.07	3.39	1.20	.0738
Part-time	4.13[a]	0.86	3.76[b]	1.04	4.28[a]	1.14	.0006*
General Questions							
Overall	4.22	0.91	3.90	1.06	3.91	1.15	.0592
Full-time	4.05	0.97	3.81	1.11	3.71	1.13	.6502
Part-time	4.57[a]	0.63	3.94[b]	1.04	4.42[ab]	1.08	.0054*
Research Questions							
Overall	3.94	0.99	3.89	1.01	3.60	1.35	.3368
Full-time	3.79	1.05	3.61	1.10	3.36	1.29	.3637
Part-time	4.25	0.79	4.02	0.96	4.25	1.39	.5645
Statistics Questions							
Overall	3.61	1.00	3.54	0.93	3.57	1.19	.9083
Full-time	3.52	1.09	3.43	1.03	3.41	1.14	.8690
Part-time	3.80	0.77	3.59	0.88	4.00	1.31	.3640
Computer Questions							
Overall	3.40	1.03	3.50	1.12	3.33	1.27	.7355
Full-time	3.26	1.01	3.68	1.02	2.95	1.17	.5856
Part-time	3.70	1.03	3.43	1.16	4.38	0.92	.0687

[ab]Means in the row with different superscripts were statistically significant.
*Differences were statistically significant at the alpha = .05 level.

Full-time students receiving traditional classroom delivery rated Research Design at 3.70; full-time students receiving electronic distance education delivery rated Research Design at 3.65; and full-time students receiving condensed time-frame delivery rated Research Design at 3.39. These differences were not statistically significant (p = .0738).

Part-time students receiving traditional classroom delivery rated Research Design at 4.13; part-time students receiving electronic distance education delivery rated Research Design at 3.76; and part-time students receiving condensed time-frame delivery rated Research Design at 4.28. Part-time students receiving traditional classroom delivery or condensed time-frame delivery rated the course significantly higher than part-time students receiving electronic distance education delivery ($p = .0006$).

In analyzing individual general questions about Research Design, students receiving traditional classroom delivery rated the course at 4.22; students receiving electronic distance education delivery rated the course at 3.90; and students receiving condensed time-frame delivery rated the course at 3.91. These differences were not statistically significant ($p = .0592$). Full-time students receiving traditional classroom delivery rated the course at 4.05; full-time students receiving electronic distance education delivery rated the course at 3.81; and full-time students receiving condensed time-frame delivery rated the course at 3.71. These differences were not statistically significant ($p = .6502$). Part-time students receiving traditional classroom delivery rated the course at 4.57; part-time students receiving electronic distance education delivery rated the course at 3.94; and part-time students receiving condensed time-frame delivery rated the course at 4.42. Part-time students receiving traditional classroom delivery rated the course significantly higher than part-time students receiving electronic distance education delivery ($p = .0054$).

In analyzing individual research questions about Research Design, students receiving traditional classroom delivery rated the course at 3.94; students receiving electronic distance education delivery rated the course at 3.89; and students receiving

condensed time-frame delivery rated the course at 3.60. These differences were not statistically significant (p = .3368). Full-time students receiving traditional classroom delivery rated the course at 3.79; full-time students receiving electronic distance education delivery rated the course at 3.61; and full-time students receiving condensed time-frame delivery rated the course at 3.36. These differences were not statistically significant (p = .3637). Part-time students receiving traditional classroom delivery rated the course at 4.25; part-time students receiving electronic distance education delivery rated the course at 4.02; and part-time students receiving condensed time-frame delivery rated the course at 4.25. These differences were not statistically significant (p = .5645).

In analyzing individual statistics questions about Research Design, students receiving traditional classroom delivery rated the course at 3.61; students receiving electronic distance education delivery rated the course at 3.54; and students receiving condensed time-frame delivery rated the course at 3.57. These differences were not statistically significant (p = .9083). Full-time students receiving traditional classroom delivery rated the course at 3.52; full-time students receiving electronic distance education delivery rated the course at 3.43; and full-time students receiving condensed time-frame delivery rated the course at 3.41. These differences were not statistically significant (p = .8690). Part-time students receiving traditional classroom delivery rated the course at 3.80; part-time students receiving electronic distance education delivery rated the course at 3.59; and part-time students receiving condensed time-frame delivery rated the course at 4.00. These differences were not statistically significant (p = .3640).

In analyzing individual computer questions about Research Design, students receiving traditional classroom delivery rated the course at 3.40; students receiving

electronic distance education delivery rated the course at 3.50; and students receiving condensed time-frame delivery rated the course at 3.33. These differences were not statistically significant (p = .7355). Full-time students receiving traditional classroom delivery rated the course at 3.26; full-time students receiving electronic distance education delivery rated the course at 3.68; and full-time students receiving condensed classroom delivery rated the course at 2.95. These differences were not statistically significant (p = .5856). Part-time students receiving traditional classroom delivery rated the course at 3.70; part-time students receiving electronic distance education delivery rated the course at 3.43; and part-time students receiving condensed time-frame delivery rated the course at 4.38. These differences were not statistically significant (p = .0687).

When analyzing students based on their study location within electronic distance education delivery, students taking the course on-site rated Research Design at 3.70, and students taking the course off-site rated Research Design at 3.76, as noted in Table XIV. These differences were not statistically significant (p = .5784).

Full-time students taking the course on-site rated Research Design at 3.71, while full-time students taking the course off-site rated Research Design at 3.28. These differences were not statistically significant (p = .1099). Part-time students taking the course on-site rated Research Design at 3.68, and part-time students taking the course off-site rated Research Design at 3.80. These differences were not statistically significant (p = .3831).

TABLE XIV

GENERAL PERCEPTIONS OF STUDENTS BY STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

	On-site		Off-site		
Source	Mean	S.D.	Mean	S.D.	Prob
Overall	3.70	1.08	3.76	1.03	.5784
Full-time	3.71	1.04	3.28	1.18	.1099
Part-time	3.68	1.14	3.80	1.01	.3831
General Questions					
Overall	3.86	1.18	3.94	0.97	.6502
Full-time	3.86	1.13	3.50	1.05	.4673
Part-time	3.85	1.26	3.97	0.96	.6059
Research Questions					
Overall	3.76	1.05	4.00	0.97	.2582
Full-time	3.67	1.09	3.25	1.26	.4935
Part-time	3.89	1.02	4.06	0.93	.5139
Statistics Questions					
Overall	3.52	0.99	3.56	0.88	.8690
Full-time	3.54	1.02	2.75	0.96	.1600
Part-time	3.50	0.99	3.62	0.85	.6254
Computer Questions					
Overall	3.57	1.04	3.44	1.19	.5856
Full-time	3.71	0.91	3.50	1.73	.7129
Part-time	3.39	1.20	3.44	1.16	.8744

In analyzing individual general questions about Research Design, on-site students rated the course at 3.86, and off-site students rated the course at 3.94. These differences were not statistically significant ($p = .6502$). Full-time on-site students rated the course at 3.86, and full-time off-site students rated the course at 3.50. These differences were not statistically significant ($p = .4673$). Part-time on-site students rated the course at 3.85,

and part-time off-site students rated the course at 3.97. These differences were not statistically significant (p = .6059).

In analyzing individual research questions about Research Design, on-site students rated the course at 3.76, and off-site students rated the course at 4.00. These differences were not statistically significant (p = .2582). Full-time on-site students rated the course at 3.67, and full-time off-site students rated the course at 3.25. These differences were not statistically significant (p = .4935). Part-time on-site students rated the course at 3.89, and part-time off-site students rated the course at 4.06. These differences were not statistically significant (p = .5139).

In analyzing individual statistics questions about Research Design, on-site students rated the course at 3.52, and off-site students rated the course at 3.56. These differences were not statistically significant (p = .8690). Full-time on-site students rated the course at 3.54, and full-time off-site students rated the course at 2.75. These differences were not statistically significant (p = .1600). Part-time on-site students rated the course at 3.50, and part-time off-site students rated the course at 3.62. These differences were not statistically significant (p = .6254).

In analyzing individual computer questions about Research Design, on-site students rated the course at 3.57, and off-site students rated the course at 3.44. These differences were not statistically significant (p = .5856). Full-time on-site students rated the course at 3.71, and full-time off-site students rated the course at 3.50. These differences were not statistically significant (p = .7129). Part-time on-site students rated the course at 3.39, and part-time off-site students rated the course at 3.44. These differences were not statistically significant (p = .8744).

Qualitative Comments

When students receiving electronic distance education delivery were asked if they would take another course by electronic distance education delivery again, fifty-eight percent of students (29) responded yes, twenty-six percent of students (13) responded no, and sixteen percent of students (8) did not respond, as noted in Table XV. Forty-one percent of on-site students (9) responded yes, twenty-three percent of on-site students (5) responded no, and thirty-six percent of on-site students (8) did not respond. Seventy-one percent of off-site students (20) responded yes, and twenty-nine percent of off-site students (8) responded no. Twenty-nine percent of full-time students (4) responded yes, while sixty-nine percent of part-time students (25) responded yes. Twenty-nine percent of full-time students (4) responded no, while twenty-five percent of part-time students (9) responded no. Forty-three percent of full-time students (6) did not respond, while six percent of part-time students (2) did not respond. Full-time on-site students were evenly split between yes and no (3 each, 25% each), while fifty percent of full-time on-site students (6) did not respond. Sixty percent of part-time on-site students (6) responded yes, while twenty percent each of part-time on-site students (2 each) responded no or did not answer. Fifty percent of full-time off-site student (1) responded yes, and fifty percent of full-time off-site student (1) responded no. Seventy-three percent of part-time off-site students (19) responded yes, while twenty-seven percent of part-time off-site students (7) responded no. Positive written comments were primarily concerned with the convenience, accessibility, and money-saving aspect of electronic distance education delivery. Negative written comments included remarks about the technology and

instructor restriction due to the technology. The entire list of comments is found in Appendix D.

TABLE XV

STUDENT COMMENTS REGARDING ELECTRONIC DISTANCE EDUCATION DELIVERY AND CONDENSED TIME-FRAME DELIVERY

	Yes		No		Did not answer	
Source	No.	%	No.	%	No.	%
Electronic Distance Education Delivery						
Overall	29	58.00	13	26.00	8	16.00
On-site	9	40.91	5	22.73	8	36.36
Off-site	20	71.43	8	28.57	0	0.00
Full-time	4	28.57	4	28.57	6	42.86
Part-time	25	69.44	9	25.00	2	5.56
On-site						
Full-time	3	25.00	3	25.00	6	50.00
Part-time	6	60.00	2	20.00	2	20.00
Off-site						
Full-time	1	50.00	1	50.00	0	0.00
Part-time	19	73.08	7	26.92	0	0.00
Condensed time-frame delivery						
Overall	12	80.00	2	13.33	1	6.67
Full-time	8	72.73	2	18.18	1	9.09
Part-time	4	100.00	0	0.00	0	0.00

When students receiving condensed time-frame delivery were asked if they would take another course by condensed time-frame delivery again, eighty percent of students (12) responded yes, thirteen percent of students (2) responded no, and seven percent of students (1) did not answer. Seventy-three percent of full-time students (8) responded yes, eighteen percent of full-time students (2) responded no, and nine percent of students (1) did not answer. All four part-time students (100%) responded yes. Positive written comments praised the continuity and fast pace associated with the condensed time-frame delivery, while the few negative written comments felt it was too much information too fast. The entire list of comments is found in Appendix E.

Perceived Course Value

Value of Course Components by Delivery System

The total group of students rated the value of the overall course at 7.50, as noted in Table XVI. Students receiving traditional classroom delivery rated the value of the course at 7.59; students receiving electronic distance education delivery rated the value of the course at 7.29; and students receiving condensed time-frame delivery rated the value of the course at 7.92. These differences were statistically significant ($p < .0001$).

TABLE XVI

STUDENT PERCEPTIONS OF THE VALUE OF COURSE COMPONENTS BY DELIVERY SYSTEM

	Total		Traditional		Distance		Condensed		
Source	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Prob
Overall	7.50	2.31	7.59[a]	2.32	7.29[b]	2.36	7.92[c]	2.05	.0000*
Research Questions	7.84	2.21	7.92[a]	2.26	7.69[b]	2.23	8.10[a]	2.01	.0058*
Statistics Questions	6.80	2.27	6.93[a]	2.22	6.44[b]	2.31	7.60[c]	2.01	.0000*
Computer Question	6.40	2.83	6.48	2.77	6.18	2.95	6.89	2.63	.6366
Guest Speakers	7.54	2.43	7.99[a]	2.35	7.06[b]	2.43	8.12[a]	2.29	.0001*
Books	5.88	3.21	6.41[a]	3.13	5.28[b]	3.17	6.66[a]	3.27	.0066*

[abc]Means on the same row with different superscripts were statistically significant.
*Differences were statistically significant at the alpha = .05 level.

In analyzing the individual components of the course, the total group of students rated the value of the research components at 7.84, the value of the statistical components at 6.80, and the value of the computer components at 6.40. Students receiving condensed classroom delivery and traditional classroom delivery rated the value of the research components highest (8.10 and 7.92, respectively), while students receiving electronic distance education delivery rated the value of the research components significantly lower at 7.69 ($p = .0058$). Students receiving traditional classroom delivery rated the value of the statistical components at 6.93; students receiving electronic distance education delivery rated the value of the statistical components at 6.44; and students receiving condensed time-frame delivery rated the value of the statistical components at 7.60.

These differences were statistically significant ($p < .0001$). Students did not statistically differ in their ratings of the value of the computer components of the course. Students receiving condensed and traditional classroom delivery rated these components higher than did students receiving electronic distance education delivery (6.89, 6.48, and 6.18, respectively).

Additional course components included guest speakers and books. Students rated the value of the guest speakers at 7.54 and the value of the books at 5.88. Students receiving condensed and traditional classroom delivery rated the value of the guest speakers significantly higher than did students receiving electronic distance education delivery (8.12, 7.99, and 7.06, respectively; $p = .0001$). Students receiving condensed and traditional classroom delivery also rated the value of the books significantly higher than did students receiving electronic distance education delivery (6.66, 6.41, and 5.28, respectively; $p = .0066$).

Value of Course Components by Study Location Within Electronic Distance Education Delivery

The total group of students receiving electronic distance education delivery rated the value of the course at 7.29, as noted in Table XVII. Students taking the course on-site rated the value of the course at 7.46, and students taking the course off-site rated the value of the course at 7.17. These differences were statistically significant ($p = .0184$).

TABLE XVII

STUDENT PERCEPTIONS OF THE VALUE OF COURSE COMPONENTS BY STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

Source	Total		On-site		Off-site		Prob
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Overall	7.29	2.36	7.46	2.37	7.17	2.34	.0184*
Research Questions	7.69	2.23	7.94	2.14	7.51	2.27	.0025*
Statistics Questions	6.44	2.31	6.38	2.37	6.48	2.26	.6501
Computer Question	6.18	2.95	6.67	3.33	5.81	2.63	.2885
Guest Speakers	7.06	2.43	7.85	2.13	6.55	2.47	.0000*
Books	5.28	3.17	6.10	3.08	4.68	3.11	.0080*

*Differences were statistically significant at the alpha = .05 level.

In analyzing the individual components of the course, the students rated the value of the research components at 7.69, the value of the statistical components at 6.44, and the value of the computer components at 6.18. Students taking the course on-site rated the value of the research and computer components highest (7.94 and 6.67, respectively), while students taking the course off-site rated the value of the statistical component highest (6.48). Student ratings of the value of the research components of the course were statistically significant depending on study location ($p = .0025$), while student ratings of the value of the statistical and computer components of the course were not statistically significant depending on study location ($p = .6501$ and .2885, respectively).

Additional course components included guest speakers and books. Students rated the value of the guest speakers at 7.06 and the value of the books at 5.28. Students taking the course on-site rated the value of the guest speakers significantly higher than did students taking the course off-site (7.85 and 6.55, respectively; $p < .0001$). Students taking the course on-site also rated the value of the books significantly higher than did students taking the course off-site (6.10 and 4.68, respectively; $p = .0080$).

Qualitative Comments

Table XVIII noted comments regarding the most effective aspects of the course were predominantly concerned with the writing aspects of the course (37.50%). These included writing the first three chapters, critiques, and the mini-proposal. Comments about the assignments, interaction, presentations, guest speakers, and statistics comprised 28.65 percent of the comments. The syllabus and modules were listed on 28.13 percent of the comments. The instructor was noted on 5.21 percent of the comments, while distance education warranted 0.52 percent of the comments. Twelve respondents did not make any comments (9.92% of respondents). The entire list of comments is found in Appendix F.

In a separate question, comments regarding the least effective aspects of the course were predominantly concerned with the syllabus and modules (53.54%). Comments about the assignments, interaction, presentations, guest speakers, and statistics comprised 27.27 percent of the comments. Distance education was noted on 9.09 percent of the comments, while writing of the first three chapters, the critiques, and the mini-proposal comprised 7.07 percent of the comments. The instructor was noted on 3.03

percent of the comments. Twenty respondents did not make any comments (16.53% of respondents). The list of comments is found in Appendix G.

TABLE XVIII

STUDENT COMMENTS REGARDING THE MOST AND LEAST EFFECTIVE ASPECTS AND SIGNIFICANT CHANGES OF RESEARCH DESIGN

Subject Areas[a]	Most Effective (%)	Least Effective (%)	Significant Changes (%)
Writing	37.50	7.07	20.35
Assignments, Interaction, Presentations, Guest Speakers, and Statistics	28.65	27.27	27.43
Syllabus/Modules	28.13	53.54	44.25
Instructor	5.21	3.03	3.54
Distance Education	0.52	9.09	4.42
No Comments[b]	9.92	16.53	15.70

[a]Calculated as a percentage of the total comments.
[b]Calculated as a percentage of the total respondents.

The last open-ended question asked for suggestions for significant changes. These were predominantly concerned with the syllabus/course text (44.25%). Various aspects of the course (27.43%) and writing of the first three chapters, the critiques, and the mini-proposal comprised many of the comments (20.35%). The instructor was noted on 3.54 percent of the comments, while distance education warranted 4.42 percent of the comments. Nineteen respondents did not make any comments (15.70% of respondents).

The entire list of comments is found in Appendix H. Twenty-six percent of these comments were positive, while seventy four percent of these comments were negative.

Academic Achievement

Academic achievement was analyzed to determine any differences in grades between students receiving different delivery systems and study location within electronic distance education delivery. Out of the 142 total students as noted in Table XIX, sixty-eight percent of students (96) received a grade of A, and twenty-seven percent of students (39) received a grade of B. Only one percent of students (2) received a grade of C, and four percent of students (5) have not completed requirements for the course resulting in a grade of I. The overall mean grade point average was 3.58 on a 4.00 scale.

When the frequency of grades was analyzed by delivery system, no significant differences were noted ($p = .4737$). Students receiving condensed time-frame delivery and traditional classroom delivery had the highest mean grade point averages, while students receiving electronic distance education delivery had the lowest mean grade point averages (3.74, 3.60, and 3.49, respectively). When only the electronic distance education student grades were analyzed with respect to study location, no significant differences were noted ($p = .9823$). On-site students had a mean grade point average of 3.48, while off-site students had a mean grade point average of 3.49.

TABLE XIX

STUDENT ACADEMIC ACHIEVEMENT BY DELIVERY SYSTEM AND STUDY LOCATION WITHIN ELECTRONIC DISTANCE EDUCATION DELIVERY

Source	A (4.0)		B (3.0)		C (2.0)		I (0.0)		Mean	S.D.	Prob
	N	%	N	%	N	%	N	%	G.P.A.		
Overall	96	67.61	39	27.46	2	1.41	5	3.52	3.58	0.79	
Traditional	32	68.09	13	27.66	1	2.13	1	2.13	3.60	0.74	.4737
Distance	50	65.79	21	27.63	1	1.32	4	5.26	3.49	0.96	
Condensed	14	73.68	5	26.32	0	0.00	0	0.00	3.74	0.45	
On-site	21	67.74	8	25.81	0	0.00	2	6.45	3.48	1.03	.9823
Off-site	29	64.44	13	28.89	1	2.22	2	4.44	3.49	0.92	

CHAPTER V

SUMMARY, CONCLUSIONS/IMPLICATIONS, AND RECOMMENDATIONS

Introduction

The purpose of this chapter was to present a summary of the study problem, purpose, and objectives, and a summary of the major findings. Conclusions and recommendations/implications were also included which were based on analysis and summarization of data collected and observations and impressions resulting from the survey. An alpha level of .05 was established a priori to determine statistical significance.

Summary

Problem

Evaluation of the effectiveness of traditional classroom delivery, electronic distance education delivery, and condensed time-frame delivery had not been conducted to determine if these systems accomplish the objectives of the research design course. The course objectives are to: (1) increase research knowledge of students, (2) increase statistical knowledge as a tool of research, (3) increase computer knowledge as a tool of research and statistics, and (4) prepare and assist students in writing the first three

chapters of their thesis, report, or dissertation. Research needs to be conducted to determine the effectiveness of the three systems at accomplishing these course objectives.

Purpose

The purpose of this study was to compare perceived knowledge, perceived value, and academic achievement of graduate students receiving Research Design by delivery system (traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery) and study location of students receiving Research Design by electronic distance education delivery (on-site or off-site).

Objectives

The following objectives were established to achieve the purpose of the study:

1. To compare the perceived research, statistical, and computer knowledge of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.
2. To compare the perceived value of the individual components of Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.
3. To describe the perceptions of the most and least effective aspects of Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery.

4. To compare the academic achievement in Research Design of students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery and students located on-site or off-site receiving electronic distance education delivery.

Major Findings

Perceived Research Knowledge. Students rated their perceived research knowledge before taking Research Design at a mean score of 2.31 and after taking Research Design at a mean score of 3.82, a 1.51 increase in the mean score of perceived research knowledge on a five point scale. Students receiving traditional classroom delivery rated their perceived research knowledge significantly higher before and after taking Research Design than students receiving electronic distance education delivery and condensed time-frame delivery. Most students had previously taken only one research course. However, the majority of students felt their research knowledge increased as a result of the course.

Full-time students rated their perceived research knowledge significantly higher before taking the course than part-time students, but they rated it the same as part-time students after taking the course. Full-time students perceived a significantly lower increase in research knowledge than part-time students. Full-time students receiving traditional classroom delivery rated their perceived research knowledge significantly higher than full-time students receiving electronic distance education delivery and condensed time-frame delivery, both before and after taking the course. Part-time students receiving condensed time-frame delivery rated their perceived research

knowledge after taking the course significantly higher than part-time students receiving traditional classroom delivery, who in turn rated their perceived research knowledge significantly higher than part-time students receiving electronic distance education delivery. Part-time students receiving condensed time-frame delivery and traditional classroom delivery perceived a significantly greater increase in their research knowledge than part-time students receiving electronic distance education delivery.

Students receiving electronic distance education delivery did not differ in their perceived research knowledge before Research Design, but off-site students rated their perceived research knowledge after Research Design significantly higher than on-site students. In addition, both full-time and part-time off-site students rated their perceived research knowledge significantly higher than either full-time or part-time on-site students. Full-time students taking the course on-site rated their perceived research knowledge before taking the course significantly lower than full-time students taking the course off-site. Part-time students taking the course on-site rated their perceived research knowledge before and after taking the course significantly lower than part-time students taking the course off-site.

Perceived Statistical Knowledge. Students rated their perceived statistical knowledge before taking Research Design at a mean score of 2.26 and after taking Research Design at a mean score of 3.37, a 1.11 increase in the mean score of perceived statistical knowledge on a five point scale. Students receiving traditional classroom delivery and condensed time-frame delivery rated their perceived statistical knowledge significantly higher than students receiving electronic distance education delivery, both

before and after taking Research Design. Most students had previously taken at least one statistics course, and many had previously taken two statistics courses. However, the majority of students felt their statistical knowledge increased as a result of the course.

Full-time students rated their perceived statistical knowledge significantly higher than part-time students, both before and after taking the course. However, part-time students perceived a significantly greater increase in statistical knowledge than full-time students. Significant differences existed between full-time students and part-time students receiving traditional classroom delivery, electronic distance education delivery, and condensed time-frame delivery, both before and after taking the course. Full-time students receiving traditional classroom delivery rated their perceived statistical knowledge significantly higher than students receiving electronic distance education delivery or condensed time-frame delivery before and after taking Research Design. However, full-time students receiving electronic distance education delivery perceived a greater increase in statistical knowledge than full-time students receiving traditional classroom delivery and condensed time-frame delivery. Part-time students receiving electronic distance education delivery and condensed time-frame delivery rated their perceived statistical knowledge significantly higher before the course than part-time students receiving traditional classroom delivery. Part-time students receiving condensed-time frame delivery rated their perceived statistical knowledge significantly higher after the course than part-time students receiving traditional classroom delivery or electronic distance education delivery, while part-time students receiving traditional classroom delivery also rated their perceived statistical knowledge significantly higher after the course than part-time students receiving electronic distance education delivery.

However, part-time students receiving electronic distance education delivery were significantly lower in their perceived increase in statistical knowledge than students receiving traditional classroom delivery and condensed time-frame delivery.

Students receiving electronic distance education delivery on-site rated their perceived statistical knowledge before Research Design significantly higher than students receiving electronic distance education delivery off-site, but they did not differ in their perceived statistical knowledge after Research Design. Off-site students perceived a significantly greater increase in statistical knowledge than on-site students. However, no significant differences were noted for full-time and part-time students depending on their study location. Full-time students taking the course on-site rated their perceived statistical knowledge before taking the course significantly lower than full-time students taking the course off-site. On-site full-time students perceived a significantly greater increase in perceived statistical knowledge than off-site full-time students. Part-time students taking the course on-site rated their perceived statistical knowledge after taking the course significantly lower than part-time students taking the course off-site. Off-site part-time students perceived a significantly greater increase in statistical knowledge than on-site part-time students.

Perceived Computer Knowledge. Students rated their perceived computer knowledge before taking Research Design at a mean score of 3.13 and after taking Research Design at a mean score of 3.78, a 0.77 increase in the mean score of perceived computer knowledge on a five point scale. Students receiving traditional classroom delivery rated their perceived computer knowledge significantly higher than students

receiving electronic distance education delivery, both before and after taking Research Design. Students receiving traditional classroom delivery and electronic distance education delivery perceived a significantly greater increase in computer knowledge than students receiving condensed time-frame delivery. Many students had previously taken several computer courses. However, the majority of students receiving traditional classroom delivery and condensed time-frame delivery felt their computer knowledge did not increase as a result of taking the course. The majority of students receiving electronic distance education delivery felt their computer knowledge increased as a result of taking the course.

Full-time students rated their perceived computer knowledge significantly higher than part-time students, both before and after taking the course. However, part-time students perceived a significantly greater increase in computer knowledge than full-time students. Full-time students receiving traditional classroom delivery rated their perceived computer knowledge before taking the course significantly higher than students receiving electronic distance education delivery and condensed time-frame delivery. Part-time students receiving condensed time-frame delivery rated their perceived computer knowledge after the course significantly higher than part-time students receiving traditional classroom delivery and electronic distance education delivery. Part-time students receiving traditional classroom delivery and condensed time-frame delivery perceived a significantly greater increase in computer knowledge than part-time students receiving electronic distance education delivery.

Students receiving electronic distance education delivery on-site rated their perceived computer knowledge before Research Design significantly higher than students

receiving electronic distance education delivery off-site, but they did not differ significantly in their perceived computer knowledge after Research Design. However, off-site students perceived a significantly greater increase in computer knowledge than on-site students. Full-time students did not differ significantly in their perceived computer knowledge, before or after the course. Part-time students taking the course on-site rated their perceived computer knowledge after taking the course significantly lower than part-time students taking the course off-site and perceived a significantly lower increase in computer knowledge.

TABLE XX

SUMMARY OF PERCEIVED STUDENT KNOWLEDGE

Source	Traditional	Distance	Condensed	Prob	Full-time	Part-time	Prob
Research							
Before	2.43	2.24	2.26	.0004	2.51	2.11	.0000
After	3.94	3.76	3.74	.0000	3.85	3.79	.1319
Diff.	1.50	1.52	1.49	.8490	1.34	1.67	.0000
Statistics							
Before	2.51	2.07	2.37	.0000	2.63	1.91	.0000
After	3.53	3.23	3.49	.0000	3.52	3.23	.0000
Diff.	1.01	1.17	1.12	.0078	0.89	1.32	.0000
Computer							
Before	3.40	2.95	3.17	.0000	3.44	2.78	.0000
After	3.89	3.70	3.87	.0000	3.98	3.61	.0000
Diff.	0.86	0.77	0.47	.0030	0.67	1.19	.0000

TABLE XX

SUMMARY OF PERCEIVED STUDENT KNOWLEDGE (Continued)

Source	Full-time Traditional	Full-time Distance	Full-time Condensed	Full-time Prob	Part-time Traditional	Part-time Distance	Part-time Condensed	Part-time Prob
Research								
Before	2.61	2.55	2.26	.0000	2.04	2.11	2.28	.1393
After	3.93	3.94	3.57	.0000	3.96	3.69	4.22	.0000
Diff.	1.33	1.39	1.30	.4682	1.92	1.57	1.93	.0000
Statistics								
Before	2.87	2.42	2.45	.0000	1.77	1.92	2.14	.0103
After	3.63	3.52	3.32	.0038	3.32	3.11	3.96	.0000
Diff.	0.75	1.09	0.87	.0000	1.55	1.20	1.82	.0000
Computer								
Before	3.72	3.33	3.25	.0003	2.74	2.79	2.92	.7589
After	4.03	3.91	3.77	.0645	3.59	3.61	4.31	.0005
Diff.	0.46	0.58	0.52	.3893	1.38	0.84	1.53	.0000

Source	Full-time On-site	Full-time Off-site	Full-time Prob	Part-time On-site	Part-time Off-site	Part-time Prob
Research						
Before	2.22	2.26	.5343	2.39	3.53	.0000
After	3.70	3.81	.0255	3.92	4.04	.3461
Diff.	1.47	1.55	.2106	1.52	1.51	.0000
Statistics						
Before	2.20	1.96	.0007	2.35	2.86	.0269
After	3.25	3.22	.6205	3.56	3.23	.0862
Diff.	1.05	1.27	.0006	1.21	0.37	.0000
Computer						
Before	3.10	2.83	.0262	3.36	3.15	.4682
After	3.68	3.71	.8047	3.97	3.60	.1056
Diff.	0.59	0.91	.0001	0.61	0.45	.4284

Source	Full-time On-site	Full-time Off-site	Full-time Prob	Part-time On-site	Part-time Off-site	Part-time Prob
Research	3.15	3.79	.0000	2.69	2.98	.0000
Statistics	2.96	3.01	.6013	2.42	2.55	0.663
Computer	3.66	3.38	.1292	3.03	3.26	.0442

General Perceptions. Students receiving traditional classroom delivery, electronic distance education delivery, and condensed time-frame delivery were not significantly different in rating Research Design. Part-time students receiving condensed time-frame delivery and traditional classroom delivery rated Research Design significantly higher than part-time students receiving electronic distance education delivery, but full-time students did not significantly differ in their ratings. The total group of students, full-time students, and part-time students did not significantly differ on course ratings depending on delivery system when each aspect of the course - general, research, statistics, and computer components - was evaluated individually. The single exception was part-time students receiving traditional classroom delivery rated the general course significantly higher than part-time students receiving electronic distance education delivery.

Students receiving electronic distance education delivery on-site and off-site were not significantly different in rating Research Design. Neither full-time nor part-time students rated Research Design significantly different depending on study location. The total group of students, full-time students, and part-time students did not significantly differ on course ratings depending on study location when each aspect of the course - general, research, statistics, and computer components - was evaluated individually.

Qualitative Comments. The majority of students receiving electronic distance education delivery and condensed time-frame delivery would take another course by that system. Off-site students and part-time students receiving electronic distance education delivery responded favorably about taking another course by electronic distance education delivery. The majority of off-site part-time students stated that they would take

another course by electronic distance education delivery. All part-time students receiving condensed time-frame delivery stated that they would take another course by that system, and many full-time students stated that they would take another course by that system.

Value of Course Components. Students rated the value of the course components at 7.50 on a ten point scale. Students receiving traditional classroom delivery and condensed time-frame delivery rated the value of the course, the research questions, the statistics questions, the guest speakers, and the books significantly higher than students receiving electronic distance education delivery. Students receiving different delivery systems were not significantly different on their ratings of the value of the computer questions. Students receiving electronic distance education delivery on-site rated the value of the course, the research questions, the guest speakers, and the books significantly higher than students receiving electronic distance education delivery off-site. Students did not differ significantly on their ratings of the value of the statistics and computer questions.

Qualitative Comments. Many students felt the most effective aspects of the course dealt with writing the first three chapters, critiques, and the mini-proposal. Students also felt the assignments, interaction, presentations, guest speakers, and statistics and the syllabus/modules were effective. The majority of students felt the least effective aspect of the course was the syllabus/modules. Students noted significant changes that should be made in all aspects of the course, particularly in the syllabus/modules. Twenty-six percent of these comments were positive, while seventy-four percent of these comments were negative.

Academic Achievement. Ninety-six students received a grade of A, 39 students received a grade of B, two students received a grade of C, and five students have not completed requirements for the course resulting in an I grade. The overall mean grade point average was 3.58 on a 4.00 scale. No significant differences were noted in grades depending on delivery system or study location within electronic distance education delivery.

Conclusions/Implications

The analysis of the data and subsequent findings were the basis for the following conclusions and implications:

1. Students taking Research Design increased their perceived research, statistical, and computer knowledge from the levels prior to taking the course. However, the amount of increase of research knowledge was not dependent upon the delivery system used or study location within electronic distance education delivery but was dependent upon the full-time or part-time status of the students. The amount of increase of statistical and computer knowledge was dependent upon the delivery system used, study location within electronic distance education delivery, and full-time or part-time status of the students. Students receiving electronic distance education delivery consistently rated their perceived research, statistical, and computer knowledge lower than students receiving traditional classroom delivery or condensed time-frame delivery. Therefore, it was concluded that all three delivery systems appeared to be effective in increasing research, statistical, and computer knowledge of the students.

2. Study location did affect the perceived increase in statistical and computer knowledge of students receiving electronic distance education delivery but did not affect the perceived increase in research knowledge of students receiving electronic distance education delivery. On-site students consistently rated their perceived knowledge higher before and after the course than off-site students, but off-site students perceived a greater increase in knowledge than on-site students. Off-site students appeared to enter the class with less knowledge but learned more during the class than on-site students. Therefore, it was concluded that special attention should be paid to students receiving electronic distance education delivery and more specifically part-time on-site and full-time off-site students.

3. The full-time or part-time status of the students affected the perceived increase in research, statistical, and computer knowledge. Part-time students consistently rated their perceived knowledge lower than full-time students, but part-time students perceived a greater increase in knowledge than full-time students. Based on these results, it was concluded that part-time students appeared to enter the class with less knowledge but learned more during the class than full-time students.

4. Students felt the course itself was excellent in content and delivery system. This was not affected by delivery system used, study location within electronic distance education delivery, or full-time status but was affected by part-time status. Part-time students receiving electronic distance education delivery rated Research Design lower than part-time students receiving traditional classroom delivery or condensed time-frame delivery. Therefore, it was apparent that part-time students receiving electronic distance

education delivery may need more attention than part-time students receiving traditional classroom delivery or condensed time-frame delivery.

5. Students responded overwhelmingly that they would take another course by electronic distance education delivery or condensed time-frame delivery. Off-site and part-time students were more open to taking another course by these systems. The largest group responding favorably was part-time off-site students receiving electronic distance education delivery. Therefore, it was concluded that additional courses and off-campus degree programs should be developed to meet the needs of these part-time and/or off-site students.

6. Students valued the course as important. These differences were dependent upon the delivery system used and study location within electronic distance education delivery. Students receiving traditional classroom delivery and condensed time-frame delivery consistently rated the value of the course, the research questions, the statistics questions, the guest speakers, and the books higher than students receiving electronic distance education delivery. Students receiving electronic distance education delivery on-site valued the course more than students receiving electronic distance education delivery off-site. These differences corresponded to the perceived differences in research, statistical, and computer knowledge. Based on these results, it was apparent that students receiving electronic distance education delivery may merit special attention.

7. Students felt that writing the first three chapters, critiques, and the mini-proposal was the most effective aspect of the course. Students felt the least effective aspect of the course was the syllabus/modules. Since the main assignment in the course

was the completion of the student's thesis, report, or dissertation, it was comforting that the students regarded the writing aspect as being effective.

8. Most students received either a grade of A or B in Research Design and were not affected by delivery system used or study location within electronic distance education delivery. Therefore, it was concluded that grades were independent of the other variables.

Recommendations

Teaching by all three delivery systems was effective for this research design course. Electronic distance education delivery was as effective a delivery system as traditional classroom delivery or condensed time-frame delivery. It is essential that formal and non-formal educational entities continue to explore and utilize state-of-the-art delivery systems. Particular attention should be focused on the use of distance education delivery with part-time adult students. In addition, the use of condensed time-frame delivery merits more attention and use in other courses.

Longitudinal evaluation should continue to determine further effectiveness of delivery systems and students' satisfaction with the course and different delivery systems. Additional studies should be conducted with other research design courses at other institutions and in other disciplines. In addition, further research should be continued with future students of AGED 5980 Research Design at Oklahoma State University to further explore the factors affecting students' perceptions and knowledge.

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APPENDIX A

QUESTIONNAIRE

Evaluation of a Research Design course at Oklahoma State University by students receiving traditional classroom instruction, electronic distance education instruction, and condensed classroom instruction

I took AGED 5980 Research Design by:

_____traditional classroom setting (Spring)
_____distance education setting (Fall)
_____Stillwater
_____Oklahoma City
_____Tulsa
_____condensed summer setting (Summer)

I took AGED 5980 Research Design during:

_____Fall 1995
_____Spring 1996
_____Summer 1996
_____Fall 1996
_____Spring 1997
_____Summer 1997

When you took AGED 5980 Research Design, were you a full time student or part time student?

_____full time student _____part time student

*Rate your level of knowledge on the following items regarding AGED 5980 Research Design both **BEFORE** and **AFTER** you completed the course (1=No Knowledge; 5=Very Knowledgeable).*

	BEFORE					**AFTER**				
	No Knowledge				Very Knowledgeable	No Knowledge				Very Knowledgeable
Research in general	1	2	3	4	5	1	2	3	4	5
Research methods	1	2	3	4	5	1	2	3	4	5
Research procedures	1	2	3	4	5	1	2	3	4	5
Literature searching	1	2	3	4	5	1	2	3	4	5
Library resources	1	2	3	4	5	1	2	3	4	5
Principles of logic	1	2	3	4	5	1	2	3	4	5
Deductive reasoning	1	2	3	4	5	1	2	3	4	5
Inductive reasoning	1	2	3	4	5	1	2	3	4	5
Scientific method	1	2	3	4	5	1	2	3	4	5
Steps for developing Introductory Chapter of thesis, report, or dissertation	1	2	3	4	5	1	2	3	4	5
Steps for developing Review of Literature Chapter of thesis, report, or dissertation	1	2	3	4	5	1	2	3	4	5
Steps for developing Procedures Chapter of thesis, report, or dissertation	1	2	3	4	5	1	2	3	4	5
Sampling	1	2	3	4	5	1	2	3	4	5
Questionnaire	1	2	3	4	5	1	2	3	4	5
Interview	1	2	3	4	5	1	2	3	4	5
Other data gathering tools (scales, direct observations, semantic differential, Q methodology, conferences, Delphi technique, nominal group technique, focus groups technique)	1	2	3	4	5	1	2	3	4	5
Instrument reliability	1	2	3	4	5	1	2	3	4	5
Instrument validity	1	2	3	4	5	1	2	3	4	5
Historical research methods	1	2	3	4	5	1	2	3	4	5
Descriptive research methods (survey studies, interrelationship studies, developmental studies)	1	2	3	4	5	1	2	3	4	5
Experimental research methods	1	2	3	4	5	1	2	3	4	5
Experimental research design	1	2	3	4	5	1	2	3	4	5
Qualitative research methods	1	2	3	4	5	1	2	3	4	5

	BEFORE					AFTER				
	No Knowledge				Very Knowledgeable	No Knowledge				Very Knowledgeable
Statistics in general	1	2	3	4	5	1	2	3	4	5
Use of statistics in research	1	2	3	4	5	1	2	3	4	5
Statistical methods	1	2	3	4	5	1	2	3	4	5
Statistical procedures	1	2	3	4	5	1	2	3	4	5
Selecting the appropriate statistical procedure	1	2	3	4	5	1	2	3	4	5
Descriptive statistics	1	2	3	4	5	1	2	3	4	5
Inferential statistics	1	2	3	4	5	1	2	3	4	5
Parametric statistics	1	2	3	4	5	1	2	3	4	5
Non-parametric statistics	1	2	3	4	5	1	2	3	4	5
Levels of measurement	1	2	3	4	5	1	2	3	4	5
Hypothesis testing	1	2	3	4	5	1	2	3	4	5
Probability	1	2	3	4	5	1	2	3	4	5
Statistical significance	1	2	3	4	5	1	2	3	4	5
Linear regression	1	2	3	4	5	1	2	3	4	5
Correlation	1	2	3	4	5	1	2	3	4	5
t-test	1	2	3	4	5	1	2	3	4	5
Analysis of variance	1	2	3	4	5	1	2	3	4	5
Chi square	1	2	3	4	5	1	2	3	4	5
Computers in general	1	2	3	4	5	1	2	3	4	5
Use of computers in research	1	2	3	4	5	1	2	3	4	5
Use of computers in literature searching	1	2	3	4	5	1	2	3	4	5
Use of computers in statistical analysis	1	2	3	4	5	1	2	3	4	5
Components of a computer	1	2	3	4	5	1	2	3	4	5
Computer applications	1	2	3	4	5	1	2	3	4	5
Word processing applications	1	2	3	4	5	1	2	3	4	5
Spreadsheet applications	1	2	3	4	5	1	2	3	4	5
Database applications	1	2	3	4	5	1	2	3	4	5
Graphics applications	1	2	3	4	5	1	2	3	4	5

Please rate your feelings about the following items regarding AGED 5980 Research Design. (1=Poor; 5=Excellent)

	Poor				Excellent
Overall course content	1	2	3	4	5
Overall instructor	1	2	3	4	5
Delivery method (traditional, distance, or condensed)	1	2	3	4	5
How thorough was the research material?	1	2	3	4	5
How well was the research material presented?	1	2	3	4	5
How thorough was the statistics material?	1	2	3	4	5
How well was the statistics material presented?	1	2	3	4	5
How thorough was the computer information?	1	2	3	4	5
How well was the computer information presented?	1	2	3	4	5

How many research courses did you take before taking AGED 5980 Research Design? _____
Do you feel your research knowledge increased as a result of taking AGED 5980 Research Design? _____ Yes _____No

How many statistics courses did you take before taking AGED 5980 Research Design? _____
Do you feel your statistical knowledge increased as a result of taking AGED 5980 Research Design? _____ Yes _____No

How many computer courses did you take before taking AGED 5980 Research Design? _____
Do you feel your computer knowledge increased as a result of taking AGED 5980 Research Design? _____ Yes _____No

If you took AGED 5980 Research Design by the distance education method, would you take another course by this format in the future?
_____Yes _____No
Why or why not?

If you took AGED 5980 Research Design as a summer course, would you take another course by this format in the future?
_____Yes _____No

Why or why not?

Comments?

APPENDIX B

EVALUATION QUESTIONNAIRE

RESEARCH DESIGN EVALUATION

1. Please rate the **value to you** of each of these components of the course:
(1=Low Value -- 10=High Value)

_____1. Library Orientation
_____2. Logic Module
_____3. First Three Chapters Modules
_____4. Sampling Module
_____5. Internal Review Board Discussion
_____6. Questionnaire and Interview Module
_____7. Other Data Gathering Tools Module
_____8. Reliability and Validity Module
_____9. Historical Research Module
_____10. Descriptive Research Module
_____11. Experimental Research Module
_____12. Qualitative Research Module
_____13. Computer Module
_____14. Descriptive Statistics Module
_____15. Correlation Module
_____16. Regression Module
_____17. "t" Test Module
_____18. Analysis of Variance Module
_____19. Chi Square Module
_____20. Statistics Selection Module
_____21. Critiquing Research Studies
_____22. Writing the Mini-Proposal
_____23. Writing the Draft of the 1st Three Chapters or Creative Component
_____24. Writing the Final Draft of the 1st Three Chapters or Creative Component
_____25. Mr. Pat Anderson - Graduate College
_____26. Ms. Kay Porter - Manuscript Preparation
_____27. The Research Design Syllabus
_____28. Research Book, Leedy, Practical Research
_____29. Research Book, Kerlinger, Foundations of Behavior Research
_____30. Statistics Book, Spatz, Basic Statistics
_____31. Take-Home Final Examination

Please make comments for improvement by the items or in this space.

2. What was **most effective**?

3. What was **least effective**?

4. What would be the most **significant change(s)** you would make?

Agricultural Education Department
448 Agricultural Hall
Stillwater, OK 74078

APPENDIX C

COVER LETTER

August 15, 1997

Dear Former Student:

The last few years have brought numerous changes to Research Design at Oklahoma State University taught by Dr. Key. The most significant of these changes is the use of distance education and a shortened summer class in addition to the traditional class.

In an effort to improve the quality of Research Design, we are conducting a study to determine whether AGED 5980 Research Design at Oklahoma State University is accomplishing the objectives designed for and by you. As a former student during the past two years, you can have a direct influence on the continued success of this course.

Enclosed please find the survey addressing the "Evaluation of a Research Design course at Oklahoma State University". Answer all questions unless directed otherwise. Your responses are strictly confidential and will only be reported in the aggregate. Please take a few minutes to complete and return in the enclosed pre-addressed, stamped envelope by August 30, 1997.

Please understand that participation is voluntary and there is no penalty for refusing to participate. If you have any questions regarding this study, please do not hesitate to contact Laura Griffeth at (405) 744-8135, Dr. James P. Key (405) 744-8136, or Gay Clarkson Institutional Review Board Executive Secretary (405) 744-5700.

Thank you for taking the time to share your insight and opinions.

Sincerely,

Dr. James P. Key
Professor
Agricultural Education, Communications, and 4-H Youth Development

Laura Griffeth
Graduate Student
Agricultural Education, Communications and 4-H Youth Development

APPENDIX D

ELECTRONIC DISTANCE EDUCATION DELIVERY
QUALITATIVE COMMENTS

- Technology is not yet advanced enough to be utilized for an interactive classroom. Relies heavily on lecture and a good lecture needs to be active and innovative to be interesting.
- I started at UCT but this course seemed to be very involved, so I drove almost 2 hrs to Stillwater to be in the classroom with Dr. Key.
- There was adequate time for questions to be answered following the class.
- Restricts instructor behind a desk. Hard to build a rapport with students in a studio.
- This wasn't the problem; it was not real exciting, but this is a separate issue. The problem is that the course as currently structure is an intro stat course, NOT a rd course. This could be a wonderful course -as is, however, it is worth very little.
- Good delivery tool. Technology is getting better all the time. Saves time and money
- convenience/cost
- I consider the electronic distance education instruction as effective in delivering knowledge.
- Undecided. Class would sometimes start late. Traditional format is superior. If no alternative, then possibly yes.
- Because it was difficult for Dr. Key to give us (Stillwater group) enough attention since he had to tend to the other two sites.
- Worked great for me. Knowledgeable instructor - comfortable with equipment. Few problems with equipment
- It was so difficult to stay focused at times with two other sites chiming in. I had a difficult time with the instructor only sitting in front of the room - there was little actual teaching.
- Taking it in Stillwater was just like taking it in a regular classroom.
- If I was in the broadcast room - I would not like a whole class by talkback.
- convenient. Downside is not being able to always hear other students in classroom, hence minimal understanding of their input.
- The course material was presented very effectively. Distance learning is the best way to take this course. It makes the student pay more attention to course content for better understanding.
- It was very convenient with a family and two jobs.
- Even though it was distance education, you still had the opportunity to talk with the instructor and ask questions. It saved me a trip to Stw from Ardmore.
- Already have a degree
- Required
- Much more interactive than I would have guessed.
- I am fascinated by technology and enjoy Dr. Key's approach. I am also a self-motivated learner and appreciate the opportunity to work solo.
- Format does not fit my learning needs.
- Distance courses allow us students to take courses without driving to Stillwater. It does take a motivated student to learn in a distance class.
- Very convenient
- Convenient
- Impersonal. If I need that little contact, I will do independent study.
- Close to home
- Not unless only way offered - could not hear questions that were asked in other classroom
- Accessibility!
- Technology for transmission is not satisfactory. Video lacked clarity, could not hear other students, and entire process was distracting.
- My goal was completed successfully.
- Convenience

APPENDIX E

CONDENSED TIME-FRAME DELIVERY
QUALITATIVE COMMENTS

- Absolutely not enough time to cover any material thoroughly enough to learn a damn thing!!
- Quick which is good. Even though it was a lot of work, it seemed less painful.
- Allows student to concentrate on one subject at a time
- Because I feel it made me get things done and I didn't have a lot of dead time between classes.
- Though it was impossible to study for mastery, we did learn about the scope and where to go for necessary information. This approach worked (works) for me.
- It allowed for continuity in coursework. Three weeks was extremely fast. Six or eight weeks might be better.
- Presented too much too fast with no time to really process the material for a reasonable level of understanding. If one was not computer proficient at the outset, the workload was greatly increased. Too much like drinking from a fire hose.
- Depends on who is teaching it and what the course is. I prefer to get in and get the work done quickly.
- Because this method fit my needs. It made me focused and I finished my work without procrastinating because I had to!
- The fast pace made me focus on the course and complete my assignments on time. I was able to concentrate on what had to be done.

APPENDIX F

MOST EFFECTIVE QUALITATIVE COMMENTS

Fall 1995

Stillwater

- problem, purpose, objective formulation; most of packages were useful
- computer module
- getting us busy at first and doing a little bit at a time; how it all added up to help us as course went along
- library use; stat introduction
- historical, descriptive, experimental, and qualitative modules; library work
- assignments
- library orientation; writing 1st three chapters
- organization of vast amount of material covered in class; modules in syllabus helped tremendously; Dr. Key's knowledge of subject matter and ability to communicate that to students is incredible; helpful to be able to work on my creative components instead of an independent project
- use of examples; step-by-step examples; descriptions and explanations in book; having to write beginning of thesis; Dr. Key's willingness to help one-on-one
- research methods; library use; computer use in research and statistics

Oklahoma City

- writing and how to write paper
- Dr. Key very effective in conducting a very difficult class trying to keep it entertaining; guest speakers
- how to develop 1st three chapters; understanding statistical data
- overall course itself was effective
- library, logic modules; writing introductory, review of literature, and procedures chapters modules; experimental research modules; statistics selection chart
- critiques of research; step-by-step preparation of creative component
- comments on returned work
- research design syllabus; procedures, content and format in preparing 1st three chapters of study
- writing introductory, review of literature, and procedures chapters modules
- critique of literature
- three critiques; grades on draft
- critiques
- critiquing other research papers; syllabus was excellent example to follow
- providing class by distance means a life save; instructor was a life saver; orientations and drafts were on target

Tulsa

- library tour and librarian assistance
- learning how to narrow research subject down for thesis
- feedback on rough drafts
- writing 1st three chapters of thesis
- suggestions for writing; statistical information; was impressed with ability to use excel, etc.
- diversity of information presented; lighting a fire to get started on thesis
- use of computer software; syllabus
- lectures on available resources and what they are used for

Spring 1996

- statistics problems
- mini-proposal
- learning a reasonably logical method of starting research; text was helpful in figuring out what each chapter of paper should contain; graduate assistant helpful with papers as far as grammar, punctuation, etc.

- critiques; dissertation work
- information on writing 1st three chapters (given head start and forced me to start report)
- writing mini-proposal
- learning how to use the library for graduate research
- information leading to effective research approaches
- writing chapters
- library
- critiques; library tour; draft of 1st three chapters; guest speaker on manuscript preparation (Kay Porter)
- allowance for group interaction; critique of questionnaires; group presentations
- guest speaker on sampling (Dr. Shaw); critiques
- speakers from the college
- experimental design section; 1st three chapters sections
- presentation style (manner, sensitivity to learners, etc.) and programmed sequence and its coinciding sequence of workbook
- drafting 1st three chapters; having students evaluate questionnaires
- drafting 1st three chapters with feedback; group activities
- working on 1st three chapters

Summer 1996

- writing 1st three chapters; writing problem, purpose, objectives, mini-proposal
- writing 1st three chapters
- open door policy
- all different kinds of lectures
- statistics review; writing 1st three chapters; writing critiques
- writing critiques; writing mini-proposal; writing 1st three chapters
- none

Fall 1996
Stillwater

- teaching us how to write 1st three chapters step by step
- pinning down problem statement, purpose, and objectives for diss.
- critiques made me read articles and theses more critically
- format of book, matching videos, and lectures; time frame for completing work up front; treating students like professionals when problems came up; clear teaching methods in modular format; guest speakers and interesting videos on surveys and library tools
- writing critiques; writing 1st three chapters; class in general was effective
- critiques were an asset to evaluate; library tour
- library tour; lecture on questionnaires and surveys
- research critique; writing 1st three chapters
- quizzes; having final exam at beginning of semester; syllabus was well written and easy to follow; quick reviews of previous material; opportunity to have peers critique topics, objectives, and instruments
- problem, purpose, and objective; writing the 1st three chapters
- Dr. Key's method of instruction; Dr. Key's easy to talk to; working on 1st three chapters
- library tour; use of Pete and CD-ROM searching; introduction to stats; whole research aspect beneficial
- library research; statistics were excellent review

Tulsa

- critiques; mini-proposal; writing 1st three chapters
- putting together the 1st three chapters bit by bit

- mini-proposal; article/research study reviews
- information required for 1st three chapters (what they should contain, format, technical details of writing, Kay Porter's contribution)
- examples; feedback on critiques and reviews
- having students teach
- class interaction (your ability and desire to work with us)
- syllabus very comprehensive and complete; learning how to do research in a library at a graduate level was very useful; nailing down a problem to be researched
- critiques
- statistics selection chart and exercises on statistics helped tie various parts together; 1st two critiques
- student conducted classes (set up some time guidelines)

Spring 1997

- use of module, syllabus
- self-directed learning both individually and in groups
- writing 1st three chapters; reviewing other dissertations
- doing the writing, especially having to critique someone's thesis
- practical application approach; syllabus
- Dr. Key's positive attitude
- breaking down course into modules was effective
- class participation
- writing 1st three chapters
- provide for confidence to begin research progress
- modules or chapters
- student participation, modules are useful, prompt feedback on written work
- writing final draft of 1st three chapters
- helpful assignments; willingness to work with students is helpful
- group projects
- library orientation
- class discussions based on assignments
- critiques helped; group work; team presentations
- Kay Porter; library tour; talking about 1st three chapters

Summer 1997

- everything was effective; Dr. Key's very proficient at explaining the material; guest speakers were all great; teaching aide was very helpful
- classroom discussion regarding critiquing each others' work
- critiquing journal articles and dissertations
- individual questions and answers (students presenting their studies)
- forced progress in writing and organizing
- invitation of Pat and Kay was valuable information; classroom participation and feedback (critiques); video about sending out surveys
- deadlines for completing 1st 3 chapters

APPENDIX G

LEAST EFFECTIVE QUALITATIVE COMMENTS

Fall 1995 Stillwater
• interviews by telephone
• nothing
• too much time on how to use library
• historical research
• logic module
• computer information interesting (Netscape, Powerpoint) but already known
• lack of stimulation and variation from presentations due to presenters having to sit in front of the camera; atmosphere of cameras, TVs, and off-site students makes for a less interactive class
• method of presentation (limited due to satellite students)
• quick explanation of stats assumed some prior exposure making it tough on those with little exposure; might require basic stats as a prereq
Oklahoma City
• statistics
• time was wasted; class got behind; students had most (90%) of paper completed when we began to study research portion in syllabus
• grading draft of creative components; did not approve of end of class exams
• none
• none
• library orientation (because I was already familiar); difficult for class at OKC to conceptualize actual library process unless previously familiar with library
• library module should be at library
• statistical methods
• library usage without being familiar with OSU system; pop quizzes should have been sent to site to keep students from having to write questions and answers
• length of lecture on library usage
• length of class (3 hours each Tuesday for 16 weeks)
• downlink from Stillwater
• library
• some modules did not apply to everything (hit and miss)
Tulsa
• making an assignment and going over it week after
• talking or interchange with teacher
• communication between instructors and students (just do not like it because feel like I don't matter as a student)
• inability to ask questions immediately
• unsupervised class via compressed video (some were disruptive)
• video
• statistics discussions were not understandable; use of statistics to explain research was over my head
Spring 1996
• student presentations of types of research
• group presentations
• statistics (bewildering for those who had no stats - undergraduate work should require some form of stats for everyone)
• statistics material
• statistics (will not be using)
• 3rd critique; IRB discussion and higher statistics (did not apply to my study)
• statistics

- not much, mostly impersonal module applications
- mini-proposal (no one wanted it in Grad College); logic
- none
- statistics
- none
- drab week to week lectures with little student participation
- library and research chapters (because I'm from another college)
- logic module
- fixed table-chair setting
- statistics
- syllabus information didn't follow course material from lecture to lecture, so stuff was hard to find
- of 3 critiques (2 sufficient)

Summer 1996

- statistics; final copy
- video lectures; class presentations
- limited time
- statistics
- none

Fall 1996
Stillwater

- none
- statistics (already had several classes)
- session transmitted from Tulsa
- I didn't feel that I understand how to do statistics as much as I wanted. This is not a major focus of the class, so I will learn that next semester
- none
- some modules were not defined enough
- doing critiques
- none
- none
- Leedy text book
- none
- none
- some stats got deep if not used

Tulsa

- access to professor and lack of on-site visits to UCT by OSU personnel; lack of feedback on thesis; lack of suggestions on material to write thesis paper, i.e., suggestions of books to check out and researchers on subject
- covering material strictly from the book (class material could have been taken from other sources as well)
- statistics
- use of video for distance learning is not effective (cannot hear students' questions/comments in distant cities; time delay is annoying); p. 213 on final is very confusing (stats table)
- 213 on final
- library tour (only talked about Stillwater; those at UCT could have used a tour at UCT at that time)
- library discussion
- hard to interact with teacher (class loses flexibility); design approved by class (problem, purpose, and objective) may not be approved by advisory team
- information over thesis (doing creative component)
- third critique

- scramble over test (p. 213 was ridiculous)

Spring 1997

- I was gone ost of time
- nothing
- activity involving t-test, chi square, etc.
- too many summarized or truncated topics to really learn any one topic except writing, which is OK since that is really what the class is for
- group presentations
- room was small and felt cramped
- some stats needed further explanation
- evaluation on critiquing research studies (instead of just writing proofread carefully, it would be better if the errors were specified)
- I was already familiar with library
- need more time on key statistics concepts
- computer module
- IRB discussion
- did not need stats info
- take-home final
- extra assignments on nights when major assignments were due
- sampling surveying presentor
- group presentations

Summer 1997

- can't really think of anything that was not useful
- library and computer orientation
- presentations
- group presentations
- lack of depth due to time factor
- less math work on stats (people get hung up on numbers)

APPENDIX H

MOST SIGNIFICANT CHANGES QUALITATIVE COMMENTS

Fall 1995

Stillwater

- practical methods in data analysis; practical ways in sample selection
- more time spent on actual writing of 1st three chapters
- spend less time on all of stat formulas and give more examples of comparing populations
- revise book and organize it better; more time and detail should be spent on how to write chapters
- update modules (layout could be more visually appealing)
- some sort of assignment to involve classmates in working together; ability to work together on final was helpful; group assignment to review each other's titles and objectives were also helpful
- begin with more general information and graduate to more difficult stats; don't assume anyone knows any stats
- concentrate on computer calculations of stats giving more time for explanation of use of each stat and their relationship to each other and to certain situations

Oklahoma City

- statistics before course
- change format of syllabus to assist future students with their research and writing their research papers
- not putting a grade on creative components draft
- none
- none
- make library orientation on-site
- satellite feed on interviewing and surveying was very boring
- shorten lecture on library usage
- cut amount of time spent on library and spend more time on actual development of paper
- class is so informative it should actually be mandatory for all freshmen regardless of major

Tulsa

- not have class via satellite; have more class time for independent work (for those who travel to use the library to the fullest extent)
- teacher visits
- begin working on chapters earlier in semester; maybe turn in one chapter at a time
- teaching class with traditional teacher in class; apply statistical knowledge to use in groups; it's hard to be self-directed in this class when one feels lost most all the time
- none
- compressed video operator more often (maybe a short class in operating the equipment)
- provide greater opportunity for student interaction
- course should not be taught by TV; arrange syllabus in order class is taught

Spring 1996

- actually evaluate a graduate study in the class
- allow more flexibility in the final 3 chapters assignment
- less statistics
- class needed as is
- work more on 1st three chapters; build sample reports for those who have no idea what their thesis will be about; separate into two groups (one stats heavy; one light stats)
- take out 3rd critique; have 1st three chapters due separately
- more guest speakers that pertain to different areas of course
- personalized instruction
- more statistics
- none
- reduce exposure to statistics

- more class presentations to add variety
- get rid of statistics portion of course
- change syllabus information to include other colleges
- spend less time on questionnaire and interview techniques and more time on experimental design
- none any more appropriate than what was offered
- delete the statistics; get out of class on time
- change syllabus to follow lectures
- begin work on 1st three chapters from beginning

Summer 1996

- teach research design
- emphasize when to use experimental design
- help develop questions; fix modules
- would be better in a full semester
- need more time for summer (6 weeks)
- update module

Fall 1996
Stillwater

- see Dr. Key more often; finish 1st three chapters ahead of time
- none
- spend more time on actual instruments, data, and deciding just how to analyze
- none - class was well organized and expectations were clear
- either grade the exercised in book or go over them in class
- do only one critique; spend more time in library with more hands on experience; more in depth details in writing review of literature; more different styles of teaching methods would be helpful
- more in depth lecture on how to write the review of literature; do one critique; spend more time in library in structured fashion
- none
- more student participation
- cut the course to 2 credit hours and consolidate the material to meet just 2 hours at a time
- more time spent on how to construct review of literature
- maybe have some handouts and complete example problems of stats
- balance more research with statistics

Tulsa

- replace p. 213 on test with problems (statistics chart)
- table of contents for book
- none
- eliminate compressed video
- time for students to interact with each other for clearing up problems
- none
- none
- whole class dedicated to library research starting with simplest to more complicated
- 213 of final exam (stats table)
- go slower on lecture for experimental research and design, especially various designs (they ran together)
- adequate miking for distance site so we can hear questions or replies to questions; needs more excitement; more classes conducted by students

Spring 1997

- increase communication between student and instructor for students who are taking the course through use of videos (students' responsibility not instructor's)

- course outlined study path I will be following for the next 2-3 years; it pointed out the importance of developing a focus and study plan to generate towards that final dissertation; therefore, it was most beneficial to take this course in my second semester
- adding a class listserve
- statistics did not sink in because each topic was skimmed (frustrating)
- add library orientation to 1st doctoral seminar in OAED
- more about creative component option; more information about 1st three chapters (maybe a rough draft, then 1st draft, then final copy); more specific about final copy (what format); maybe more info or class on citations from new book on references
- more emphasis on method; less emphasis on stats
- no comments
- critique problem statements in class rather than small groups
- spend more time on statistical analysis on computers exploring packages or get statistician to speak
- drop sampling and computer modules
- more time devoted to writing and reviewing 1st three chapters
- focus on how to write 1st three chapters
- give extra assignments on nights other than major assignment due dates - excellent course and instructor
- larger classroom
- focus more on first three chapters; spent too much time on stats

Summer 1997

- I would liked to have had a little more time to develop my dissertation
- great class
- eliminate presentations and library tour for those who have had it before; I felt I could have used this time more effectively toward research
- update syllabus
- more on actual statistic computations
- don't schedule through session I, II, and III
- more time in library during a class period, so that if you have any questions on research or related matters your instructor is present (2nd week of class)
- less statistics

APPENDIX I

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 08-14-97 **IRB#:** AG-98-004

Proposal Title: EVALUATION OF A RESEARCH DESIGN COURSE AT OKLAHOMA STATE UNIVERSITY BY STUDENTS RECEIVING TRADITIONAL CLASSROOM INSTRUCTION, ELECTRONIC DISTANCE EDUCATION INSTRUCTION, AND CONDENSED CLASSROOM INSTRUCTION

Principal Investigator(s): James P. Key, Laura Ann Griffeth

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: _____ Date: August 14, 1997
Chair of Institutional Review Board
cc: Laura Ann Griffeth

VITA

Laura Ann Griffeth

Candidate for the Degree of

Doctor of Philosophy

Thesis: A COMPARISON OF DELIVERY SYSTEMS FOR A RESEARCH DESIGN COURSE

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Athens, Georgia, September 25, 1969, the daughter of James C. and Dr. Jo N. Griffeth

Education: Graduated from Turner County High School, Ashburn, Georgia, in May, 1987; received Bachelor of Science degree in Animal Science from Mississippi State University in 1991; received Master of Science degree in Nutrition/Animal Science from Texas A&M University in 1993; completed requirement for the Doctor of Philosophy degree at Oklahoma State University in December, 1997

Professional Experience: Graduate Teaching and Research Assistant, Department of Animal Science, Texas A&M University, 1991 - 1993; Proposal Service Analyst, CIC Agency, Inc., 1993 - 1995; Graduate Teaching Assistant, Department of Agricultural Education, Communications, and 4-H Youth Development, Oklahoma State University, 1995 - 1997