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ABSTRACT

This study compares the learning styles of community college students who have enrolled in an online course via the Internet with the learning styles of comparable community college students who are taking the same course on-campus in the community college setting. The students taking the online course were off-campus students. A sample consisting of 1,642 students who were enrolled in an online course or a traditional course that was also offered through the Internet at the community college during the spring 2001 semester was used for the study. There were 587 online students, of whom 340 completed the study, for a return rate of 57.9%, and 1,302 traditional students, with a return rate of 100%. Fourteen course titles with 22 different course numbers were included in the study, as well as 28 section numbers. The majority of online students were aged 26 or older, while the majority of the traditional students were under the age of 26. Findings from the study also indicate that 85% of the online students were white, versus 76% of traditional students. Family incomes were also higher for online students. The study concludes that the majority of online students have a visual learning style preference. Knowledge of learning styles may help target students who are at risk of dropping online courses. Survey instrument, permission letters, statistical frequency data tables, and crosstabulations of study findings are appended. (Contains 125 references.) (NB)

LOYOLA UNIVERSITY CHICAGO

ONLINE VERSUS TRADITIONALLY-DELIVERED INSTRUCTION: A DESCRIPTIVE STUDY OF LEARNER CHARACTERISTICS IN A COMMUNITY COLLEGE SETTING

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL OF EDUCATION

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF EDUCATION

DEPARTMENT OF CURRICULUM, INSTRUCTION,

AND EDUCATIONAL PSYCHOLOGY

BY

ALANA M. HALSNE

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CHICAGO, ILLINOIS

MAY 2002

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ONLINE VERSUS TRADITIONALLY-DELIVERED INSTRUCTION: A DESCRIPTIVE STUDY IN LEARNER CHARACTERISTICS IN A COMMUNITY COLLEGE SETTING

This study compared the learning styles of community college students enrolled in an online course (via the Internet) and community college students taking the same course on-campus. All students were in enrolled in a community college in a Chicago suburb. The research questions concerned differences in: (1) learning styles, (2) demographic characteristics, (3) employment and occupational status, (4) educational characteristics, and (5) time spent on class work.

The results indicated that the typical online learner was primarily a visual learner, while the typical traditional learner was primarily an auditory or kinesthetic learner. The typical online learner was female, 26 to 55 years old, married, and had children living at home. The typical traditional learner was male, less than 25 years old, had never been married, and had no children living at home. The online learner was primarily White/Caucasian, and had a family income over $60,000. The traditional learner was also primarily White/Caucasian but was more likely than the typical online learner to be of Spanish/Hispanic origin and more likely to have a lower family income. The typical online learner was in the employment sector as a full-time worker, and predominant

occupational status was professional, educator, or "other." The typical traditional learner had a part-time status in the workforce, and was employed as a student, service worker, or sales representative. The typical online learner was a part-time student and had taken some college courses and beyond. The typical traditional learner was a full-time student and had at least graduated from high school. The online learners spent one hour more per week, on the average, on class work than did the traditional learners.

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CHAPTER I

INTRODUCTION

This chapter provides an overview of the dissertation. The chapter begins with the background of the problem, followed by the purpose and significance of the study. Then, an overview of the methodology is presented, followed by the limitations of the study and definition of terms. The chapter concludes with the organization of the remainder of the dissertation.

Background of the Problem

Currently, there is a trend in American higher education toward the use of various educational technologies. The advances of technology use in education challenge the notion that education needs to takes place in a classroom (Toffler, 1980). One force driving these educational technologies is the demand for a well-educated and skilled workforce. Another force is older, more mature students. Akker and Plomp (1992) and Gray, Vernez, and Rolph (1996) have found that the make-up of the student population has changed dramatically since the 1980s. Today's college students are older, more diverse, and display varying degrees of academic readiness. Many are well above traditional college age and, due to various commitments, cannot relinquish their current jobs for the sake of education. Further, people who are disadvantaged due to geographic remoteness or restricted by their work schedule are able to take advantage of distance

learning methods. Overall, distance learning provides learners a more flexible way to further their education.

As such, distance learning, with its attendant technology, is the fastest growing educational modality (Bell, 1991; Hayes, 1995; Martin & Samels, 1995). Distance learning has the potential to affect colleges and universities, businesses and industries, and our personal lives. An obvious impact is the growing number of individuals seeking advanced education and training as a result of the availability of such learning programs. In response to the demand for distance learning, governments and the private sector are trying to develop new ways to provide education that are accessible to the whole population. Gordon (1995) recommends that more research in distance education be conducted, using other learning style instruments that identify the learning style preference of off-campus learners.

Purpose of the Study

The purpose of this study is to compare the learning styles of community college students who have enrolled in an online course (via the Internet) with the learning styles of comparable community college students who are taking same course on-campus in the community college setting. The students taking the online course are off-campus students.

Significance of the Study

According to UCEA (2000), the number of adults enrolled in distance education/learning is increasing. However, much of the research on learning styles has not involved adults, despite the usefulness of learning styles diagnosis for higher

education (Price, 1983). Coggins (1988) deplores the lack of learning style-related research that focuses on those adults who are pursuing their education outside the classroom.

The results of this study should have benefits for faculty and administrators, as well as students. Both of these groups will gain information regarding the learning preferences of adult students. Knowledge of students' learning styles may allow faculty to present information in a way that will accommodate those various learning styles, enable administrators to design and implement better programs, and help students to better understand their learning styles and needs.

Methodology

This study was designed to identify and compare the demographic characteristics (age, gender, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income), employment and occupational status, educational characteristics (student classification, student status, highest level of education completed, and college major), course enrolled in, section number of course, average time spent on class work per week, and learning styles of students who enrolled in an online course or traditional on-campus course.

Limitations of the Study

The limitations of this study may be characterized as follows. First, the data collected from the surveys are self-reported measures and, as such, are subject to reporting bias. Second, due to online students having to visit a web site on their own to take the survey, the return rate could be low. Current research in survey design illustrates

that survey return rates are commonly low (Dillman, 2000). Third, the study was limited to only one community college, so the results are limited to the students at this institution.

Definition of Terms

Distance education/distance learning is the delivery of real time, live instruction, from one distant site to another, or to multiple sites, using audio and/or video technologies which also allow the teachers and students to interact with each other from different sites. Teaching and learning in distance learning involves physical separation of teacher and learner (Moore & Thompson, 1997). Such learning also can involve instruction in which the teacher and learner communicate through regular mail or e-mail, fax, telephone, and other technologies. Instruction is usually designed for distribution to learners over wide geographical areas.

Distance education students are students who are taking courses without having to be physically present on-campus.

Electronic mail (e-mail) is text messages transmitted across networks and usually accessible only by the addressee.

Internet™ is a system of networks, sharing the same underlying network address space as well as the same domain name space, and interconnected into a network of information. It is largely a government-funded collection of networks that connect government, university, and commercial agencies.

Learning styles are the combined characteristics of a student's cognitive, affective, and physiological factors that serve as indicators of how the student perceives, interacts with, and responds to the learning environment (Keefe, 1979).

Local area networks (LANs) are the linkage of computers and/or peripherals (e.g., printers) confined to a limited area that may consist of a room, building, or campus that allows users to communicate and share information.

Online courses are courses that students take off campus and do the class work at their own pace and send their work via electronic mail to the instructor.

Online students are students who are not physically on the campus to attend courses and instead receive instruction though the Internet via electronic mail.

Wide area network (WAN) are data communications linkages designed to connect computers over distances greater than the distance transmitted by local area networks (e.g., building to building, city to city, across the country, or internationally), that allows users to communicate and share information.

World Wide Web (WWW) is a system that allows access to information sites all over the world using a standard, common interface called hypertext to organize and search information. It simplifies the process of finding a site, connecting, locating the appropriate documents, and downloading the information through the use of a browser (e.g., America Online (AOL), CompuServe, Internet Explorer, Netscape).

Organization of the Remainder of the Study

The study is divided into five chapters. This chapter provided an introduction to the study, including the background of the study, purpose of the study, significance of the study, overview of the methodology, limitations, and definition of terms.

Chapter II provides a review of literature. The review includes characteristics of distance education, conditions and rationale for distance education, and evaluation of

distance learning, background. It includes the definition of learning styles, learning style categories, learning styles and distance learning, and learning style inventories. A history of community colleges, community colleges today, and community college demographics are included in the review of literature. Chapter III includes the methodology of the research, including the purpose, population and sample, instrumentation, data collection procedures, measurement of variables, and plans for analyzing data.

Chapter IV presents the results of the data analysis. Finally, Chapter V provides a discussion of findings and their implications, a conclusion, and recommendations for further study.

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to present the research and literature related to distance education, learning styles, and community colleges. Distance education is defined and its salient characteristics are discussed. This is followed by a discussion of theories and research on learning styles. The final section, community colleges, contains a history of the community college system up to the present, the role of community colleges, and the demographics of the students.

Distance Education

This section contains information on the characteristics of distance education, conditions for distance learning, the rationale for implementing distance education, distance education policy, evaluation of distance learning, characteristics and attitudes of distance learners, a profile of distance learners, examples of distance education programs, and gaps in the research on distance education.

Characteristics of Distance Education

Distance education is the registration and inquiry with an educational institution that provides lesson materials organized into a consecutive and analytical order for study by students on their own. When each lesson is finished, the student provides by facsimile, mail, or computer the assigned work for revising, grading, commentary, and subject

matter direction by qualified teachers. Corrected assignments are returned to the student, an exchange that provides a personalized student-teacher connection (Moore & Kearsley, 1996).

Initially instituted as a "substitute" type of education, instruction by distance education has advanced into a "preferred alternative" for millions of people who seek education and training. Distance education programs are being offered today by colleges and universities, major corporations, large corporations and small businesses, educational agencies, government agencies, branches of the armed services, trade associations, religious institutions, service industries, political entities, private entrepreneurs, and charitable, nonprofit organizations (Distance Education and Training Council, 1998).

Conventional theorists have tended to state that a student either attends a class in person or studies at a distance. Yet, in fact, half of the members of a class may be at a distance location, or a resident student's courses may be completed partly on, and partly off campus. Electronic programs that permit distance learning can enrich the educational possibilities of learners both at a distance and on-campus (Rossman, 1993).

Faibisoff and Willis (1987) outlined the common characteristics of distance education. Distance education: "(1) provides occasional interaction with faculty, (2) provides student independence and individualized study, (3) is delivered through courses both on and off-campus, and (4) is based on the student's needs" (p. 225).

Web technology also enriches the distance learning experience. This technology provides content and interactive features that other distance learning methods lack, including: (1) expanded interaction with faculty through e-mail, bulletin boards, and

multimedia lectures; (2) student-to-student interaction through e-mail, bulletin boards, and chat room discussions; (3) superior presentation through graphics, audio, and video; (4) immediate access to course-related content including lecture notes, reading, and links to relevant external sites; and (5) interactive learning and assessment tools (O'Leary, 2000).

Conditions for Distance Learning

The ideal conditions for distance learning occur when students at any one site are not only granted direct interactions with their instructor, but are also able to communicate directly with students at other distant sites during the instructional process. Observers agree that real-time transmissions are more effective than time-delayed transmissions because they better simulate regular classroom teaching and learning. Research also shows that better education results when teachers and students have instantaneous contact. Such contact allows them to discuss issues, raise questions, clarify points, and review lessons together (Black 1998).

An asynchronous system is satisfactory for a course such as creative writing in which teachers and students can exchange essays and poetry with fax machines, with e-mail messages, and by downloading files. In contrast, a synchronous system is better for an instructor of a course such as conversational Japanese, in which students need to perfect their pronunciation and practice speaking.

Rationale for Implementing Distance Education

The traditional face-to-face classroom has some inherent limitations due to its physical layout, the number of teachers and learners who can participate, flexibility in time and delivery of courses, and the geographical distribution of participants (Heckman & Owens, 1996). The current model of the classroom as an instructional delivery system will need to change and include distance learning components to meet the needs of people in the future. Nearly 20 years ago, prominent adult learning expert, Malcolm Knowles (1983), predicted that by the end of the 20th century, the majority of educational resources and programs would be delivered electronically.

Additionally, governments are being challenged by an increasing need to make college and university programs more accessible to nontraditional students, who tend to be mature, employed, and have family duties. Since 1990, the Annenberg Foundation, in accordance with the Corporation for Public Broadcasting, has financed the New Pathways to a Degree Initiative to provide financial aid to colleges and universities using telecommunications to deliver associate, bachelor's, and master's degree programs (Ludlow & Duff, 1998).

The changing demographics in the United States has contributed to an increasing need for adult teaching simply because of the aging demographics within the U.S. population (Merriam & Caffarella, 1991). Further, the growing demand for adult education will continue in the future. In 1994, 40% of the 15 million students enrolled in college courses were 25 years and older, and the age group over 40 years of age has tripled during the same time period (Brand, 1995; Verville, 1995). This growing number

of older students is forcing the professorate to consider alternate teaching styles (Johnson, 1985). Distance learning programs provide a way of delivering of quality instruction in a flexible format. Kirby and Driscoll (1997) state that distance learning does constitute a distinct educational process if structured appropriately. The growth of the Internet and the steady increase in personal computer use in the general public also has been a force driving distance education. The online course format allows for greater communication and discussion between lecturers and students than does a traditional lecture format.

Distance education's accessibility is based on its convenience and appropriateness for working people who wish to expand their knowledge and skills sets without giving up their jobs, leaving home, or reducing their income. All of the related research published since 1920 has indicated that correspondence/distance study students perform just as well as, and in most cases better than, their classroom counterparts (Distance Education and Training Council, 1993).

According to the University Continuing Education Association (UCEA) (2000), great numbers of women prefer to study for college degree programs on a part-time basis. Distance education is not only an attractive option for women, it is also appealing to the general population, many of whom face barriers to participation in adult learning, such as traveling for work and family obligations. Since distance education serves those students who cannot commit to a full-time program (Mood, 1985), it is expected that such potential learners will find distance learning attractive. The technology of distance education makes it possible to unite the learner with the institution (Mood, 1995; Moore & Kearsley, 1996), and it enables the committed adult learner to participate in learning

almost anywhere (Mood, 1995).

Total distance learning market revenue is projected to reach approximately $3 billion by 2005, maintaining a 21% growth rate through the 1995-2005 forecast period (Kollie, 2000). The U.S. Department of Education reports that 1,680 academic institutions offered an estimated 5,400 online courses in 1998, for which more than 1.6 million students were enrolled, a 70% increase over 1995. The Department further states that the trend continued at a rapid pace during the year 2000 (Boehle, Dobbs, & Stamps, 2000).

Currently, many higher education institutions, from community colleges to universities, offer distance learning opportunities. In 1998, approximately 5% of college and university students took distance learning courses; by 2002, this share is expected to be 15% (O'Leary, 2000).

Distance Education Policy

On March 21, 2000, the National Education Association (NEA) and Blackboard, Inc. published a study that provided a significant, research-driven list of benchmarks for distance learning in higher education. The list of 24 quality measures is the main focus of "Quality on the Line," an Institute for Higher Education Policy study commissioned by NEA and Blackboard Inc. (Merisotis, 2000). The benchmark categories include institutional support, course development, teaching/learning, course structure, student support, faculty support, and evaluation and assessment (Merisotis, 2000).

On April 6, 2000, the Senate of San Diego State University (SDSU) released an "Academic Policy and Planning Committee on Distance Education Policy." The purpose

of this policy was to apply guidelines to new distance education courses and programs, as well as existing courses and programs in which the method of delivery has changed. Any department or faculty group offering a distance education program (those in which more than half of the courses are offered through distance education) is expected to meet the Western Association of Schools and Colleges (WASC) requirements and be guided by policy established by the University. Eleven principles were articulated and implemented in the areas of curriculum and instruction, evaluation and assessment, library and learning resources, student services and admissions, and facilities and finances (San Diego State University Senate, 2000).

Evaluation of Distance Learning

Between September 1998 and April 1999, a group of 16 tenured professors in various disciplines at the University of Illinois participated in a study in which they immersed themselves in online-teaching literature and listened to presentations from various experts. The results of the study focused on the benefits and pitfalls for students when classes are conducted online. Specifically, the results indicated that online education requires a significantly increased effort from instructors who must communicate at length, in writing, with individual students in order to match the feedback pupils would otherwise receive in a classroom. This factor increases the cost of online courses, at least in terms of instructors' time.

More important, such programs can never replace the personal touch that comes through face-to-face interaction. The report cautions against offering undergraduate degrees entirely online and suggests, instead, that students take only a few classes on the

Internet. It also recommends that online class size not exceed 20. Critics of the University of Illinois report argue that even if online education is more expensive now, future developments in technology are bound to reduce costs. Further, the goal of distance learning programs at universities is broadening access to higher education, not bolstering profits (Boehle, Dobbs, & Stamps, 2000).

Characteristics and Attitudes of Distance Learners

Moore and Thompson (1997) reviewed the literature on learner characteristics as relevant to distance learning. They report that research has found that demographic and psychosocial characteristics interact with course or program features to influence distance education students' perceptions of learning experiences. They also note that researchers have studied factors such as learners' need for control, instructional behaviors, and availability of student support to better understand the mechanisms of learner satisfaction and levels of interaction with the instructor.

Other research shows that, while most learners state a clear preference for face-to-face instruction and interpersonal contacts, they generally express satisfaction with distance education because of its greater accessibility (McNabb, 1994; Wagner, 1993). Phipps and Merisotis (1999) reviewed research on the effectiveness of distance education in higher education. They found that distance learning students have similar grades and test scores, as well as similar attitudes toward the course as their counterparts in a traditional classroom setting.

Biner, Bink, Huffman, and Dean (1995) developed a large-scale field-study examining: (1) differences in personality between students in televised college courses

and those in traditional courses and (2) specific personality traits that might be predictive of success in telecourses. One key finding of this study was that personality traits that are more likely to describe telecourse students than the general college population include intelligent, emotionally stable, and trusting.

Eyadat (1998) studied the relationship between methods of instruction (conventional instruction versus television instruction), achievement, interaction between students and their instructor, use of e-mail, and students' attitudes towards distance learning. Significant differences were found between the two methods of instruction on key dependent variables. Specifically, television-taught students had a significantly greater positive attitude toward media than did conventionally taught students. However, these two groups were not significantly different from each other in terms of achievement or attitudes toward distance learning.

Yaverbaum and Ocker (1998) examined the perceptions of students relative to experiences within two types of problem solving teams; one with a technology-supported collaborative environment and the other without such support. The results showed that distance and asynchronous opportunities, associated with computer conferencing, improve the perceived quality of the problem solving process and satisfaction with that process. Overall, the researchers agreed that distance education provides an unaffected forum for learner-centered principles, and results will weigh firmly upon the techniques that support it. This assumes that all these relevant factors can be made identical to those of a traditional classroom and that it is actually feasible to do so.

Profile of Distance Learning Students

Hyatt (1992), based on a report from Chattanooga State Technical Community College (CSTCC), reports that the majority of its distance learners are working adults seeking specialized training or degrees, students planning to transfer to four-year institutions, or homebound students. The author further reports that CSTCC students who took distance courses instead of traditional courses did so due to time constraints, inconveniences which prohibited traditional classroom attendance, distance from campus, associated cost-savings, and flexibility of instruction. Annenberg/CPB (1998) found typical distance learning students to be over 26 years of age, goal oriented, highly motivated, and unable to attend the traditional classroom setting. Other studies have found that the majority of distance learners were at least 24 years old and employed (Burton, 1999; Mngomezlu, 1999; Sheets, 1992).

The Distance Education and Training Council (DETC) (1998) surveyed its 61 accredited members to determine the profile of a typical student who enrolls with a DETC-accredited institution. Within this profile, the median age is approximately 31 years old, 48% percent are male, 90% are employed at the time of enrollment, and 31% have their tuition paid by their employer.

A report of the American Association of University Women Educational Foundation (2001) confirmed recent research that found that the average online student is a woman, 34 years old, employed part-time, and has previous college credits. Their report also found that many of these women have children and take their online courses late at night, after their children are in bed, or early in the morning before work.

Examples of Distance Education Programs

The University of Phoenix online "campus" was developed exclusively to disseminate quality education to working adults, regardless of where they resided or what time of day they were able to take classes. The nation's largest private accredited university with over 100 campuses nationwide offering bachelor's and master's degree programs was designed specifically to accommodate working adults (University of Phoenix, 1995).

The Teletechnet Network in Virginia offers more than 80 upper-division undergraduate courses to students. Students communicate with faculty during class sessions through interactive audio and outside of class through e-mail and voice mail. A worthy by-product of this system has been the heightened communication between the community college system and the university (Old Dominion) sponsoring the upper-level courses. In 1995, there were 500 users in the program (Teletechnet, 1995).

Maricopa Community College System in Arizona is the second largest college system in the nation, with year-round enrollments of approximately 160,000. This college system has developed an "internal" model of distance learning by wiring all ten of their campuses so that any course may be taken at any campus. The course is conducted "live" at one campus and electronically at the other nine. The plan for this electronic course availability was put into place in 1996 (Shoemaker, 1998).

Gaps in the Research on Distance Education

Merisotis and Phipps (1999), who conducted a review of the literature, found that in 40 original studies, there is no significant difference in student performance between distance learning and traditional classroom learning. Further, the existing research does not take into account differences among distance and traditional learners in achievement levels or how different learning styles of students relate to the use of particular technologies. Specifically, Merisotis and Phipps discussed four shortcomings of the existing research. First, much of the research does not control for extraneous variables and, therefore, cannot show cause and effect. Second, most of the studies did not use randomly selected subjects. Third, the validity and reliability of the instruments used to measure student outcomes and attitudes were questionable. Finally, many studies did not sufficiently control for the feelings and attitudes of students and faculty.

Summary

In a very brief time, distance education has become a recognized means of teaching and learning in American schools. An increasing number of schools are implementing distance education and many other schools are starting to use related concepts. Both synchronous and asynchronous transmissions of instruction currently connect teachers and students to a broad expanse of knowledge outside the confines of the traditional classroom. Although it has enjoyed some early success, if distance education is to be successful in the long run, "its appropriate application should be based on the belief that the more similar the learning experience of the distant student is that of the local student, the more similar will be the desired outcomes of the learning

experience" (Simonson & Schlosser, 1995).

Learning Styles

This section presents the background and definition of learning styles, followed by learning style categories, understanding student learning styles, learning styles and distance education, and learning style inventories.

Background and Definition of Learning Styles

Learning style theory started with Carl Jung (1927), who distinguished major differences in the way people perceived (sensation versus intuition), the way they made decisions (logical thinking versus imaginative feelings), and how active or reflective they were while interacting (extroversion versus introversion). Myers and Briggs (1977) applied Jung's theories to produce the Myers-Briggs Type Indicator. The Myers-Briggs Type Indicator (MBTI) is a self-report personality inventory designed to provide people information about their Jungian psychological type preferences. Myers and Briggs began developing the MBTI in the early 1940s to make Jung's theory of human personality understandable and useful in everyday life. Although learning style theorists explain personality types in various ways, nearly all models have two things in common. The first is a focus on how individuals absorb knowledge, think about information, and evaluate the results. The second is the belief that learning is the result of a personal individualized act of thought and feeling (Silver, Strong, & Perini, 1997).

Early models of learning, developed by Bloom (1956) and Knowles (1984), can be thought of as efforts that attempted to define learning styles or approaches. Bloom headed a group of educational psychologists who proposed a classification of levels of

intellectual behavior important in learning. Bloom's taxonomy created an order of complexity in learning, with memorization of knowledge being the lowest level and evaluation being the highest. Bloom presented six levels of cognitive development. Level 1 is memorize and recall knowledge such as to arrange or list items. Level 2 is comprehension of knowledge such as classification or description. Level 3 is application of knowledge to solve defined problems. Level 4 is analysis of situations using the knowledge. Level 5 is synthesis of that knowledge with others to create something new. Level 6 is evaluation, such as appraising, comparing, or predicting

Knowles (1984) developed a model that differentiates the learning styles of children and adults (Elias & Merriam, 1980). Knowles (1984), defined "pedagogy" as the art and science of teaching children and, in contrast, "andragogy" as the art and science of teaching adults. Knowles suggested that pedagogy focuses on the role of the teacher who transmits knowledge to learners, whereas andragogy is based on four basic assumptions about the characteristics of adult learners. Knowles' (1984) four basic assumptions were: (1) adult learners may differ with respect to self-concepts; (2) adult learners define themselves with respect to their own unique experiences; (3) adult learners' readiness to learn is linked to distinct developmental tasks unique to a state in life; and (4) adult learners desire immediate applications of the knowledge, as compared to children who are more willing to postpone application of a concept or idea (Elias & Merriam, 1980; Knowles, 1984).

A person's learning style is the way that he or she concentrates on, processes, internalizes, and remembers new and difficult academic information or skills. Styles often

vary with age, achievement level, culture, global versus analytic processing preference, and gender (Shaughnessy, 1998). Learning styles develop over time, can change slowly, and may reflect other characteristics of a person (Conti & Welborn, 1986). Grasha (1996) has defined learning styles as "personal qualities that influence a student's ability to acquire information, to interact with peers and the teacher, and otherwise to participate in learning experience" (p. 41).

A learning style also may be understood as a distinct and customary manner of obtaining knowledge, skills, or attitudes through study or experience (Riding, 1993). This may be contrasted with a learning strategy, which may be defined as an action plan adopted in the attainment of knowledge, skills, or attitudes through schooling or experience (Riding, 1993). As such, style is a habitual manner (i.e., a built-in and automatic way of learning), whereas strategy is a conscious attempt to deal with a particular situation and may be derived in part from the drawbacks of the style (Riding, 1993).

Learning style models tend to have certain strengths and limitations. The strengths include: (1) a tendency to focus on how distinct individuals process knowledge across numerous content domains; (2) identification of the role of cognitive and affective processes in learning, which can provide insight into issues connected to motivation; and (3) a tendency to accentuate thought as a essential element of learning, therefore avoiding reliance on basic and lower-level learning activities.

Learning style models also have limitations, which include: (1) a failure to identify how styles vary in different content domains and disciplines; and (2) a lack of

sensitivity, at times, to the effects of context on learning (Silver, Strong, & Perini, 1997).

According to Kolb (as cited in Matthews & Hamby, 1995), learning style is characterized by the degree to which the learner emphasizes abstractness over concreteness and action over reflection in the learning situation. Research on learning and information processing suggest that individuals perceive and process information differently (Claxton & Murrel, 1987; Dunn, Dunn, & Price, 1985; Riding & Sadler-Smith, 1992). The recognition that individuals have preferred learning styles is becoming an increasingly important consideration for designing and delivering instruction. Claxton and Murrel (1987) consider learning style information an important tool for improving curricula and teaching in higher education. Souder (1993) recommends that future studies should focus on learning style factors that are required for a successful distance learning experience.

Research that investigates student learning styles is important because students learn best when they are taught through their own style of learning (Gordon, 1995). When the curriculum is integrated around a theme with proper attention given to brain compatibility, teaching strategies, and curriculum development, learning is enhanced (Kovalik, 1993). Although students do learn when instruction is provided through strategies that do not complement their learning styles, significantly higher test scores result when students are taught with strategies that complement their learning style preferences (Brudnell & Carpenter, 1990). Ideally, lessons should be structured so that all learning styles are addressed, enabling every student to become actively engaged in the lessons.

Griggs (1985) found significant improvement in academic achievement when student learning style preference is accommodated in the instructional process. Information needs to be presented in ways that accommodate learners with various learning styles (Kyllonen & Shute, 1989). Research has shown that matching teaching with learning styles results in significant improvement in academic performance (Griggs, 1985). Matching the teaching style with the learning style not only contributes to the achievement of higher grades, but also results in students giving their instructors higher ratings on teacher effectiveness (Campbell, 1991). Claxton and Murrel (1987) recommend matching learning styles for all college students. However, some mismatching may also help students develop ways of thinking that were not previously developed (Claxton & Murrel, 1987).

Reiff (1992) argues that a short period of misunderstanding can result in new experiences and appreciation for another style, but warns that extreme misunderstanding can lead to frustration and anger. In fact, long-term misunderstanding could result in major mental, emotional, and physical problems if the mismatch is not recognized and handled accordingly. The appropriateness of matching, and even mismatching, can be identified only when learning styles are recognized. Educators need to have more knowledge and understanding of how individuals learn in order to design and implement teaching that will enhance overall learning (Campbell, 1991; Sims & Sims, 1995).

Reiff (1992) argues that "understanding theories of style can help teachers become better planners to meet the learning needs of their students" (p. 6). According to Claxton and Murrel (1987), administrators have successfully used learning style information to

change teaching strategies of faculty in various departments. Further, Griggs (1985) states that academic achievement improves significantly when individual learning style preferences are matched with complementary teaching styles, instructional approaches, and other resources. The learning style concept not only informs faculty about their teaching practices, but it also identifies surface issues that help both faculty and administrators seriously consider their roles and the organizational culture in which they carry out their responsibilities (Claxton & Murrel, 1987).

Researchers have reported statistically higher test scores and/or grade point averages for students whose teachers changed from traditional teaching to learning-style teaching at all levels-elementary, secondary, and college. Improved achievement was often apparent after only six weeks of learning-style instruction. After one year, teachers reported significantly higher standardized achievement and aptitude test scores for students who had not scored well previously (Bruner & Majewski, 1990).

Blackmore (1996) suggested that one of the first things teachers can do to aid the learning process is simply to be aware that there are diverse learning styles within the student population. Many teachers think the same teaching methods that work in their traditional classes will also work for distance learning. Their underlying assumption is that students who enroll in distance education classes will have the same learning preferences as those in traditional classes. Faculty often assume that teaching styles, and accompanying classroom processes, are like a "master key" and thus appropriate for any setting (Diaz & Cartnal, 1999).

Learning styles have received much attention in recent years, and rightly so

considering their influence on students' performance in the university (Ross, Drysdale, & Schulz, 1999). According to Farrington (1999), professors across the country are beginning to realize that, indeed, "one size does not fit all" when it comes to teaching today's students. Farrington believes that it is "intuitively illogical" for educators to think that the lecture-recitation is best for all subjects and all students.

Despite the fact that research has shown that individual differences in the classroom affect learning, there is limited research on learning styles and distance education. Most of the existing research focuses on the relationships between learning styles and specific student achievement outcomes such as drop rate, completion rate, attitudes about learning, and predicators of high risk (Diaz & Cartnal, 1999).

Learning Style Categories

There are four general strategies used (or preferred) by adults for acquiring new information. The four preferences are listening (listening through lectures and tapes), reading (reading or examining the written words in books and pamphlets), iconic methods (viewing illustrations, slides, movies, and videocassettes), and direct experience (handling things, performing activities, and taking field trips) (Verduin & Clark, 1991).

A "sensory web" can be used to accommodate students with diverse preferences for processing sensory (visual, auditory, and kinesthetic) information. For example, a visual web learner is someone who prefers processing information primarily through sight, and such a learner can become frustrated easily with a professor who mainly uses the auditory, lecture approach to teach course content (Sarasin, 1998). Learners who have difficulty processing auditory information in a lecture could benefit greatly by having the

professor's written lecture notes online (Ross & Schultz, 1999).

Auditory web learners prefer listening to course material as a way to internalize content. Students who learn best in this way will often refrain from taking notes during lectures, choosing instead to devote their full attention to the lecturer (Sarasin, 1998). Some professors, rather than recording their entire lectures, may chose to tape 15-to-20-minute class summaries for posting on their web site.

A kinesthetic web learner prefers actively "doing something" in order to learn the material (Sarasin, 1998). Professors who do not allow for an opportunity to "put theory into practice" can frustrate these learners. Practicing problems, doing lab experiments, creating solutions, and brainstorming ideas are all ways to involve this learner in the classroom.

Social web learners are social learners who prefer learning by interacting with their peers. (Grasha & Riechmann, 1975). Grasha and Riechmann contend that collaborative learners seek out peer interaction as an important part of the learning process. A way to involve collaborative learners is to create a course-relevant listserv. The listserv is a forum that uses e-mail as the communication medium (Ross & Schultz, 1999).

Research by Willett and Adams (1985) focused on male adult learners who were enrolled in an external undergraduate program. The authors identified the learning styles of these students using the self-administered Canfield Learning Style Instrument.

Griggs and Dunn's (1995) analyses of the learning styles of underachieving students from different cultures reveal that these students' learning styles differ

significantly from the learning styles of high achievers. Moreover, their research affirms that teaching and counseling these students congruently with their learning style preference results in increased test scores and positive outlooks on learning. Griggs and Dunn conclude that there is great diversity within ethnic groups and recommend that teachers should concentrate not on cultural group characteristics but on the learning style strengths of each individual student. Similarly, Guild (1994) maintains that, although cultures have distinctive learning style patterns, the great variation among individuals within a group means that teachers should use diverse teaching strategies with all students.

Other research has examined the different learning style preferences of males and females, the differences across grades, and the various learning preferences of ethnic minorities. Hickson and Baltimore (1996) found that females have more of a preference for visual learning tasks than do males. Research assessing the learning styles of ethnic minorities has revealed 12 variables that discriminate the learning styles of four ethnic groups (Hickson, Land, & Aikman, 1994), suggesting learning may be influenced by cultural differences. Therefore, an awareness of learning style differences of ethnic populations and accommodating these differences in the classroom may result in better academic achievement for these youth.

According to Dunn (1995), 55% of adults are global learners, while 28% are analytic learners. In this approach, students are classified as either global or analytic learners and matched to either a global or an analytic method of teaching. The global learners and methods of today are noticeably similar to the visual learners and methods of

long ago, and the analytic learners and methods of today are markedly similar to the auditory learners and methods of the past methods. Furthermore, reviews of empirical studies of the new learning styles approach, have revealed a dearth of evidence to support the approach (Snider, 1992; Stahl & Kuhn, 1995).

The remaining 17% can process information easily either way and adapt according to circumstances. The traditional education system is aimed at analytic learners. When asked to identify the ideal method for teaching challenging material, Dunn recommends giving learners information in their primary perceptive style-visual, auditory, kinesthetic or tactual-and then strengthening the information with a second preference. If, for example, an individual has a visual preference, Dunn would advise showing him or her a flip chart of the information and reinforcing it with something kinesthetic such as a role-play. The last component for making teaching as effective as possible is to have learners do something creative with the material. Dunn claims exceptional results with learners writing poems or songs about the information they have studied.

Understanding Student Learning Styles

Teachers need to determine students' learning styles. Teachers can accomplish this either by giving students a self-scoring test or by using norms to calculate the blend in the audience. According to Dunn (as cited in Filipczak, 1995), the learning-style distribution in an "average" group is 30-40% visual, 20-30% auditory, and 30-50% kinesthetic/tactual. Barbe and Milone (1981) conducted a study of 1,000 students to determine modality preference of students and found similar results. They concluded that

30% of the students were visual learners, 25% auditory, 15% kinesthetic, and 30% were mixed modalities.

Knowing the learning style of one's students can be beneficial in several ways. Teachers can orient their lectures toward those students with the modal learning style, keeping in mind that some students may be at a disadvantage. By varying the explanations, the instructor can reach a larger proportion of the students. Knowing the learning style of each student can also be helpful when working individually with a student. Similarly, students should know their own learning styles in order to make better use of their study time (Bell, 1998).

Bell (1998) administered the Learning Style Inventory to 40 students in a Business Statistics course. The Learning Style Inventory classifies the subject as a visual, auditory, or tactile learner (Learning Style Inventory, 1996). The final grades for the course were significantly higher for the visual learners, when compared to tactile and auditory learners. As a result of this study, the Leaning Style Inventory is administered and scored on the first day of class by the instructor. Some study strategies for the various learning styles are included with the scoring sheet. This can help the students budget their study time more wisely. By administering the instrument the first class day, the instructor can determine the distribution of visual, auditory, and tactile learners (Bell, 1998).

Gee (1990) studied nine female graduate education students who attended on-campus classes and 17 female graduate education students at a remote site who received instruction through a two-way television system. She used the Canfield Learning Style Inventory to determine if students' preferred learning styles affected academic

achievement, attitude toward the learning environment, and course completion in distance education. These groups were taught simultaneously, and both had two-way audio and visual interaction through the use of a two-way television system. These studies excluded the comparison with students taking the same courses on-line (through the Internet) to the same students taking the course on-campus (traditional method of instruction). Students in the distance learning class who possessed a more independent and conceptual learning style had the highest average scores in all of the student achievement areas. Students with the lowest achievement in the distance learning course had a more social and conceptual learning style. Students with both a social and applied learning style performed much better in the on-campus class. The outcomes of the Gee study suggested that successful distance education students favored an independent learning environment while successful on-campus students demonstrated a preference for working with others. The relatively small sample of 26 students suggested that additional work is needed to further explore this relationship.

Using students who had taken courses via cable television at North Carolina State University, Mngomezulu (1999) investigated the learning styles of these students controlling for demographic characteristics, employment and occupational status, educational characteristics, and enrollment activities. The results indicated that a mixed style tended to be their predominant style of learning.

Learning Styles and Distance Learning

In distance as well as traditional education, instruction should take into account various learning styles. The fact that distance learning involves the separation of the learner from the instructor and from other learners has led researchers to conclude that distance education learners in general have a different style of learning. Researchers suggest that distance learners generally have a field-independent cognitive style of learning, which makes them suitable for distance learning experiences (Clark & Verduin, 1989; Moore & Kearsley, 1996; Thompson & Knox, 1987). Students who are suited for distance education are likely to indicate an increased need for autonomy in their learning, control over the pace of learning, and less need for structure and interaction with the instructor and other students (Thompson & Knox, 1987). These characteristics, according to Thompson and Knox (1987), are similar to those associated with the cognitive style of field-independence.

Gunawardena and Boverie (1993) studied the relationships between learning styles and distance education. The research utilized four graduate classes: one was taught at a distance and the other three were traditional on-campus classes taught by a different instructor. The researchers used Kolb's Learning Style Inventory to identify learning styles that positively interact with distance education instructional media and methods of instruction. Instruction was broadcast live through an audiographics system that enabled the off-campus group to interact with the instructor and with the on-campus students. Electronic mail was used for group discussions and learner support. The results indicated that learning styles do not affect students' interaction with the media and methods of

instruction. According to Gunawardena and Boverie, however, the sample size in the distance class was small and, as such, the results must be interpreted with caution.

Diaz and Cartnal (1999) compared social learning styles between distance education students and equivalent on-campus students using the Grasha-Reichmann Student Learning Style Scales (GRSLSS) (Grasha, 1996; Hruska-Riechmann & Grasha, 1982). Relatively large differences in the average scores of the two types of students occurred for the independent and the dependent learning styles. Independent learners prefer independent study and self-paced instruction while dependent learners look to the teacher and to peers as a source of structure and guidance. Compared with those students enrolled in the traditional classroom, the students in the distance class had significantly higher scores on the independent learning style scale and lower scores on the dependent scale.

Diaz and Cartnal (1999) concluded that online students are more independent, and on-campus students are more dependent, in terms of their learning styles. The on-campus students seemed to match the profile of traditional students who are willing to work in class, provided they can obtain rewards for working with others and for meeting teacher expectations. Online students appeared to be driven more by intrinsic motives and not by the reward structure of the class.

Wells (2000) assessed the influence of student attitudes toward: (a) using the Internet to deliver a computer-mediated communication course and (b) requiring the integration of Internet applications into the design of instruction for learners enrolled in the Computer-Mediated Communication in Education course (TE 365). The results

revealed that over 75% of students enrolled in the course had learning styles that were highly field-independent (FI), and less than 1% field-dependent. Wells concluded that being an FI learners makes one well suited for participating in the individualized web-based teaching/learning environment provided by the course.

Ross and Schulz (1999) studied the relationship of learning style to Web-based learning. They reported that the way course information is presented and assignments are structured on the Internet can cater to different sensory, social, and thinking styles of students. They provided numerous illustrations of how an online course might structure information to make it compatible with the needs of various types of learners. They also explained that independent learners must be flexible and willing to collaborate with other students in project work. The visual learners might need to explore their kinesthetic style by learning how to draw images and charts on a computer.

Dille and Mezack (1991) used Kolb's Learning Styles Inventory to identify predicators of high risk among community college telecourse students. Successful students had lower scores on their preferences for concrete experiences than did the unsuccessful students. Students with higher scores on concrete experiences tend to exhibit a great sensitivity to feelings and would be expected to require more interactions with the teacher and peers. Due to distance learning courses often leading to social isolation and requiring greater reliance on self-discipline, independent learning skills may be expected to be better suited to the distance format. Successful students also preferred to look for abstract concepts to help explain the concrete experiences associated with their learning. That is, they wanted to know "why" certain things happened in conceptual or theoretical

terms. This more abstract approach clearly favored success in the telecourse.

Learning Style Inventories

Three important factors to consider when selecting a learning style instrument are the intended use of the data to be collected, matching the instrument to the intended use, and selecting the most appropriate instrument (James & Gardner, 1995). Other concerns include the underlying concepts and design of the instrument, validity and reliability issues, administration difficulties, and cost.

Kolb Learning Style Inventory. A popular learning style inventory is the Kolb Learning Style Inventory (LSI) (Kolb, 1986). Kolb's LSI measures student learning style preference in two bipolar dimensions-concrete and abstract. Over a period of time, learners develop a preference for either concrete experiences or abstract or conceptual analyses when acquiring skills and knowledge. The two dimensions yield four quadrants, which are: accommodator-combines active experimentation and concrete experience, diverger-combines concrete experience and reflective observation, assimilator-combines reflective observation and abstract conceptualization, and converger-combines abstract conceptualization and active experimentation (Raschick, Maypole, & Day, 1998).

Diaz and Cartnal (1999) found that both the Canfield Inventory and The Canfield Learning Style Inventory (CLSI) focus on the attitudinal and affective dimensions rather than cognitive ones. The CLSI reportedly assesses learning preferences defined by a model for describing learning styles. A. A. Canfield and Judith Canfield also developed the Instructional Styles Inventory (ISI) which closely parallels the CLSI. Kolb's LSI create a narrow range of applicability for learning styles by limiting learning preferences

to one or two dimensions. Although this learning style "stereotyping" may be convenient for statistical analysis, it is less helpful in terms of teaching students about weaker or unused learning preferences. Further, the Kolb LSI, which has been widely used, is primarily a cognitive learning preference instrument, which does not specifically take into account social preferences that are a key distinction between distance and traditional classroom.

Barsch Learning Style Inventory. The Barsch Learning Style Inventory (BLSI) identifies perceptual preference. The preferred learning style is established by a subject's responses to the inventory by their preferred perceptual mode-auditory, kinesthetic, visual, or tactile-for processing information.

The BLSI does not provide absolute numbers for an auditory preference, a kinesthetic preference, a visual preference, or a tactile preference. Rather, the BLSI provides a gross score which is either markedly higher in the auditory, kinesthetic, visual, or tactile quadrant, shows no marked preference, or shows a balance of learning styles.

The instrument used to determine student learning styles in this dissertation was the Barsch Learning Style Inventory developed by Jeffrey Barsch (Appendix A). The Barsch Learning Style Inventory lacks long-term data. This instrument is an indicator of learning style and not a definitive diagnostic tool. For the purposes of this study, however, the Barsch Learning Style Inventory is quick, easily scored and corrected, and the expense and ease of using this instrument is superior to others evaluated. There are no data on reliability or validity in the literature for the Barsch Learning Style Inventory.

Community Colleges

This section presents the history of community colleges, community colleges today, community college demographics, and a case study of distance learning at a community college.

History of Community Colleges

In the 1800s, higher education was reserved largely for the rich. In 1862, however, Congress passed the Morrill Act, establishing land-grant universities that emphasized agricultural and mechanical training. In 1901, the nation's first public junior college was founded in Joliet, Illinois. Then, in 1907, California empowered secondary schools to offer college-level courses. The American Association of Junior Colleges was founded in 1921 and, by 1940, the country boasted 575 two-year colleges, more than half of them private church-affiliated (Wright, 2000).

In 1944, the GI Bill provided tuition assistance to soldiers returning from World War II, breaking down the social and economic barriers to college for millions. In 1947, President Harry S. Truman released "Higher Education for American Democracy," a report calling for a network of public community colleges. The W.K. Kellogg Foundation, in 1960, established a series of grants to set up programs at 12 universities nationwide to train administrators for community, junior, and technical colleges.

The mission of community colleges began expanding in the 1960s in response to demographic, economic, and even political factors among the growth in the ranks of baby boomers and an emerging national commitment to universal access to higher education. In 1963, the Higher Education Facilities Act set aside nearly $1.2 billion to construct new

college and university facilities. In 1972, the American Junior College Association changed its name to the American Association of Community and Junior Colleges (Wright, 2000).

In 1988, an American Association of Community and Junior Colleges report, "Building Communities: A Vision for a New Century," argued that two-year colleges should serve broad regions beyond their local communities, paving the way for a more global vision of education and community. In 1988, the American Association of Community and Junior Colleges dropped the "junior." In 1997, a survey of U.S. governors by the Denver-based Education Commission of the States gave two-year colleges the highest marks of any higher-education sector for "meeting fundamental state needs" (Wright, 2000).

Administrators at several colleges formed the Community College Baccalaureate Association to lobby in 1999 for "applied" bachelor's degrees. Florida Legislature allowed two-year colleges to start four-year academic programs under limited circumstances. In March 2000, the 100,000-student Los Angeles Community College District, the nation's largest, said it needed $1 billion to refurbish its nine aging campuses due to increased student enrollment and demand for new facilities (Wright, 2000).

Community Colleges Today

Community colleges can be characterized as institutions of higher education that focus on both vocational and transfer courses. In general, colleges and universities play two major roles in an individual's life. They prepare the student by providing the academic background and experience necessary to find a place in the economic order, and

they are concerned with providing socializing experiences, which will facilitate a smooth transition into society.

Community colleges are the primary means of expanding opportunities for college education and are considered as portals to social mobility. They provide opportunities for technical and occupational training, meet the needs of those aiming for a bachelor's degree and they promote social equity. The community college is a two-year school with three primary missions: (1) general education equivalent to the freshman and sophomore years at a four-year college or university; (2) vocational/adult basic education, remedial/developmental and occupational training; and (3) community service (Callan, 1997).

As the U.S. shifts from an economy based on manufacturing and heavy industry to an economy increasingly based on information and human capital, more and more people are entering college for the first time or are returning. Many are going to two-year colleges, which many education experts say have proven more responsive to students' evolving needs. "The reputation of community college is the highest it's even been," according to George B. Vaughan, a professor of adult and community college education at North Carolina State University and a former community college president. "It's never been better to work or study at a community college than it is today" (Wright, 2000, p. 331). In addition, President Clinton, who once said that community colleges are "America at its best," praised two-year colleges in a 1997 Rose Garden ceremony honoring achievements in the arts and humanities (Wright, 2000).

A report in 1997 by the Illinois Community College Board provided information

from graduates of selected occupational programs regarding the effectiveness of their Illinois community college experience, addressing issues such as employment status and satisfaction of employment and components of the educational program completed. Study findings, based on responses from 2,070 graduates in 36 program areas, included the following: (1) 92.7% were employed or pursuing additional education or both; (2) 89.0% of the occupational completers were employed, with 81.2% working in positions related to their training; (3) 82.2% of the employed graduates had full-time status; (4) 18.8% of graduates were working in positions unrelated to their area of training; (5) the average hourly salary for full and part-time employed graduates was $11.47; (6) on average, graduates ranked their degree of satisfaction with the program at 4.13 on a 5-point scale; and (7) 25.0% of the respondents were pursing additional education (Illinois Community College Board, 1997).

Others are more critical of today's community colleges. Some say that community colleges need to toughen their academic standards and others complain that colleges' strong emphasis on workforce training has led them to turn out students who lack a broad-based liberal arts background. Some community college experts believe that several factors have contributed to the colleges' poor image, mainly their policy of accepting all students, their work with academic underachievers, and their low tuition cost. However, Jamie Merisotis, President of the Institute for Higher Education Policy, credits community colleges with dismantling many of the barriers to higher education faced by low-income families, minorities, and other disadvantaged populations. "If you look at historical trends of participation in higher education, we've gone from less than 30

percent of the nation attending college in 1960s to more than 60 percent today," according to Merisotis. "A significant part of this is due to community colleges" (Wright, 2000, pp. 331-32).

Community colleges make up only about one-third of all U.S. colleges and universities, but enroll nearly half of all minority students in higher education. Community colleges have high part-time attendance due to the colleges' focus on what one calls "life-long learning." Community colleges also have a large following due to their low tuition costs. The average annual tuition at the nation's public two-year colleges was $1,318 in the 1997-98 academic year, compared with $3,110 at four-year public colleges and universities, and $13,392 at private, four-year institutions (Wright, 2000). Related to these factors, the National Center for Education Statistics projects that community college enrollment may increase at an annual rate of 1.1% between 1994 and 2006, to 6.2 million (Hedden, 1996).

In general, community colleges mirror the demographic profile of their surrounding communities, and collectively they include a growing percentage of the U.S. population pursuing higher education. These two-year colleges commonly include small business and corporate employees (Dungy, 1999). The National Workforce Development Study by the American Association of Community Colleges states that "ninety-five percent of businesses and organizations surveyed reported they would recommend community college workforce education and training programs to others" (Zeiss, 1997, p. 51).

Community colleges are responsive to job market trends. By the year 2005, nearly

80% of new jobs will require a two-year degree or less (Bhasin, 1999). More students than ever before are choosing to complete their first two years of their degree at a community college. In 1995, 46% of all first-year college students were enrolled in two-year schools, up from 17% in 1955. Some college-bound students opt for a two-year school to keep costs down; others do not have the test scores or the grades required for admission to into a four-year school. In the past decade, most pubic and some private universities have adopted "articulation agreements" which standardize college credit transfer agreements between community colleges and four-year universities and colleges (McGraw, 1999).

The Workforce Investment Act of 1998 and the anticipated passage of the Carl D. Perkins Vocational and Applied Technology Education Act Amendments will encourage states to require accountability for community college employment and earning outcomes (Stevens, 1998). Research by Grubb and Bragg (1997), Stevens, Richmond, Haenn, and Michie (1992), and Stevens and Shi (1996) has provided evidence about economic gains experienced by former community college students. Grubb and Bragg reported that "the economic benefits of completing associate degrees and certificates are significant . . . [and] are highest for those in occupational fields who find jobs related to their areas of study. In addition, transfer rates to four-year colleges are now as high from occupational subjects . . . as they are from academic subjects. Therefore, occupational programs are not by any means 'dead end programs'" (Grubb & Bragg, 1997, p. 5).

Li (2000) found that, as the largest and most available sector of higher education, community colleges must assume greater responsibility for a workforce that is educated

and technology savvy. They should also set a basis for good citizenship, help prepare leaders in and out of the classroom, and nurture networks of connectivity to address a global society.

Community College Demographics

Cohen and Brawer (1996) note various changes in the profile of the community college student during the period between 1970 and 1994. Specifically: (a) the mean age for students increased from 27 in 1980 to over 31 by 1993 as large numbers of adult learners returned to college to upgrade and acquire skills; (b) females, many of whom attend college part-time, did not equal males in enrollment until 1978, but outnumbered males (55% to 45%) by 1991; (c) minority enrollment increased from 20% in 1976 to 25% by 1991; and (d) part-time students, most of whom are members of one or more nontraditional groups, increased from 49% of the student population in 1970 to more than 65% of the population by 1992. According to the American Council on Education (1998), the above patterns have continued through 1996, and it is likely that over 65% of the students enrolled in community colleges fall into at least one nontraditional student category.

The American Association of Community Colleges (1997) states that 10.4 million students (5.4 million credit; 5.0 million non-credit) are enrolled in community colleges and represent 44% of all undergraduate students. Currently, community college students represent 46% of all African American students in higher education, 55% of all Hispanic students in higher education, 46% of all Asian/Pacific Islander students in higher education, and 55% of all Native American students in higher education. The students are

46% of first-time freshmen, 58% female and 42% male, 64% part-time, and 36% full-time (12 credit hours or more), and the median student age is 29 years old. In Illinois, in the fall of 1996, there were 113,471 full-time students, 237,464 part-time students, for a total of 350,935 during the fall semester of 1996 and a total of 715,233 during the full year of 1995-96.

A Case Study of Distance Learning at a Community College: The College of Lake County

Research on the College of Lake County (CLC) (1999) examined tenth day enrollment (attrition) in course sections offered in an alternative delivery format and comparative attrition rates in course sections in which both alternative delivery and traditional formats were available. The study was done by the Office of Institutional Effectiveness, Planning and Research at the College of Lake County found that enrollments in telecourse sections remained stable during the semesters included in the study and the average section size ranged from 27 to 36 students. The attrition in telecourse sections appeared to be considerably higher than the attrition in corresponding traditional sections; however, the attrition rate comparisons of telecourse and traditional sections varied greatly when examined by course number.

The Internet sections at the College of Lake County had been available in a small number of courses for only three semesters, beginning spring 1998. Internet section attrition appeared to be somewhat higher (2% to 8% higher) than in traditional sections. The number of distance learning sections originating from CLC varied greatly from term to term, but average section size ranged from 8 to 13 students. While attrition in distance

learning sections and corresponding traditional sections varied by only 1% to 2% most semesters, neither format emerged as demonstrating a consistently better retention rate.

In providing to their reasons for taking an online course, 70.3% reported taking an online course because their busy schedule prevented them from taking a course on-campus, 62.2% reported taking an online course because they preferred to complete the work at home or at work, 48.6% noted taking an online course because they preferred to set their own pace for learning, and 27.0% stated taking an online course for various other reasons.

In the College of Lake County study (2000), the majority of students had regular contact with their professors during the semester. Specifically, 59.5% stated that they were in contact with their professor weekly, 24.3% noted that they had contact every other week, and only 2.7% reported that they never had contact with their professor. Of the respondents, 2.7% also reported having daily contact with their professor. In addition, 54.1% of respondents reported that they would use an online orientation program for online courses if it was offered, and 51.4% stated that they would use online tutorial services if they were offered.

The study concluded that more needs to be done to make online students aware of the various services available to them online. However, the majority of those students who were aware of and made use of the various services, were very satisfied.

Summary of the Review of Related Literature

The purpose of this chapter was to present the research and literature related to distance education, learning styles, and community colleges. Distance education involves enrollment with an educational institution that provides lesson materials prepared in a consecutive and analytical order for study by students on their own. Initially instituted as a "substitute" type of education, instruction by distance education has advanced into a "preferred alternative" for millions of people who seek education and training. Distance education programs are being offered today by colleges and universities, particularly community colleges, which are the focus of this study.

An important aspect of distance education is student learning styles. A person's learning style is the way that he or she concentrates on, processes, internalizes, and remembers new and difficult academic information or skills. In distance as well as traditional education, instruction should take into account various learning styles as a means to ensure the success of students.

The final section, community colleges, contains information on the role of community colleges and the demographics of enrolled students. Community colleges can be characterized as institutions of higher education that focus on both vocational and transfer courses. In general, colleges and universities play two major roles in an individual's life. They prepare the student by providing the academic background and experience necessary to find a place in the economic order, and they are concerned with providing socializing experiences which will facilitate a smooth transition into society. The profile of the community college student is changing. Community college students

today are older, at least 25 years of age, more ethnically diverse, and females outnumber males. In addition, due to the diversity of their lifestyles, many find it easier to "attend" community colleges as online students. The review concludes with a discussion of a successful online community college program.

CHAPTER III

METHODOLOGY

This chapter focuses on the methodology used in conducting the study. First, a brief description of the research design is presented, followed by the definition of the population and sample that were used in conducting the study. Then, a complete description of the instrument is given, followed by the procedures that were used in data collection. The next section explains how variables were measured and is followed by a discussion of data analysis.

Purpose

This research study is a descriptive quantitative study. According to Gall, Borg, and Gall (1996), descriptive research is a type of quantitative research that involves making careful descriptions of educational phenomena. Descriptive studies are mainly concerned with determining "what is" (Gall, Borg, & Gall, 1996).

This study was designed to identify and compare the demographic characteristics (age, gender, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income), employment and occupational status, educational characteristics (student classification, student status, highest level of education completed, and college major), course enrolled in, section number of course, average time spent on classwork per week, and learning styles of students who enrolled in

an online course or traditional on-campus course.

The purpose of this study is to compare the learning styles of community college students who have enrolled in an online course (via the Internet) with the learning styles of comparable community college students who are taking the same course on-campus in the community college setting. The students taking the online course are off-campus students. It was assumed that students who took courses over the Internet would have a different learning style than those students who took classes on-campus. Due to the increased number of online courses offered, it appeared to be advantageous to study the differences between the two groups to assist instructors in adapting their curriculum for their online students. Since the drop-out rate of students online has been extremely high, it appeared to be of benefit to identify the differences, if any, between the learning styles of online versus traditional students, as well as their demographic information.

The academic studies that focus on the high drop-out rate of students online consistently neglect to mention the reason for the high drop-out rate. One could speculate that the drop-out rate may be due to personal, economic, academic, or socioeconomic factors, or any combination thereof, resulting in students not finishing their courses over the Internet. To determine the reason behind the drop-out rate, it is beneficial to research this phenomenon from the point of view of the student who chooses to take a course either online and compare the findings to those of traditional students.

Population and Sample

The participants in this study were chosen from one community college in the Chicago suburbs. The primary reason for choosing this particular institution was that the researcher was also an instructor at this institution and was familiar with the school curriculum. All participants were taking at least one course during the spring semester in order to be part of this study, either online or on-campus. The participants were chosen from the courses that were taught over the Internet in the spring 2001 semester and compared to subjects who were taking the same course on-campus during the same semester. During the spring semester 2001, 31 different classes were taught online. The number of students from the community college enrolled in either an online course or traditional course was 15,368 as of January 26, 2001, the tenth day of classes.

Each instructor was contacted by the researcher to receive permission to involve his or her classes in this study. All contacted instructors granted permission.

Instrumentation

The demographic background survey information sheet developed by the researcher was used in gathering information regarding the sample. Information that was gathered included the following: average time spent on the classwork each week, course enrolled in and section number, student status, gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, employment status, occupational status, total family income, highest level of education completed, and college major (see Appendix A).

Although several learning style inventories could have been utilized for this study,

it was the intent of the researcher to identify certain key learning style factors in the survey instrument. After researching the Mental Measurements Yearbook (Impara & Plake, 1998) and speaking personally to several researchers who developed learning style inventories, the researcher decided on Dr. Jeffrey Barsch's Learning Style Inventory (Academic Therapy Publications, Novato, California) (1996). The main reasons for using Barsch's inventory were its short length and content. The inventory contains only 32 forced-choice questions and focuses on the areas of auditory, kinesthetic, tactile, or visual learning. The cost factor was also a consideration after speaking to several other companies on the cost of the estimated sample size. Academic Therapy Publications allowed the researcher to use Dr. Barsch's Learning Style Inventory with no permission fee for the dissertation use but if the study is published in the future, there is a need to present a permission document. The researcher received permission to use their learning style instrument for this study (see Appendix B).

The Barsch Learning Style Inventory was developed by Dr. Jeffrey S. Barsch in 1980 and revised in 1996. As noted above, this 32-item instrument is a self-report measure of individual learning styles. The 32 items correspond to one of the four learning styles: visual, auditory, tactile, or kinesthetic. Visual learners should see all study materials and use charts, maps, filmstrips, notes, and flashcards in learning. They should write out everything for frequent and quick visual review (Barsch, 1996). Auditory learners should use tapes in learning and should sit in the lecture hall or classroom where they can hear lectures clearly (Barsch, 1996). Tactile learners should trace words as they say them. The facts that must be learned should be written several times, and they should

keep a supply of scratch paper for taking lecture notes (Barsch, 1996). Kinesthetic learners need to involve their body in the process of learning and should walk and study their notes on flashcards at the same time. It is easier for them to memorize schoolwork if they involve some movement in his memory task (Barsch, 1996). The Barsch Learning Style Inventory can be administered individually or in group settings. Since the test is self-administered, the examiner does not need specialized training, and the administration time is about ten minutes.

Scoring and translating scores is undertaken by the administrator and does not require specialized training. Translation is clearly specified in the pamphlet of the learning style inventory. In scoring, the responses are translated into "often" (5 points), "sometimes" (3 points), and "seldom" (1 point) categories, and the frequency of selection by categories is summed.

The researcher also wanted to identify demographic variables frequently observed to be valid to this topic of study, as noted above. The final survey utilized in this study (see Appendix A) was developed from a pilot study conducted with 30 community college students. After the responses were compiled, the instrument was then restructured to include more demographic questions. The use of the pilot study ensured at least a reasonable degree of validity for all sections. Thus, the variables chosen for the instrument reflected a desire to establish a credible case for content validity, since these variables were elicited from a careful review of the pertinent literature (Dillman, 2000). Likewise, having experts in the area review the instrument and suggest corrections reasonably approximated face validity. The number of subjects that return the survey

instrument can also indicate some degree of reliability. The traditional student sample had a return rate of 100.0% and the online student sample had a return rate of 57.9%.

Data Collection Procedures

The researcher obtained permission to conduct the study from the Institutional Research Board at Loyola University in Chicago, Illinois (see Appendix C) and the Office of Institutional Effectiveness, Planning and Research at the community college (see Appendix D) used in this study. All students who enrolled in an online course at the community college in the spring of 2001 were given, by their instructor, a web site address to go to participate in my study. As such, the students were able to participate in the online study at a time of their convenience. At the web site, the students read a letter of consent and clicked "I Accept" on a button to continue on to the survey part. At the end of the survey, students clicked on a button, "Send My Responses," which sent the results to the researcher's e-mail mailbox. The researcher was able to determine if students clicked on the "Send" button twice and eliminated the duplicate results.

The online study took place from February 2001 to May 2001. Throughout the semester, online instructors were sent e-mail reminders to have their students to participate in the study. On-campus students taking the same course as the online students were surveyed during their class time during the spring semester of 2001 at the community college. The instructors mailed the surveys to the researcher's on-campus mailbox.

Measurement of Variables

Independent Variables

The demographic section developed by the researcher was used to gather information on the following independent variables: average time spent on the class each week, course enrolled in and section number, student status, gender, age group, marital status, number of dependent children, race or ethnic background, Spanish/Hispanic origin, employment status, occupational status, total family income, highest level of education completed, and college major (see Appendix A). These independent variables were converted into categorical variables, which were grouped as follows:

Average amount of time spent on the class each week. Respondents were asked to indicate on the survey how much time they spent on the class, on the average, each week. The respondents were shown an example of 3-hours/per week and asked to write in their answers on the line provided. The question was chosen to determine whether there was a difference between the online students and traditional students in regard to use of the amount of time spent on the class each week. A numeric approach was used for this question, since there could be a variety of answers given.

Course enrolled in and section number. Respondents were asked to indicate on the survey which course and section number they were enrolled in. An example of BUS 101, Section 01 was given to help the respondent in answering the question. This question was asked in order to code the data as either an online student or a traditional student. It also allowed the researcher to identify differences between the students who took a course on-campus and the students who took the same course online. This question was coded

with three different categories. The first category was the course title, the second category was the course number, and the third category was the section number.

Student status. Respondents were asked to indicate their student status while they were enrolled in a course by selecting one response. Responses were grouped for analysis into two categories: (a) full-time student and (b) part-time student.

Gender. Respondents were asked to indicate their gender by selecting one response. Responses were grouped for analysis into two categories: (a) male and (b) female.

Age group. Respondents were asked to indicate their age by selecting one age group range that identified their current age. Responses were then grouped for analysis into six categories: (a) 25 years or less, (b) 26-35 years, (c) 36-45 years, (d) 46-55 years, (e) 56-65 years, and (f) Over 65 years.

Marital status. Respondents were asked to indicate their marital status by selecting one response that corresponded to their current status. Responses were then grouped for analysis into five categories: (a) married, (b) separated, (c) widowed, (d) divorced, and (e) never married.

Number of dependent children. Respondents were asked to indicate the number of dependent children under their care while enrolling in a course. On the survey instrument, it stated "dependent children" as the total number of children under 18 years living at home. Respondents were asked to write in their total number of dependent children under the age of 18 years living at home.

Racial or ethnic background. Respondents were asked to indicate the best

category that represented their racial or ethnic background by selecting one choice. Responses were then grouped for analysis into seven categories: (a) Asian American, (b) Black/African American, (c) White/Caucasian, (d) Hispanic (may be any race), (e) Native American, (f) Pacific Islander, and (g) Other (Please specify: _____).

Spanish/Hispanic origin. Respondents were asked if they were of Spanish/Hispanic origin. Respondents either replied with a yes or no. This question was chosen from the U.S. Census Bureau's research survey.

Employment status. Respondents were asked to indicate their employment status by checking one of the categories. Responses were grouped for analysis into five categories: (a) full-time employment (more than 35 hours/week), (b) homemaker, (c) part-time employment (less than 35 hours/week), (d) not working for pay, and (e) retired.

Occupational status. Respondents were asked to indicate their occupational status by checking one of the categories. Responses were grouped for analysis into 11 categories: (a) business owner or manager, (b) clerical worker, (c) sales representative, (d) service worker, (e) professional, (f) educator, (g) skilled laborer or foreperson, (h) student, (i) homemaker, (j) retired, (k) other (please specify:_____).

Total family income. Respondents were asked to indicate their total family annual income by selecting one of the categories. Responses were grouped for analysis into 13 categories: (a) Under $12,499, (b) $12,500-14,999, (c) $15,000-17,499, (d) $17,500-19,999, (e) $20,000-22,499, (f) $22,500-24,999, (g) $25,000-29,999, (h) $30,000-34,999, (i) $35,000-39,999, (j) $40,000-49,999, (k) $50,000-59,999, (l) $60,000-74,999, and (m) $75,000 and over.

Highest level of education completed. Respondents were asked to indicate their highest level of education completed at the time of the survey instrument. Responses were grouped for analysis into six categories: (a) high school graduate, (b) some college courses taken, (c) Associate Degree, (d) Bachelor's Degree, (e) Master's Degree, and (f) Doctorate/Professional Degree (e.g., Ph.D.).

College major. Respondents were asked to indicate their college major. Respondents were asked to write in their current college major at the time of the survey instrument. Since at the community college level there are many majors, the researcher found it easier to have the respondents write in their major, and then the researcher categorized the majors at a later time. College majors were broken down by frequency data and compiled into top five highest frequencies.

Dependent Variable

The Barsch Learning Style Inventory was used to collect data regarding the dependent variable, which is the learning style of community college students. As noted above, each of the 32 questions on the instrument had three choices from which the participants were required to check the one that best described them. The first choice was "often," the second choice was "sometimes," and the third choice was "seldom." For scoring procedures, the "often" category was worth 5 points, the "sometimes" category was worth 3 points, and the "seldom" category was worth 1 point. The learning style inventory identified whether the student was a visual, auditory, tactile, or kinesthetic learner.

The following questions were relevant to the visual learner: 2, 7, 10, 14, 16, 22,

26, and 32. In the auditory category, the following questions were relevant: 1, 5, 8, 11, 18, 21, 24, and 28. The following questions were relevant to the tactile learner: 4, 6, 12, 15, 20, 27, 30, and 31. In the kinesthetic category, the following questions were relevant: 3, 9, 13, 17, 19, 23, 25, and 29. Multivariate analysis of variance (MANOVA) was used to compare the four learning styles across the two types of students (online and traditional).

Data Analysis

The data collected for this study were analyzed using basic descriptive statistical procedures for calculating frequencies and percentages along with general linear model tests (multivariate analysis of variance or MANOVAs), crosstabulation tests (chi-square tests of independence), and t-tests. The data were analyzed separately for each research question, as indicated below.

Research Question 1

Are there differences in learning styles of students who enroll in courses taken online compared to students who take traditional courses on-campus in the community college level?

Participants were identified by course and section number (question #34) to determine whether they were taking the course on-campus or over the Internet. The responses for the 32 items contained in the Barsch Learning Style Inventory correspond to four learning styles. When the responses are summed, the category with the highest amount of points indicates the student's preferred style of learning.

To determine the learning style of each participant, using the scoring key provided

in the learning style manual, the question responses were translated into visual, auditory, tactile, and kinesthetic. The style was determined by the greatest sum in one particular category. If none of the scores was greater than the others, that individual was classified as having a mixed style. The frequencies and percentages of each of the four dependent variables (learning styles) were calculated. To analyze this research question, multivariate analysis of variance (MANOVA) was used to examine the differences between the traditional and online students with respect to the four learning styles measured by the Barsch Learning Style Inventory. The F-test used in this analysis was based on Wilks' Lambda.

Research Question 2

Are there differences in demographic characteristics (gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income) of students who enroll in online courses compared to those of the traditional on-campus students in a community college level?

The demographic characteristics of gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income were analyzed separately. Frequencies for each of the categories were calculated. Due to the fact that raw scores are difficult to interpret, the percentage of students that falls under each category was calculated. For the demographic characteristic categories, the frequencies of each category and the corresponding percentages were calculated from both groups for all the demographic questions asked in the survey instrument. To analyze this research question statistically, a chi-square test of

independence was conducted on the frequency counts.

Research Question 3

Are there differences in the employment and occupational status of students who enroll in online courses compared to traditional on-campus students in the community college level?

As noted above, the demographic characteristic of employment status has the following five categories: (a) full-time employment (more than 35 hours/week), (b) homemaker, (c) part-time employment (less than 35 hours/week), (d) not working for pay, and (e) retired. Occupational status has the following eleven categories: (a) business owner or manager, (b) clerical worker, (c) sales representative, (d) service worker, (e) professional, (f) educator, (g) skilled laborer or foreperson, (h) student, (i) homemaker, (j) retired, and (k) other (please specify). The frequencies and percentages of each category were calculated for both groups. To analyze this research question statistically, a chi-square test of independence was conducted on the frequency counts.

Research Question 4

Are there differences in the educational characteristics (student status, highest level of education completed, and college major) of students who enroll in an online course compared to the traditional on-campus course in a community college?

Each educational characteristic was analyzed separately. As noted above, the variable of student status had two categories: (a) full-time student and (b) part-time student. The highest level of education completed has the following six categories: (a) high school graduate, (b) some college courses taken, (c) Associate Degree, (d)

Bachelor's Degree, (e) Master's Degree, and (f) Doctorate/Professional Degree. The college major of the student was also calculated and analyzed. The frequencies and percentages of each category were calculated. To analyze this research question statistically, a chi-square test of independence was used on the frequency counts.

Research Question 5

Does an online student spend more time on the class, on the average, each week than a student who takes traditional courses on-campus in a community college?

As noted above, the following question was asked: How much time do you spend on the class, on the average, each week? An independent samples t-test was used to compare the mean time spent per week on class work for each group.

Summary of the Data Analysis

In analyzing the research questions, 13 tests were conducted, with an alpha level of .05. The general linear model test (MANOVA) was used for research question 1. The variables involved included the four learning styles (visual, auditory, tactile, and kinesthetic), along with the SECTCAT (categorized by section) including traditional and online students. The results of the test yielded the mean, standard deviation, and sample size (N), which allowed for a comparison of the differences in learning styles between the traditional and online students. The multivariate tests for this research question involved the Wilks' Lambda test.

Chi-square tests of independence were used for research questions 2, 3, and 4, for a total of 11 tests. The independent variables for these tests were the frequency counts of traditional and online students. The dependent variables for these tests included gender,

age group, marital status, dependent children, ethnic or race background, Spanish/Hispanic origin, income level, employment status, occupational category, student status and educational level. Specifically, for research question 2, gender, age group, marital status, dependent children, ethnic or race background, Spanish/Hispanic origin and income level were analyzed separately. For research question 3, employment status and occupational category were analyzed separately. For research question 4, student status, and education level were analyzed separately. College major was excluded from the crosstabulation data due to the online student survey data missing this variable when entering the statistical data.

For research question 5, an independent samples t-test was conducted using the traditional and online students as the independent variable with the average amount of time spent on class work as the dependent variable.

CHAPTER IV

RESULTS

This chapter presents the findings of this study, the purpose of which was to compare the learning styles of students who were enrolled in an online course or a traditional on-campus course. Comparisons were also made between their demographic characteristics. The chapter begins with a description of the study sample, followed by the findings related to each research question.

Sample

The sample consisted of 1,642 students who were enrolled in an online course or a traditional course that was also offered through the Internet at the community college during the spring 2001 semester. There were 587 online students, of whom 340 completed the study, for a return rate of 57.9%, and 1,302 traditional students, with a return rate of 100.0%. The difference in the sample sizes was due to online students generally having only one section per course available over the Internet, while the traditional students were able to enroll in five to 20 sections on-campus for the same course offering.

Demographic Information

Fourteen different course titles were included in this study (see Appendix E). Of these, 22 course numbers were included in this study (see Appendix F), as well as 28 section numbers (see Appendix G). The frequencies for course title, course number, section number, student status, gender, age group, marital status, number of dependent children, ethnic or racial background, Hispanic/Spanish origin, employment status, occupational category, income level, educational level, and major in college were calculated and appear in Appendix H. Each demographic variable was broken down by frequency, percent, valid percent, and cumulative percent and is shown in Appendices I through U.

Learning Style Data

The responses to the learning style inventory questions were considered continuous data, with a minimum score of 8 and a maximum score of 40. Skewness and kurtosis were not an issue, and there were no outliers in this study. The answers to each individual learning style question are presented by the mean and standard deviation (see Appendix V), as well as the frequency, percent, valid percent, and cumulative percent (see Appendices W through AG).

Research Questions

Research Question 1

Are there differences in learning styles of students who enroll in courses taken online compared to students who take traditional courses on-campus in the community college level?

Individual learning style scores, standard deviation, mean, and sample size can be found in Appendices AH through AK. Table 1 presents the descriptive statistics showing the differences in mean (M) and standard deviation (SD) between online and traditional students in terms of the four learning styles. For visual learners, the traditional students had the following scores: M = 29.35 and SD = 4.58, while the scores for online students scored as follows: M = 31.39 and SD = 4.55. For auditory learners, the traditional students had the following scores: M = 26.46 and SD = 5.31, while the online students scored as follows: M = 24.86, and SD = 5.29. For tactile learners, the traditional students had the following scores: M = 25.00 and SD = 5.39, while the online students scores as follows: M = 24.19 and SD = 5.78. For kinesthetic learners, the traditional students had the following scores: M = 26.56 and SD = 7.39, while the online students scored as follows: M = 24.41 and SD = 8.05.

Table 1

Learning Styles for Traditional and Online Students

	Student	Mean	Std. Deviation	N
Visual	Traditional	29.3487	4.5758	1302
	Online	31.3941	4.5516	340
	Total	29.7722	4.6440	1642
Auditory	Traditional	26.4624	5.3061	1302
	Online	24.8588	5.2896	340
	Total	26.1303	5.3408	1642
Tactile	Traditional	24.9969	5.3924	1302
	Online	24.1941	5.7804	340
	Total	24.8307	5.4828	1642
Kinesthetic	Traditional	26.5637	7.3939	1302
	Online	24.4059	8.0463	340
	Total	26.1169	7.5818	1642

Table 2 presents the results of the Pearson Correlation tests of the four learning styles. Visual and auditory had a correlation of -.228; visual and tactile, .096; and visual and kinesthetic, .099. Auditory and visual had a correlation of -.228; auditory and tactile, .187; and auditory and kinesthetic, .236. Tactile and visual had a correlation of .096; tactile and auditory, .187; and tactile and kinesthetic, .289. Kinesthetic and visual had a correlation of .099; kinesthetic and auditory, .236; and kinesthetic and tactile, .289. For all correlations, $p = .00$.

Table 2

Pearson Correlation Tests of the Four Learning Styles

		Visual	Auditory	Tactile	Kinesthetic
Visual	Pearson Correlation	1.000	-.228	.096	.099
	Sig. (2-tailed)	.000	.000	.000	
Auditory	Pearson Correlation	-.228	1.000	.187	.236
	Sig. (2-tailed)	.000	.000	.000	
Tactile	Pearson Correlation	.096	.187	1.000	.289
	Sig. (2-tailed)	.000	.000	.000	
Kinesthetic	Pearson Correlation	.099	.236	.289	1.000
	Sig. (2-tailed)	.000	.000	.000	

N = 1,642

Table 3 presents the results of a Wilks' Lambda to compare learning styles between online and traditional students.

Table 3

Comparison of Learning Styles Using Wilks' Lambda

Effect	Value	F	Hypothesis df	Error df	Sig.	
Intercept	Wilks' Lambda	.016	24582.256	4.000	1637.000	.000
SECTCAT	Wilks' Lambda	.947	23.041	4.000	1637.000	.000

With an F value of 23.041 on 4 and 1,637 degrees of freedom, the null hypothesis was rejected at $p < .001$. This indicates there are significant differences in learning styles of students who enroll in courses taken online compared to the learning styles of students who take traditional courses on-campus in the community college level (see Appendix AH).

Table 4 presents the results of univariate tests of between-subjects effects. As seen below, all four subscales were significantly different at $p \leq .02$. This is strong evidence that there is a significant difference between the online and traditional student groups for each of the four subscales.

Table 4

Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
SECTCAT	Visual	1127.933	1	1127.933	53.989	.000
	Auditory	693.230	1	693.230	24.654	.000
	Tactile	173.757	1	173.757	5.797	.016
	Kinesthetic	1255.352	1	1255.352	22.120	.000

The mean score for online students was 31.39 while the traditional students had a mean score of 29.35 for the visual subscale. Online students had a mean score of 24.86 while traditional students had a mean score of 26.46 for the auditory subscale. The mean score for online students was 24.19 while the traditional students had a mean score of

25.00 for the tactile subscale. Online students had a mean score of 24.41 while traditional students had a mean score of 26.56 for the kinesthetic subscale. The largest difference between the two subscale groups was the visual learning style for the online students. The traditional students were found to have an auditory and kinesthetic learning style compared to the online students. The learning style of tactile, even though statistically significant, showed very little difference for both groups of students (see Appendix AI).

Research Question 2

Are there differences in demographic characteristics (gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income) of students who enroll in online courses compared to those of the traditional on-campus students in a community college level?

Gender. In regard to gender, for online students, males comprised 32.0% of the sample and females comprised 68.0%. For traditional students, males comprised 48.4% of the sample, while females comprised 51.6% (see Appendix AJ).

Table 5 presents the results of the Chi-Square test (Chi-Square = 29.325, p = .000), which indicates that there is a significant relationship between gender and type of student. This is a result of the female to male ratio for online courses being significantly larger than traditional courses.

Table 5

Relationship Between Gender and Type of Student

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (2-sided)
Chi-Square	29.325	1	.000		
Continuity Correction	28.663	1	.000		
Likelihood Ratio	30.012	1	.000		
Linear-by-Linear Association	29.306	1	.000		
N of Valid Cases	1614				

Age Group. In the characteristic of age group status, the online students who were less than 25 years of age comprised 44.2% of the sample, while the traditional students comprised 80.0%. The online students of the 26-35 years group comprised 27.3% of the sample, while the traditional students comprised 10.9%. The online students of the 36-45 years group comprised 14.6% of the sample, while the traditional students comprised 6.4%. The online students of the 46-55 years group comprised 12.7% of the sample, while the traditional students comprised 2.1%. The age categories of 56-65 years and over 65 years did not have a sufficient sample size to be analyzed for this study (see Appendix AK).

Table 6 presents the results of the Chi-Square test (Chi-Square = 192.373, p = .000), which indicates that there is a significant relationship between age group and type of student. Specifically, the majority of online students are 26 years old and older, while

the traditional students are primarily less than 25 years of age.

Table 6

Relationship Between Age Group and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	192.373	5	.000
Likelihood Ratio	171.712	5	.000
Linear-by-Linear Association	152.736	1	.000
N of Valid Cases	1625		

Marital Status. Online married students comprised 42.5% of the sample, while traditional married students comprised 13.2%. Online separated students comprised 0.6% of the sample, while the traditional separated students comprised 0.9%. Online widowed students comprised 1.2% of the sample, while traditional widowed students comprised 0.4%. Divorced online students comprised 7.5% of the sample, while traditional divorced students comprised 2.9%. Never married online students comprised 48.2% of the sample, while traditional never married students comprised 82.6% (see Appendix AL).

Table 7 presents the results of the Chi-Square test (Chi-Square = 178.526, p = .000), which indicate that there is a significant relationship between marital status and type of student. Specifically, the majority of online students are married, while the majority of traditional students were never married.

Table 7

Relàtionship Between Marital Status and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	178.526	4	.000
Likelihood Ratio	159.038	4	.000
Linear-by-Linear Association	159.254	1	.000
N of Valid Cases	1618		

Number of Dependent Children. In regard to the number of dependent children, online students with no children comprised 56.0% of the sample, while traditional students with no children comprised 82.7%. Online students with one child comprised 17.1% of the sample, while traditional students with one child comprised 8.9%. Online students with two children comprised 15.9% of the sample while traditional students with two children comprised 5.1%. Online students with three children comprised 8.3% of the sample, while traditional students with three children comprised 2.4%. Online students with four children comprised 1.8% of the sample, while traditional students with four children comprised 0.7%. Online students with five children comprised 0.9% of the sample, while traditional students with five children comprised 0.2% (see Appendix AM).

Table 8 presents the results of the Chi-Square test (Chi-Square = 117.412, p =

.000), which indicate that there is a significant relationship between number of dependent children and type of student. This can be attributed to the fact that there is a significant relationship between marital status and type of student, as noted above.

Table 8

Relationship Between Number of Children and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	117.412	5	.000
Likelihood Ratio	103.929	5	.000
Linear-by-Linear Association	104.933	1	.000
N of Valid Cases	1624		

Race/Ethnicity. In regard to race/ethnicity, online Asian American students comprised 3.0% of the sample, while the traditional Asian American students comprised 4.5%. Online Black/African American students comprised 6.0% of the sample, while traditional Black/African American students comprised 6.2%. Online White/Caucasian students comprised 84.7% of the sample, while traditional White/Caucasian students comprised 76.1%. Online Native American students comprised 1.5% of the sample while traditional Native American students comprised 0.5%. Online Pacific Islander students were not represented in the sample. Online other ethnic or race background students comprised 2.4% of the sample, while traditional other ethnic or race background students

comprised 1.3%. Online Hispanic-Any Race students comprised 2.4% of the sample, while traditional Hispanic-Any Race students comprised 10.5% (see Appendix AN).

Table 9 presents the results of the Chi-Square test (Chi-Square = 33.076, p = .000), which indicate that there is a significant relationship between race/ethnicity and type of student. This is attributed to the majority of online students being White/Caucasian, while Hispanic-Any Race was more prevalent in traditional students.

Table 9

Relationship Between Race/Ethnicity and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	33.076	6	.000
Likelihood Ratio	40.663	6	.000
Linear-by-Linear Association	10.941	1	.001
N of Valid Cases	1607		

Spanish/Hispanic Origin. In regard to Spanish/Hispanic Origin, online students of this group comprised 3.3% of the sample, while the traditional students comprised 12.5%. Table 10 presents the results of the Chi-Square test (Chi-Square = 23.409, p = .000), which indicate that there is a significant relationship between Spanish/Hispanic origin and type of student. This is attributed to the majority of online students not being of Spanish/Hispanic origin (see Appendix AO).

Table 10

Relationship Between Spanish/Hispanic Origin and Type of Student

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (2-sided)
Chi-Square	23.409	1	.000		
Continuity Correction	22.451	1	.000		
Likelihood Ratio	29.289	1	.000		
Linear-by-Linear Association	23.395	1	.000		
N of Valid Cases	1609				

Family Income. For total family income, online students with under $12,499 comprised 6.0% of the sample, while traditional students comprised 12.3%. Online students with income between $12,500-$14,999 comprised 2.2% of the sample, while traditional students comprised 4.7%. Online students with income between $15,000-$17,499 comprised 1.9% of the sample, while traditional students comprised 4.3%. Online students with income between $17,500-$19,999 comprised 2.8% of the sample, while traditional students comprised 1.8%. Online students with income between $20,000-$22,499 comprised 1.9% of the sample, while traditional students comprised 3.3%. Online students with income between $22,500-$24,999 comprised 2.5% of the sample, while traditional students comprised 4.9%. Online students with income between $25,000-$29,999 comprised 4.4% of the sample, while traditional students comprised 3.8%. Online students with income between $30,000-$34,999 comprised 4.7% of the

sample, while traditional students comprised 4.3%. Online students with income between $35,000-$39,999 comprised 6.0% of the sample, while traditional students comprised 4.2%. Online students with income between $40,000-$49,999 comprised 9.9% of the sample, while traditional students comprised 6.9%. Online students with income between $50,000-$59,999 comprised 8.2% of the sample, while traditional students comprised 8.8%. Online students with income between $60,000-$74,999 comprised 16.8% of the sample, while traditional students comprised 11.0%. Online students with income over $75,000 comprised 32.7% of the sample, while traditional students comprised 29.7% (see Appendix AP).

Table 11 presents the results of the Chi-Square test (Chi-Square = 35.109, p = .000), which indicate that there is a significant relationship between family income and type of student. This is attributed to the majority of online students having income levels of over $60,000, while the majority of the traditional students have income levels under $50,000.

Table 11

Relationship Between Family Income and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	35.109	12	.000
Likelihood Ratio	37.294	12	.000
Linear-by-Linear Association	19.038	1	.000
N of Valid Cases	1436		

Research Question 3

Are there differences in the employment and occupational status of students who enroll in online courses compared to traditional on-campus students in the community college level?

In regard to employment status, the online students who had a full-time status comprised 59.8% of the sample, while the traditional students comprised 32.1%. The online students who had a part-time status comprised 26.3% of the sample, while the traditional students comprised 55.6%. The online students who are homemakers comprised 8.0% of the sample, while the traditional students comprised 2.9%. The online students who are not working for pay comprised 5.6% of the sample, while the traditional students comprised 9.1%. The online students who are retired comprised 0.3%, while the traditional students comprised 0.3% (see Appendix AQ).

Table 12 presents the results of Chi-Square test (Chi-Square = 121.039, p = .000), which indicate that there is a significant relationship between employment status and type of student. Specifically, the majority of online students are of a full-time status, while the traditional students are primarily of a part-time status.

Table 12

Relationship Between Employment Status and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	121.039	4	.000
Likelihood Ratio	120.137	4	.000
Linear-by-Linear Association	31.117	1	.000
N of Valid Cases	1617		

Occupational Status. For occupational status, the online students who were business owners or managers comprised 3.3% of the sample, while the traditional students comprised 5.6%. The online students who were clerical workers comprised 10.8% of the sample, while the traditional students comprised 8.3%. The online students who were sales representatives comprised 4.2%, while the traditional students comprised 8.3%. The online students who were service workers comprised 1.8% of the sample, while the traditional students comprised 11.8%. The online students who were skilled laborers or foremen comprised 4.2%, while the traditional students comprised 5.0%. The

online students who were professionals comprised 22.9%, while the traditional students comprised 5.2%. The online students who were educators comprised 7.2%, while the traditional students comprised 3.0%. The online students who were students comprised 16.2%, while the traditional students comprised 35.3%. The online students who were homemakers comprised 5.7%, while the traditional students comprised 2.3%. The online students who were retired comprised 0.3%, while the traditional students comprised 0.2%. The online students who were of the "other" occupational status comprised 23.4%, while the traditional students comprised 15.0% (see Appendix AR).

Table 13 presents the results of the Chi-Square test (Chi-Square = 192.672, p = .000), which indicate that there is a significant relationship between occupational status and type of student. Specifically, the majority of online students are of the professional status, while the traditional students are primarily of the student status.

Table 13

Relationship Between Occupational Status and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	192.672	10	.000
Likelihood Ratio	186.584	10	.000
Linear-by-Linear Association	8.175	1	.004
N of Valid Cases	1591		

Research Question 4

Are there differences in educational characteristics (student status, highest level of education completed and college major) of students who enroll in an online course compared to the traditional on-campus course in a community college?

Online full-time students comprised 37.3% of the sample, while traditional full-time students comprised 70.8%. Online part-time students comprised 62.7% of the sample, while traditional part-time students comprised 29.2% (see Appendix AS).

Student Status. Table 14 presents the results of the Chi-Square test (Chi-Square = 130.385, p = .000), which indicate that there is a significant relationship between student status and type of student. Specifically, the majority of online students are of a part-time student status, while the majority of traditional students are of a full-time student status.

Table 14

Relationship Between Student Status and Type of Student

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (2-sided)
Chi-Square	130.385	1	.000		
Continuity Correction	128.937	1	.000		
Likelihood Ratio	125.931	1	.000		
Linear-by-Linear Association	130.305	1	.000		
N of Valid Cases	1626				

Educational Level. In regard to educational level, for online students, high school graduate comprised 7.4% of the sample, while the traditional students comprised 31.2%. The online students who had taken some college courses comprised 66.9% of the sample, while the traditional students comprised 57.8%. The online students who had an associate degree comprised 7.7%, while the traditional students comprised 6.7%. The online students who had a bachelor's degree comprised 9.7%, while the traditional students comprised 2.3%. The online students who had a master's degree comprised 8.0%, while the traditional students comprised 1.6%. The online students who had a doctorate/professional degree comprised 0.3%, while the traditional students comprised 0.4% (see Appendix AT).

Table 15 presents the results of the Chi-Square test (Chi-Square = 135.970, p = .000), which indicate that there is a significant relationship between educational level and type of student. Specifically, the online students had at least taken at least some college courses and received college degrees, while the traditional students are primarily high school graduates.

Table 15

Relationship Between Educational Level and Type of Student

	Value	df	Asymp. Sig. (2-sided)
Chi-Square	135.970	5	.000
Likelihood Ratio	138.198	5	.000
Linear-by-Linear Association	111.841	1	.000
N of Valid Cases	1617		

College Major. College major data were not crosstabulated as the data did not show up when sent through the Internet after respondents filled in the information. The frequencies are reported for the traditional students in the beginning of this chapter.

Research Question 5

Does an online student spend more time on the class on the average per week than a student who takes traditional courses on-campus in a community college?

To evaluate whether a student spends more time on an online course versus a traditional course, an independent t-test was run.

Table 16

Hours Per Week on Classwork

	SECTCAT	N	Mean	Std. Deviation	Std. Error Mean
Average Class Time	Traditional	1265	4.0397	2.8351	7.971E-02
	Online	339	5.1445	3.5173	.1910

As seen in Table 17, with an F value of 17.325, Levene's Test for equal variances was rejected at $p \leq .000$. Given this result, the t-test analysis was performed by not assuming equal variances.

Table 17

Levene's Test for Equality of Variances for Hours Per Week on Classwork

		Levene's Test for Equality of Variances	
		F	Sig
Average Class Time	Equal variances assumed	17.325	.000
	Equal variances not assumed		

As seen in Table 18, the t-value of -5.338, with 462.206 degrees of freedom, was significant at $p \leq .001$. The significant difference is attributed to online students spending 5.15 hours per week on classwork and traditional students spending 4.04 hours per week on classwork.

Table 18

Independent Samples Test for Hours Per Week on Classwork

		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Average Class Time	Equal variances assumed	-6.038	1602	.000	-1.1049
	Equal variances not assumed	-5.338	462.206	.000	-1.1049

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter begins with a summary of the purpose, research questions, review of selected literature, and methodology. This is followed by a summary and discussion of the findings, as well as the conclusions. The chapter concludes with recommendations for practice and future research.

Summary of the Purpose and Research Questions

The purpose of this study was to compare the learning styles of community college students who enrolled in an online course (via the Internet) with the learning styles of comparable community college students who took the same courses on-campus. The study identified and compared the demographic characteristics, employment and occupational status, educational characteristics, course enrollment, time spent on classwork, and learning styles of students who enrolled in an online course and a traditional on-campus course.

The study was guided by the following research questions:

1. Are there differences in learning styles of students who enroll in courses taken online compared to students who take traditional courses on-campus in the community college level?

2. Are there differences in demographic characteristics (gender, age group,

marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income) of students who enroll in online courses compared to those of the traditional on-campus students in the community college level?

3. Are there differences in employment and occupational status of students who enroll in online courses compared to traditional on-campus students in the community college level?

4. Are there differences in educational characteristics (student status, highest level of education completed and college major) of students who enroll in an online course compared to the traditional on-campus course in a community college?

5. Does an online student spend more time on the class, on the average, each week than a student who takes traditional courses on-campus in a community college?

Summary of the Review of Selected Literature

The review of literature was divided into three sections, including distance education, learning styles, and community colleges. Initially instituted as a "substitute" type of education, instruction by distance education has advanced into a "preferred alternative" for millions of people who seek education and training. Today, distance education programs are being offered by colleges and universities, major corporations, and small businesses, educational agencies, government agencies, branches of the armed services, trade associations, religious institutions, service industries, political entities, private entrepreneurs, and charitable, nonprofit organizations (Distance Education and Training Council, 1998)

The technology of the Web also enriches the distance learning experience. Such technology provides content and interactive features that other distance learning methods lack, including: (1) expanded interaction with faculty through e-mail, bulletin boards, and multimedia lectures; (2) student-to-student interaction through email, bulletin boards, and chat room discussions; (3) superior presentation through graphics, audio, and video; (4) immediate access to course-related content such as lecture notes, reading, and links to relevant external sites; and (5) interactive learning and assessment tools (O'Leary, 2000).

Total distance learning market revenue is projected to reach approximately $3 billion by 2005, maintaining a 21% growth rate through the 1995-2005 forecast period (Kollie, 2000). The U.S. Department of Education reports that, in 1998, 1,680 academic institutions offered an estimated 5,400 online courses, for which more than 1.6 million students enrolled, a 70% increase over 1995. The Department further states that the trend continued at a rapid pace during the year 2000 (Boehle, Dobbs, & Stamps, 2000).

Research on learning and information processing suggests that individuals perceive and process information differently (Claxton & Murrell, 1987; Dunn, Dunn, & Price, 1985; Riding & Sadler-Smith, 1992). These differences can be understood in terms of learning styles. Learning styles are characterized by the degree to which the learner emphasizes abstractness over concreteness and action over reflection in the learning situation (Kolb, as cited in Mathew & Hamby, 1995).

Research that investigates learning styles of students is important because students learn best when they are taught through their own style of learning (Gordon, 1995). Ideally, lessons should be structured so that all learning styles are addressed,

enabling every student to become actively engaged in the lessons. The recognition that individuals have preferred learning styles is becoming an increasingly important consideration for designing and delivering instruction. In this regard, Claxton and Murrel (1987) consider learning style information an important tool for improving curricula and teaching in higher education.

The community college is a two-year school with three primary missions: (1) general education equivalent to the freshman and sophomore years at a four-year college or university; (2) vocational/adult basic education, remedial/developmental and occupational training; and (3) community service (Callan, 1997). Community colleges are the primary means of expanding opportunities for college education and are considered to be portals to social mobility. They provide opportunities for technical and occupational training, meet the needs of those aiming for a bachelor's degree, and promote social equity.

The profile of the community college student is changing. Community college students today are older, at least 25 years of age, more ethnically diverse, and females outnumber males. In addition, due to the diversity of their lifestyles, many find it easier to "attend" community college as online than as traditional students.

Summary of the Methodology

The review of literature was conducted at the Mallinckrodt Library in Wilmette, Illinois and through various online database catalogs available through Loyola University in Chicago and the College of Lake County in Grayslake, Illinois.

The following resources were utilized for the review of selected literature:

Educational Resources Information Center (ERIC), EDBSCO Databases, Psychological Abstracts, FirstSearch, Wilson Databases, Virtual Illinois Catalog, LIAison/Online (North Suburban Library System Union List), and Dissertation Abstracts International. The American Association of Community Colleges, American Council on Education, Distance Education and Training Council, the Institute for Higher Education Policy, and University Continuing Education Association were contacted to get the findings of research pertinent to the study. The Publication Manual of the American Psychological Association (4th ed., 1994) was used as a guide to form and style for this study along with the Loyola University Chicago, Graduate School of Education, Dissertation Format Guidelines, A User-Friendly Guide.

The main methodology of this study was survey research. The surveys were administered during the spring semester 2001. To qualify for the study, participants had to be enrolled in at least one course during the spring semester, either online or on-campus. The participants were chosen from courses that were taught over the Internet in the spring 2001 semester and were compared to participants who were taking the same course on-campus during the same semester. During the spring semester 2001, 31 different classes were taught online. The number of students from the community college enrolled in either an online course or traditional course was 15,368 as of January 26, 2001, the tenth day of classes.

The survey instrument was the Barsch Learning Style Inventory, which was obtained through the Academic Therapy Publications in Novato, California. The demographic section was developed by the researcher and was used to gather information

about the sample. The data included the following: average time spent on class work each week, course enrolled in and section number, student status, gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, employment status, occupational status, total family income, highest level of education completed, and college major.

The data were analyzed at the home of the researcher and at the computer laboratory in the School of Education at Loyola University of Chicago. The software for data analysis was the Statistical Package for the Social Sciences (SPSS).

Descriptive statistics, including means, standard deviations, frequencies, and percentages were utilized to report data generated by responses to the survey items related to demographic information, and learning styles. Inferential statistics, including independent t-tests, were used to determine the differences in the amount of time spent on class work between online and traditional students. Crosstabulation tests were used to compare the online and traditional students in regard to the demographic data. Section categories (SECTCAT) were used to group the online students and traditional students to crosstabulate the demographic data. When considering the crosstabulations, percentage values were used to determine differences.

Summary of the Findings

Of the 1,302 surveys distributed to traditional students, all were returned, for a response rate of 100.0%. Of the 587 surveys distributed to online students, 340 were returned, for a response rate of 57.9%. Of the 1,642 returned surveys, all were usable and only a few surveys were missing demographic data.

The major findings of the study were as follows. The majority of the respondents were female, full-time students, less than 25 years of age, White/Caucasian, and had taken some past college courses. The most frequent major fields of study among respondents were business, education, computers, criminal justice, and accounting.

Research Question 1

Are there differences in learning styles of students who enroll in courses taken online compared to students who take traditional courses on-campus in the community college level?

When comparing traditional and online students, online students had a significantly stronger preference for a visual learning style than did traditional students. Traditional students had a significantly stronger preference for an auditory learning style than did online students. Traditional students also had a stronger preference for a kinesthetic learning style. Both traditional and online students had a similar preference for a tactile learning style.

Research Question 2

Are there differences in demographic characteristics (gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income) of students who enroll in online courses compared to those of the traditional on-campus students in the community college level?

When comparing traditional and online students for demographic characteristics (gender, age group, marital status, number of dependent children, racial or ethnic background, Spanish/Hispanic origin, and total family income), the following results

were found. In terms of gender, females were more frequently enrolled in online instruction, while males were found more often in traditional instruction. In regard to age, online students were predominately 26-55 years of age, while traditional students were generally less than 25 years of age.

For marital status, online students were generally married or divorced, and traditional students were generally never married. In regard to the number of dependent children, online students had children living at home, while traditional students generally had no children. In the ethnic or race category, online students and traditional students were primarily White/Caucasian. The Hispanic-Any Race category was more strongly represented in the traditional sample than in the online sample. Further, online students were more likely to be of non-Hispanic origin, compared to the traditional students. In regard to total family income level, online students generally had family incomes of over $60,000 a year, while traditional students were more likely to have a lower family income.

Research Question 3

Are there differences in the employment and occupational status of students who enroll in online courses compared to traditional on-campus students in a community college level?

When comparing online and traditional students on employment and occupational status, the following results were found. In the employment status category, online students were predominately full-time status, and traditional students were generally of a part-time status. In the occupational category, online students were primarily

professionals, educators, or "other," while traditional students were mainly students, service workers, or sales representatives.

Research Question 4

Are there differences in educational characteristics (student status, highest level of education completed and college major) of students who enroll in an online course compared to the traditional on-campus course in a community college?

When comparing online and traditional students for educational characteristics, the following results were found. For student status, online students were part-time, and traditional students were full-time. For the highest level of education, online students generally had taken some college courses and beyond, while traditional students were more likely to only have a high school diploma.

Research Question 5

Does an online student spend more time on the class, on the average, each week than a student who takes traditional courses on-campus in a community college?

For average amount of time spent on the class in the average week, online students averaged over five hours per week, and traditional students averaged over four hours per week. Overall, the online students spent an additional hour each week, on the average, than students who took traditional courses on-campus in a community college.

Summary of the Addressing of the Research Questions

1. The typical online learner at this community college was primarily a visual learner, while the typical traditional learner was primarily an auditory or kinesthetic learner. Both online and traditional learners were equally distributed in terms of the

tactile learning style.

2. The typical online learner at this community college was female, 26 to 55 years old, married or divorced, and had children living at home. The typical traditional learner at this community college was male, less than 25 years old, had never been married, and had no children living at home.

3. The typical online learner and traditional learner at this community college were primarily White/Caucasian, while the Hispanic-Any Race category was more prevalent among the traditional student sample. Further, online students were more likely to be of non-Hispanic origin, compared to traditional students. Online students generally had total family incomes over $60,000, while traditional students were more likely to have lower total family incomes.

4. The typical online learner at this community college was in the employment sector as a full-time worker, and typical occupational status was professional, educator, or "other" occupational category. The typical traditional learner had a part-time status in the workforce or was employed as a student, service worker, or sales representative.

5. The typical online learner at this community college was a part-time student and had taken some college courses and beyond. The typical traditional learner at this community college was a full-time student and had at least graduated from high school.

6. The typical online learner at this community college spent, on the average, one hour more per week on class work than did the traditional learner.

Conclusions

In this section, the researcher presents conclusions based on a comparison of the results of the data analysis with past research findings.

Online learners at this community college had several distinguishing characteristics. The online learners were predominately visual learners and spent, on the average, an hour more per week on classwork than did their traditional student counterparts. There also more women than there are men taking online classes. The online learners at this community college were primarily married or divorced and had children living at home. These findings are in keeping with Hickson and Baltimore (1996), who found that females have more of a preference for visual learning tasks than do males.

The findings of this study also support research by the American Association of University Women Educational Foundation (2001), which found that the average online student is a woman, 34 years old, employed part-time, and has previous college credits. This report also found that many of these women have children and take their online courses late at night, after their children are in bed, or early in the morning before work.

The results also indicated that online learners at this community college were typically White/Caucasian, not of Spanish/Hispanic origin, and 26 to 55 years of age. The average online learner's total family income of over $60,000 a year was higher than that of the traditional learner. Online learners were typically full-time workers, and their professional status was as a professional, educator, or "other" occupational category. Typical online learners had more education than their traditional learner counterparts,

who had part-time student status. These findings are in keeping with those of the Distance Education and Training Council (DETC) (1998), which determined that the profile of the typical student is a median age of 31 years old, 48% percent male, and 90% employed at the time of course enrollment. Other studies have found that the majority of distance learners were at least 24 years old and employed (Burton, 1999; Mngomezulu, 1999; Sheets, 1992).

The traditional learners at this community college were primarily auditory or kinesthetic learners. Traditional learners were typically male, not married, under 25 years old, and had no dependent children living at home. They were White/Caucasian and more likely to be Hispanic-Any Race than were online learners. They also were more likely to be of Spanish/Hispanic origin then their online counterparts. The typical traditional learner had a lower total family income than did online learners. The traditional learner had a part-time job status and was employed as a student, service worker, or sales representative. The traditional learner was a full-time student and had graduated from high school.

Discussion and Implications

The findings of this study support the research on profiles of distance learning students (Burton, 1999; Hyatt, 1992; Mngomezulu, 1999; Sheets, 1992). Distance Education and Training Council (1998) surveyed its 61 accredited members to determine the profile of a typical student who enrolls with a DETC-accredited institution. Students are approximately 31 years old, 48% percent are male, 90% are employed at the time of enrollment, and 31% have their tuition paid by their employer.

The study identified the differences in learning styles of online and traditional students along with demographic characteristics, employment and occupational status, and educational characteristics at a local community college in Illinois. Knowles (1984) suggests that adults, who have lived longer than traditional aged students, have had more life experiences which may, in turn, be used by faculty and administrators to help improve or create a desirable learning environment. At the end of each semester, surveys may be used by program administrators to gather information regarding the strengths and weaknesses of the program. Feedback from these survey findings may then be used to improve the program.

This study also shows that majority of online students have a visual learning style preference. According to Kolb (1981), learning styles have both strong and weak points. Therefore, it is important for the learners to know their style of learning in order to identify and strengthen their weak points. Knowledge of their own learning styles may also help them to move away from their "comfort zone" by developing other styles of learning. This knowledge and recognition of one's own style of learning is necessary for the learners because faculty do not always match their teaching style with each student's learning style. Therefore, students should be able to learn in various styles in order to be comfortable in the learning environment. Research that investigates student learning styles is important because students learn best when they are taught through their own style of learning (Gordon, 1995). When the curriculum is integrated around a theme with proper attention given to brain compatibility, teaching strategies, and curriculum development, learning is enhanced (Kovalik, 1993). Research has shown that matching

teaching with learning styles results in significant improvement in academic performance (Griggs, 1995).

This study provides information on the learning styles of both online and traditional students. If an instructor knows that the majority of students prefer to learn from visual, rather than auditory information, then the instructor may choose, for example, to use more diagrams and pictures than lecture for instruction.

Knowledge of learning styles of the target audience also may help faculty and administrators in identifying those students whose styles put them at risk of dropping out of online courses. As a result, prevention programs that focus on modifying learning styles may be developed. According to Conti and Welborn (1986), learning styles can change. Kolb (1981) claims that individuals develop a learning style that has strong and weak points; therefore, students may benefit from information that could lead them towards the improvement of the weak dimension of their style of learning. This information may be more beneficial to the students if it is made available to them immediately after an orientation at the beginning of the semester, given that their learning styles have been diagnosed.

The age of the target audience is important for the faculty to acknowledge. When planning curriculum and instruction for an online course, the instructors must be mindful that the majority of their target audience is 25 years of age and older.

The majority of respondents in the study were female. According UCEA (2000), a great number of women prefer to study for college degree programs on a part-time basis. As such, administrators may use surveys to determine the factors that attracted students

who are currently enrolled in online program. This information may be useful in identifying the barriers, if any, that hinder males from taking online courses.

Another important finding from this study is that most online respondents were married. For success in distance education, support from partners or family members is crucial. A noisy study environment and lack of adequate study time can lead to dropping out of or failing the course. Further, lack of knowledge about how to manage such problems may lead to students to drop out. According to Moore and Kearsley (1996), counseling plays an important role in learning about the time demands that are involved in distance education and how such demands might affect other family members. Therefore, counseling sessions should be designed to provide distance learners with knowledge and skills that can help them cope with family problems while continuing their education.

Most respondents in this study were employed full-time. Thus, administrators must acknowledge that such students also need to focus on their full-time jobs. Mood (1995) further points out that stress at work can make it difficult for the student to concentrate on schoolwork at home. As a result, such students may fall behind in schoolwork and become discouraged, perhaps leading to dropping out. In designing successful distance education programs, therefore, administrators and faculty make take these factors into consideration. For instance, flexibility regarding submission deadlines for projects should be considered by the faculty.

In summary, the most successful educational programs make the learner the main focus of their programs. The findings of this study may, therefore, be useful to

administrators, faculty, and online and traditional students. Information that is provided about learning styles, age, gender, marital status, and employment status may aid administrators in the development of more effective programming. Similarly, knowing the characteristics of online students may help faculty in understanding who they are serving; they may then design their instruction with the specific audience in mind.

Recommendations

Based on the findings of this study, the following recommendations are offered for practice and for future research.

Recommendations for Practice

1. More effort should be made to market the online classes to recent high school graduates.

2. Local high schools in this community college district should begin to offer online classes to help articulation with the community college.

3. An effort should be made to market online classes to males since females predominate in online classes.

4. An effort should be made to keep adding new classes to the online curriculum, which would allow students in a variety of major areas to be able to complete their associate degree over the Internet.

5. An effort should be made to increase advertising and marketing of online education through the Internet.

Recommendations for Future Research

The following are recommendations for future research:

1. Future research could attempt to replicate this study using much larger samples.

2. Similar studies should be conducted to investigate the achievement and retention/attrition rates of online students, as compared to traditional students, at other community colleges.

3. Future research should be conducted at more community colleges to determine whether there is a relationship between demographic, education, employment, occupational and enrollment characteristics and the learning styles of online students.

4. More research should be conducted to compare the learning styles of online education students with those traditional students who attend on-campus classes using different learning style inventories.

APPENDIX A

LETTER OF CONSENT AND THE SURVEY INSTRUMENT

LOYOLA
UNIVERSITY
CHICAGO

SCHOOL OF EDUCATION

Mallinckrodt Campus
1041 Ridge Road
Wilmette, Illinois 60091-1591
Telephone: (847) 853-3000
Fax: (847) 853-3375

January 16, 2001

Dear Participant:

I am in the process of completing my doctoral dissertation in the Curriculum and Instruction department of the Graduate School at Loyola University in Chicago. I am a part-time professor at the College of Lake County in the Business Department.

The purpose of my study is to assess the different learning styles of students in various classes in a community college setting. Confidentiality and anonymity will be maintained at all times. There is no risk to the participant, and the participant may withdraw at any time.

The study consists of **one questionnaire** that consists of a total of **forty-six questions** that can be completed in **less than 10 minutes.** The Barsch Learning Style Inventory will assist the investigator in evaluating the students' individual learning style. Please give your instructor the completed questionnaire when you are finished.

Thank you for your participation in this research study.

Sincerely,

Alana Halsne

Alana Halsne
Ed.D. Candidate
Loyola University Chicago

The purpose of my study is to assess the different learning styles of students in various classes in a community college setting to finish my doctoral dissertation at Loyola University in Chicago. The study consists of one questionnaire that contains a total of forty-six questions, which can be completed in a total of 10 minutes. The Barsch Learning Style Inventory is being used to assist the investigator in evaluating the students' individual learning style.

The following **evaluation is a short, quick way of assessing your learning style.** This survey will establish how you learn best, e.g.., whether you are a **visual, auditory, tactile or kinesthetic learner.** By this we mean, whether you as an individual learn best through seeing things, hearing them, through the sense of touch, or through actually performing the task.

Thank you for your participation in this research study.

Either using a pen or pencil may be used to complete this questionnaire. **Besides each of the Statements listed below, please indicate your best answer by placing an "X" on the line, as to Often, Sometimes and Seldom. PLEASE DO NOT MARK IN BETWEEN THE COLUMNS.**

	Often	Sometimes	Seldom
1. Can remember more about a subject through listening than reading.	_____	_____	_____
2. I follow written directions better than oral directions.	_____	_____	_____
3. Once shown a new physical movement, I perform it quickly with few errors.	_____	_____	_____
4. I bear down extremely hard with a pen or pencil when writing.	_____	_____	_____
5. I require explanations of diagrams, graphs, or visual directions.	_____	_____	_____
6. I enjoy working with tools.	_____	_____	_____
7. I am skillful with and enjoy developing and making graphs and charts.	_____	_____	_____
8. I can tell if sounds match when presented with pairs of sounds.	_____	_____	_____
9. I can watch someone do a dance step and easily copy it myself.	_____	_____	_____
10. I can understand and follow directions on maps.	_____	_____	_____
11. I do better at academic subjects by listening to lectures and tapes.	_____	_____	_____
12. I frequently play with coins or keys in my pocket.	_____	_____	_____
13. I enjoy perfecting a movement in a sport or in dancing.	_____	_____	_____
14. I can better understand a news article by reading about it in the paper than by listening to the radio.	_____	_____	_____
15. I chew gum, smoke, or snack during studies.	_____	_____	_____
16. I feel the best way to remember is to picture it in my head.	_____	_____	_____

	Often	Sometimes	Seldom
17. I enjoy activities that make me aware of my body's movement.	_____	_____	_____
18. I would rather listen to a good lecture or speech than read the same material in a textbook.	_____	_____	_____
19. I consider myself an athletic person.	_____	_____	_____
20. I grip objects in my hands during learning.	_____	_____	_____
21. I would prefer listening to the news on the radio rather than reading about it in the newspaper.	_____	_____	_____
22. I like to obtain information on an interesting subject by reading relevant materials.	_____	_____	_____
23. I am highly aware of sensations and feelings in my hips and shoulders after learning a new movement on exercise.	_____	_____	_____
24. I follow oral directions better than written ones.	_____	_____	_____
25. It would be easy for me to memorize something if I could just use body movements at the same time.	_____	_____	_____
26. I like to write things down or take notes for visual review.	_____	_____	_____
27. I remember best when writing things down several times.	_____	_____	_____
28. I learn to spell better by requesting the letters out loud than by writing the word on paper.	_____	_____	_____
29. I frequently have the ability to visualize body movements to perform a task, e.g., correction of a golf swing, batting stance, dance position, etc.	_____	_____	_____
30. I could learn spelling well by tracing over the letters.	_____	_____	_____
31. I feel comfortable touching, hugging, shaking hands, etc.	_____	_____	_____
32. I am good at working and solving jigsaw puzzles and mazes.	_____	_____	_____

To put your answers in context, I would like to gather some personal information from you. Of course, your answers will be held in the strictest confidence. Place a check on the appropriate line after each statement.

33. How much **time** do you spend on this **class** on the **average each week?** _____ (e.g., 3 hrs/per week)

34. **Which course are you enrolled in and which section number?** _____ (Example: BUS 101, Section 01)

35. **Student status:** (check only one) _____ Full-time student _____ Part-time student

36. Your **gender** (check only one): _____ Male _____ Female

37. What is your **age group?** (check only one)

_____ 25 yrs. or less _____ 26-35 yrs. _____ 36-45 yrs. _____ 46-55 yrs.
_____ 56-65 yrs. _____ Over 65 yrs.

38. Your **marital status:** (check only one)

_____ Married _____ Separated _____ Widowed _____ Divorced _____ Never Married

39. How many **dependent children** do you have? _____ (total number of children under 18 yrs. living at home)

40. Which of the following **best** describes your **racial or ethnic background?** Please check one only.

_____ Asian American _____ Black/African American _____ White/Caucasian
_____ Hispanic (may be any race) _____ Native American _____ Pacific Islander
_____ Other (Please specify: _____)

41. Are you of **Spanish/Hispanic** origin? _____ (Yes or No)

42. **Employment status:** (check only one)
_____ Homemaker
_____ Not working for pay
_____ Full-time employment (More than 35 hrs/wk)
_____ Part-time employment (Less than 35 hrs/wk)
_____ Retired

43. What is your **occupational status?** (check only one)

_____ Business owner or manager _____ Clerical worker _____ Sales representative
_____ Service worker _____ Professional _____ Educator
_____ Skilled laborer or foreperson _____ Student _____ Homemaker
_____ Retired _____ Other (Please specify: _____)

44. What is your **total family income?** (check only one)

___Under $12499 ___$12500-14999 ___$15000-17499 ___$17500-19999 ___$20000-22499
___$22500-24999 ___$25000-29999 ___$30000-34999 ___$35000-39999 ___$40000-49999
___$50000-59999 ___$60000-74999 ___$75000 and over

45. **Highest level of education completed:** (check only one)

_____ High school graduate _____ Associate Degree _____ Master's Degree
_____ Some college courses taken _____ Bachelor's Degree _____ Doctorate/Professional Degree (e.g., Ph.D.)

46. What is your **college major?** _____

The purpose of my study is to assess the different learning styles of students in various classes in a community college setting to finish my doctoral dissertation at Loyola University in Chicago. The study consists of one questionnaire that contains a total of forty-six questions, which can be completed in a total of 10 minutes. The Barsch Learning Style Inventory is being used to assist the investigator in evaluating the students' individual learning style.

The following **evaluation is a short, quick way of assessing your learning style.** This survey will see what your best method is learning is, e.g.., whether you are a **visual, auditory, tactile or kinesthetic learner**. By this we mean, whether you as an individual learn best through seeing things, hearing them, through the sense of touch, or through actually performing the task.

Thank you for your participation in this research study.

Click on each drop down box to the right of the question and make your selection.

1. Can remember more about a subject through listening and reading.	Select:
2. I follow written directions better than oral directions.	Select:
3. Once shown a new physical movement, I perform it quickly with few errors.	Select:
4. I bear down extremely hard with a pen or a pencil when writing.	Select:
5. I require explanations of diagrams, graphs, or visual directions.	Select:
6. I enjoy working with tools.	Select:
7. I am skillful with and enjoy developing and making graphs and charts.	Select:
8. I can tell if sounds match when presented with pairs of sounds.	Select:
9. I can watch someone do a dance step and easily copy it myself.	Select:
10. I can understand and follow directions on maps.	Select:
11. I do better at academic subjects by listening to lectures and tapes.	Select:
12. I frequently play with coins or keys in my pocket.	Select:
13. I enjoy perfecting a movement in a sport or in dancing.	Select:
14. I can better understand a news article by reading about it in the paper than listening to it on the radio.	Select:

15. I chew gum, smoke, or snack during studies.	Select:
16. I feel the best way to remember is to picture it on my head.	Select:
17. I enjoy activities that make me aware of my body's movement.	Select:
18. I would rather listen to a good lecture or speech than read the same material in a textbook.	Select:
19. I consider myself an athletic person.	Select:
20. I grip objects in my hands during learning.	Select:
21. I would prefer listening to the news on the radio rather than reading about it in the newspaper.	Select:
22. I like to obtain information on an interesting subject by reading relevant materials.	Select:
23. I am highly aware of sensations and feelings in my hips and shoulders after learning a new movement on exercise.	Select:
24. I follow oral directions better than written ones.	Select:
25. It would be easy for me to memorize something if I could just use body movements at the same time.	Select:
26. I like to write things down or take notes for visual review.	Select:
27. I remember things best when writing things down several times.	Select:
28. I learn to spell better by requesting the letters out loud than by writing the word on paper.	Select:
29. I frequently have the ability to visualize body movements to perform a task, e.g., correction of a golf swing, batting stance, dance position, etc.	Select:
30. I could learn spelling well by tracing over the letters.	Select:
31. I feel comfortable touching, hugging, shaking hands, etc.	Select:
32. I am good at working and solving jigsaw puzzles and mazes.	Select:

33. How much time do you spend on this class on the average each week? (e.g. 3 hrs/per week)	
34. Which course are you enrolled in and which section number?	Select A Course
35. Student status:	Select:
36. Your gender:	Select:
37. What is your age group?	Select:
38. Your marital status:	Select:
39. How many dependent children do you have? (total number of children under 18 yrs. living at home)	
40. Which of the following best describes your racial or ethnic background?	Select:
41. Are you of Spanish/Hispanic origin?	Select:
42. Employment Staus:	Select:
43. What is your occupational status?	Select:
44. What is your total family income?	Select:
45. Highest level of education completed:	Select:
46. What is your college major?	

Send My Responses | Clear the Form

Barsch Learning Style Inventory, Jeffrey R. Barsch, Ed.D. Academic Therapy Publications, Novato, CA.

APPENDIX B

ACADEMIC THERAPY PUBLICATIONS LETTER OF PERMISSION

ACADEMIC
THERAPY
PUBLICATIONS

High Noon Books
Ann Arbor Division

November 7, 2000

Alana M. Halsne
1072 Manchester Circle
Grayslake, IL 60030

Dear Ms Halsne,

Per your request, permission is granted as stated on your letter of November 1, 2000. You may use the Barsch Learning Style Inventory for your dissertation. There will not be any permission fee for the use of the Inventory for this purpose.

If the study will be published in the future there is a need to present a permission document.

Please send your findings to us when you have completed the study.

All good wishes,

Anna M. Arena
Publisher

Anna M. Arena
President
James A. Arena
Vice President

Special materials for special needs in today's education

20 Commercial Boulevard
Novato, CA 94949-6191

(415) 883-3314
(800) 422-7249
Outside CA

APPENDIX C

INSTITUTIONAL REVIEW BOARD AT LOYOLA UNIVERSITY

LOYOLA
UNIVERSITY
CHICAGO

Lake Shore Campus
Research Services
Institutional Animal Care and
Use Committee

6525 North Sheridan Road
Chicago, Illinois 60626
Telephone: (773) 508-2477

January 12, 2001

Alana Halsne
1072 Manchester Circle
Greyslake, IL 60030

Dear Ms. Halsne,

Thank you for submitting the research project entitled: **On-line vs. Traditionally Delivered Instruction: a Descriptive Study of Learner Characteristics in a Community College Setting,** for review by the Institutional Review Board for the Protection of Human Subjects. After careful examination of the materials you submitted, we have **approved** this project as described for a period of one year.

Approximately eleven months from your initial review date, you will receive a renewal form from the IRB. When you return this form, the IRB will at that time review your responses and, if appropriate, renew your approval for another twelve-month period. If you do not return that form by **November 16, 2001,** however, your approval will automatically lapse and your project will be suspended. **When a project is suspended, no more research or writing regarding human subjects may be done until the project is reevaluated and re-approved. I recommend that you respond to these annual renewals in a complete and timely fashion.**

This review procedure, administered by the IRB, in no way absolves you, the researcher, from the obligation to inform the IRB in writing immediately if you would like to change aspects of your approved project that involve human subjects. You, the researcher, are respectfully reminded that the University's ability to support its researchers in litigation is dependent upon conformity with continuing approval for their work. Should you have questions regarding this letter or general procedures, please contact me by letter or telephone as indicated on the letterhead above. Kindly quote File **#72412** if this project is specifically involved.

With best wishes for the success of your work,

Patricia Rupert

Dr. Patricia Rupert
Chair, Institutional Review Board

cc: Gatta, CIEP

LOYOLA
UNIVERSITY
CHICAGO

6525 North Sheridan Road
Chicago, Illinois 60626
Telephone: (773) 508-2479

Lake Shore Campus
Research Services
Institutional Review Board for
The Protection of Human Subjects - Lakeside

October 2, 2001

Alana Halsne
1072 Manchester Circle
Greyslake, IL 60030

Dear Ms. Halsne,

Thank you for requesting an extension to IRB file **#72412** entitled, *"On-Line vs. Traditionally Delivered Instruction..."* After careful examination of the materials you submitted, the Board has approved this project as described for an additional 1-year period. Your next expiration date is **November 16, 2002.**

If you wish to amend any part(s) of your project during this one year approval period, you must submit the *Application for Amendment to Research Protocol* form, located on Loyola's IRB website in the "downloads" section, and submit it to the IRB for review (*directions to website below). **You may not implement any proposed changes until the IRB has approved them.** The sole exception to this requirement is in the case of a decision not to pursue the project--that is, not to use the research instruments, procedures, or populations originally approved. You are respectfully reminded that the University's willingness to support or defend its researchers in legal cases that may arise as a result of their use of human subjects is dependant upon conformity with Federal and University policies regarding IRB approval for their work.

If you complete this project prior to your next expiration date, kindly fill out the *Request to Close a Project* form, also located on the IRB website. Your project is considered "complete" when you have finished the data collection, analysis, and writing/publication phases of the project.

Thank you very much for your continued cooperation. If you have questions please feel free to contact Dana Vitullo, Compliance Manager, at (773) 508-2689.

Sincerely,

Patricia Rupert

Patricia Rupert, Ph.D.
Chair, Institutional Review Board

*Directions to website:

1. Go to Loyola's home page at www.luc.edu
2. Click "Faculty and Staff Resources"
3. Click "Faculty Resources" (left)
4. Click "Research Services" (right)
5. Click "Research Compliance" (top)
6. Click "Institutional Review Board" (within text)
   You've reached the IRB website!

APPENDIX D

LETTER OF PERMISSION FROM THE OFFICE OF INSTITUTIONAL EFFECTIVENESS, PLANNING, AND RESEARCH AT THE COLLEGE OF LAKE COUNTY

COLLEGE OF LAKE COUNTY
19351 West Washington Street
Grayslake, Illinois 60030-1198
(847) 223-6601

October 18, 2000

The Chair, IRB, c/o Research Services
Loyola University of Chicago
6525 N. Sheridan Road
Chicago, IL 60626

Dear Chair, IRB:

I have reviewed the research proposed by Alana Halsne and have approved of her conducting a survey of the College of Lake County students. She has agreed to the following:

1. she will submit a copy of the final survey instrument to my office for approval before distribution,
2. she will get permission of the faculty before surveying students in their classes, and
3. she will share a summary of her findings with my office.

If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Nancy McNerney, Ph.D.
Assistant Vice President
Institutional Effectiveness, Planning
And Research

NM/sw
Cc: Carole Bulakowski

APPENDIX E

COURSE TITLE

Course Title

	Frequency	Percent	Valid Percent	Cumulative Percent
ANT	61	3.7	3.7	3.7
BIO	79	4.8	4.8	8.5
BUS	199	12.1	12.1	20.7
CIS	114	6.9	7.0	27.6
COM	98	6.0	6.0	33.6
CRJ	65	4.0	4.0	37.6
ENG	186	11.3	11.3	48.9
FST	20	1.2	1.2	50.1
GEO	49	3.0	3.0	53.1
HST	178	10.8	10.9	64.0
HUM	70	4.3	4.3	68.2
MTH	318	19.4	19.4	87.6
PSY	81	4.9	4.9	92.6
SOC	122	7.4	7.4	100.0
Total	1640	99.9	100.0	
Missing				
999	2	.1	100.0	
Total	1642	100.0		

Note:

APPENDIX F

COURSE NUMBER

Course Number

	Frequency	Percent	Valid Percent	Cumulative Percent
101	71	4.3	4.3	4.3
102	29	1.8	1.8	6.1
108	128	7.8	7.8	13.9
115	46	2.8	2.8	16.7
116	33	2.0	2.0	18.7
120	167	10.2	10.2	28.9
121	515	31.4	31.4	60.3
122	50	3.0	3.0	63.4
123	8	.5	.5	63.8
124	49	3.0	3.0	66.8
126	11	.7	.7	67.5
127	34	2.1	2.1	69.6
128	30	1.8	1.8	71.4
177	18	1.1	1.1	72.5
216	16	1.0	1.0	73.5
217	2	.1	.1	73.6
218	3	.2	.2	73.8
219	13	.8	.8	74.6
221	179	10.9	10.9	85.5
222	208	12.7	12.7	98.2
226	4	.2	.2	98.4
231	26	1.6	1.6	100.0
Total	1640	99.9	100.0	
Missing				
999	2	.1		
Total	1642	100.0		

APPENDIX G

SECTION NUMBER

Section Number

	Frequency	Percent	Valid Percent	Cumulative Percent
1	244	14.9	14.9	14.9
2	153	9.3	9.3	24.2
3	171	10.4	10.4	34.6
4	57	3.5	3.5	38.1
5	34	2.1	2.1	40.1
6	18	1.1	1.1	41.2
7	79	4.8	4.8	46.0
8	48	2.9	2.9	49.0
9	38	2.3	2.3	51.3
10	27	1.6	1.6	52.9
11	45	2.7	2.7	55.7
12	49	3.0	3.0	58.6
14	74	4.5	4.5	63.2
15	39	2.4	2.4	65.5
16	32	1.9	1.9	67.5
17	17	1.0	1.0	68.5
18	40	2.4	2.4	71.0
19	21	1.3	1.3	72.2
20	14	.9	.9	73.1
21	22	1.3	1.3	74.4
32	17	1.0	1.0	75.5
33	1	.1	.1	75.5
101	28	1.7	1.7	77.2
200	12	.7	.7	78.0
300	8	.5	.5	78.4
301	14	.9	.9	79.3
800	317	19.3	19.3	98.6
801	23	1.4	1.4	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX H

FREQUENCIES STATISTICS

Frequencies Statistics

	Course Title	Course Number	Section Number	Student Status	Gender	Age Group Status
Valid	1640	1640	1642	1626	1614	1625
Missing	2	2	0	16	28	17
Mean	8.04	147.17	178.40	1.36	1.55	1.47
Standard Deviation	4.05	46.78	320.21	.48	.50	.88

	Marital Status	Dependent Children	Ethnic or Race Background	Other Ethnic Background	Hispanic Origin
Valid	1618	1624	1607	1642	1609
Missing	24	18	35	0	33
Mean	4.16	.42	3.28		1.89
Standard Deviation	1.58	.88	1.32		.31

	Employment Status	Occupational Category/DOT	Income Level	Educational Level	Major In College
Valid	1617	1591	1436	1617	1642
Missing	25	51	206	25	0
Mean	1.84	6.52	8.96	1.99	
Standard Deviation	.87	3.05	4.29	.90	

Note:

APPENDIX I

GENDER FREQUENCY

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	726	44.2	45.0	45.0
Female	888	54.1	55.0	100.0
Total	1614	98.3	100.0	
Missing 999	28	1.7		
Total	1642	100.0		

Note:

APPENDIX J

STUDENT STATUS FREQUENCY

Student Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Full-Time Status	1038	63.2	63.8	63.8
Part-Time Status	588	35.8	36.2	100.0
Total	1626	99.0	100.0	
Missing 999	16	1.0		
Total	1641	100.0		

Note:

APPENDIX K

AGE GROUP FREQUENCY

Age Group

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 25	1179	71.8	72.6	72.6
26-35	232	14.1	14.3	86.8
36-45	131	8.0	8.1	94.9
46-55	70	4.3	4.3	99.2
56-65	11	.7	.7	99.9
Over 65	2	.1	.1	100.0
Total	1625	99.0	100.0	
Missing 999	17	1.0		
Total	1642	100.0		

Note:

APPENDIX L

MARITAL STATUS FREQUENCY

Marital Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Married	311	18.9	19.2	19.2
Separated	14	.9	.9	20.1
Widowed	9	.5	.6	20.6
Divorced	62	3.8	3.8	24.5
Never Married	1222	74.4	75.5	100.0
Total	1618	98.5	100.0	
Missing 999	24	1.5		
Total	1642	100.0		

Note:

APPENDIX M

DEPENDENT CHILDREN FREQUENCY

Dependent Children

	Frequency	Percent	Valid Percent	Cumulative Percent
0	1253	76.3	77.2	77.2
1	172	10.5	10.6	87.7
2	120	7.3	7.4	95.1
3	59	3.6	3.6	98.8
4	15	.9	.9	99.7
5	5	.3	.3	100.0
Total	1624	98.9	100.0	
Missing 999	18	1.1		
Total	1642	100.0		

Note:

APPENDIX N

ETHNIC OR RACE BACKGROUND FREQUENCY

Ethnic or Race Background

	Frequency	Percent	Valid Percent	Cumulative Percent
Asian American	67	4.1	4.2	4.2
Black/African American	99	6.0	6.2	10.3
White/Caucasian	1252	76.2	77.9	88.2
Native American	11	.7	.7	88.9
Pacific Islander	11	.7	.7	89.6
Other	24	1.5	1.5	91.1
Hispanic-Any Race	143	8.7	8.9	100.0
Total	1607	97.9	100.0	
Missing 999	35	2.1		
Total	1642	100.0		

Note:

APPENDIX O

OTHER ETHNIC BACKGROUND FREQUENCY

Other Ethnic Background

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1634	99.5	99.5	99.5
Albanian	1	.1	.1	99.6
Arabian	1	.1	.1	99.6
Egyptian	1	.1	.1	99.7
Indian	1	.1	.1	99.8
Middle East	1	.1	.1	99.8
Middle Eastern	1	.1	.1	99.9
Pakistani	1	.1	.1	99.9
Serbian	1	.1	.1	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX P

HISPANIC ORIGIN FREQUENCY

Hispanic Origin

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	171	10.4	10.6	10.6
No	1438	87.6	89.4	100.0
Total	1609	98.0	100.0	
Missing 999	33	2.0		
Total	1642	100.0		

Note:

APPENDIX Q

EMPLOYMENT STATUS FREQUENCY

Employment Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Full-Time Status	612	37.3	37.8	37.8
Part-Time Status	800	48.7	49.5	87.3
Homemaker	65	4.0	4.0	91.3
Not Working For Pay	135	8.2	8.3	99.7
Retired	5	.3	.3	100.0
Total	1617	98.5	100.0	
Missing 999	25	1.5		
Total	1642	100.0		

Note:

APPENDIX R

OCCUPATIONAL STATUS FREQUENCY

Occupational Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Business Owner or Manager	82	5.0	5.2	5.2
Clerical Worker	141	8.6	8.9	14.0
Sales Representative	118	7.2	7.4	21.4
Service Worker	154	9.4	9.7	31.1
Skilled Laborer or Foreman	77	4.7	4.8	36.0
Professional	142	8.6	8.9	44.9
Educator	62	3.8	3.9	48.8
Student	497	30.3	31.2	80.0
Homemaker	48	2.9	3.0	83.0
Retired	4	.2	.3	83.3
Other	266	16.2	16.7	100.0
Total	1591	96.9	100.0	
Missing 999	51	3.1		
Total	1642	100.0		

Note:

APPENDIX S

INCOME LEVEL FREQUENCY

Income Level

	Frequency	Percent	Valid Percent	Cumulative Percent
Under $12499	157	9.6	10.9	10.9
12500-14999	60	3.7	4.2	15.1
15000-17499	54	3.3	3.8	18.9
17500-19999	29	1.8	2.0	20.9
20000-22499	43	2.6	3.0	23.9
22500-24999	63	3.8	4.4	28.3
25000-29999	57	3.5	4.0	32.2
30000-34999	63	3.8	4.4	36.6
35000-39999	66	4.0	4.6	41.2
40000-49999	108	6.6	7.5	48.7
50000-59999	125	7.6	8.7	57.5
60000-74999	176	10.7	12.3	69.7
75000-over	435	26.5	30.3	100.0
Total	1436	87.5	100.0	
Missing 999	206	12.5		
Total	1642	100.0		

Note:

APPENDIX T

EDUCATIONAL LEVEL FREQUENCY

Educational Level

	Frequency	Percent	Valid Percent	Cumulative Percent
High School Graduate	424	25.8	26.2	26.2
Some College Courses Taken	965	58.8	59.7	85.9
Associate Degree	111	6.8	6.9	92.8
Bachelor's Degree	63	3.8	3.9	96.7
Master's Degree	48	2.9	3.0	99.6
Doctorate/Professional Degree	6	.4	.4	100.0
Total	1617	98.5	100.0	
Missing 999	25	1.5		
Total	1642	100.0		

Note:

APPENDIX U

COLLEGE MAJOR FREQUENCY

College Major Frequency

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	618	37.6	37.6	37.6
Business	235	14.6	14.6	52.2
Education	135	7.4	7.4	59.6
Computers	87	5.1	5.1	64.7
Criminal Justice	49	3.0	3.0	67.7
Accounting	41	2.5	2.5	70.2
Total	1642	100.0	100.0	

Note:

APPENDIX V

FREQUENCY STATISTICS FOR QUESTIONS 1-32

Frequencies Statistics For Questions 1-32

		Q1001	Q1002	Q1003	Q1004	Q1005	Q1006
N	Valid	1642	1642	1642	1642	1642	1642
	Missing	0	0	0	0	0	0
Mean		3.7454	3.7186	3.7223	2.7552	2.8380	3.5847
Std. Deviation		1.2470	1.3100	1.3126	1.6001	1.4053	1.4560

		Q1007	Q1008	Q1009	Q10010	Q10011	Q10012
N	Valid	1642	1642	1642	1642	1642	1642
	Missing	0	0	0	0	0	0
Mean		2.8928	4.0024	2.8210	4.2351	3.0049	2.2582
Std. Deviation		1.4986	1.2573	1.4843	1.2624	1.4428	1.5746

		Q10013	Q10014	Q10015	Q10016	Q10017	Q10018
N	Valid	1642	1642	1642	1642	1642	1642
	Missing	0	0	0	0	0	0
Mean		3.5030	3.1827	3.1048	3.9927	3.5128	3.9635
Std. Deviation		1.6264	1.4447	1.7508	1.2879	1.3602	1.3394

		Q10019	Q10020	Q10021	Q10022	Q10023	Q10024
N	Valid	1642	1642	1642	1642	1642	1642
	Missing	0	0	0	0	0	0
Mean		3.4373	3.0926	3.3946	3.6772	3.3922	2.9196
Std. Deviation		1.5834	1.5663	1.4596	1.2834	1.5079	1.4132

		Q10025	Q10026	Q10027	Q10028	Q10029	Q10030
N	Valid	1642	1642	1642	1642	1642	1642
	Missing	0	0	0	0	0	0
Mean		2.3605	4.2594	3.9927	2.2619	3.3678	2.1194
Std. Deviation		1.4061	1.2001	1.3471	1.4448	1.5044	1.4366

		Q10031	Q10032
N	Valid	1642	1642
	Missing	0	0
Mean		3.9233	3.8136
Std. Deviation		1.3540	1.3323

Note:

APPENDIX W

LEARNING STYLE QUESTIONS 1-3

Question 10001

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	127	7.7	7.7	7.7
Sometimes	776	47.3	47.3	55.0
Often	739	45.0	45.0	100.0
Total	1642	100.0	100.0	

Note:

Question 10002

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	163	9.9	9.9	9.9
Sometimes	726	44.2	44.2	54.1
Often	753	45.9	45.9	100.0
Total	1642	100.0	100.0	

Note:

Question 10003

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	164	10.0	10.0	10.0
Sometimes	721	43.9	43.9	53.9
Often	757	46.1	46.1	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX X

LEARNING STYLE QUESTIONS 4-6

Question 10004

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	638	38.9	38.9	38.9
Sometimes	567	34.5	34.5	73.4
Often	437	26.6	26.6	100.0
Total	1642	100.0	100.0	

Note:

Question 10005

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	477	29.0	29.0	29.0
Sometimes	821	50.0	50.0	79.0
Often	344	21.0	21.0	100.0
Total	1642	100.0	100.0	

Note:

Question 10006

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	265	16.1	16.1	16.1
Sometimes	632	38.5	38.5	54.6
Often	745	45.4	45.4	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX Y

LEARNING STYLE QUESTIONS 7-9

Question 10007

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	507	30.9	30.9	30.9
Sometimes	716	43.6	43.6	74.5
Often	419	25.5	25.5	100.0
Total	1642	100.0		

Note:

Question 10008

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	119	7.2	7.2	7.2
Sometimes	581	35.4	35.4	42.6
Often	942	57.4	57.4	100.0
Total	1642	100.0	100.0	

Note:

Question 10009

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	532	32.4	32.4	32.4
Sometimes	725	44.2	44.2	76.6
Often	385	23.4	23.4	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX Z

LEARNING STYLE QUESTIONS 10-12

Question 10010

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	133	8.1	8.1	8.1
Sometimes	362	22.0	22.0	30.1
Often	1147	69.9	69.9	100.0
Total	1642	100.0	100.0	

Note:

Question 10011

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	425	25.9	25.9	25.9
Sometimes	788	48.0	48.0	73.9
Often	429	26.1	26.1	100.0
Total	1642	100.0	100.0	

Note:

Question 10012

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	926	56.4	56.4	56.4
Sometimes	399	24.3	24.3	80.7
Often	317	19.3	19.3	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AA

LEARNING STYLE QUESTIONS 13-15

Question 10013

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	388	23.6	23.6	23.6
Sometimes	453	27.6	27.6	51.2
Often	801	48.8	48.8	100.0
Total	1642	100.0	100.0	

Note:

Question 10014

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	360	21.9	21.9	21.9
Sometimes	772	47.0	47.0	68.9
Often	510	31.1	31.1	100.0
Total	1642	100.0	100.0	

Note:

Question 10015

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	588	35.8	35.8	35.8
Sometimes	380	23.1	23.1	59.0
Often	674	41.0	41.0	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AB

LEARNING STYLE QUESTIONS 16-18

Question 10016

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	135	8.2	8.2	8.2
Sometimes	557	33.9	33.9	42.1
Often	950	57.9	57.9	100.0
Total	1642	100.0	100.0	

Note:

Question 10017

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	223	13.6	13.6	13.6
Sometimes	775	47.2	47.2	60.8
Often	644	39.2	39.2	100.0
Total	1642	100.0	100.0	

Note:

Question 10018

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	163	9.9	9.9	9.9
Sometimes	525	32.0	32.0	41.9
Often	954	58.1	58.1	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AC

LEARNING STYLE QUESTIONS 19-21

Question 10019

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	374	22.8	22.8	22.8
Sometimes	535	32.6	32.6	55.4
Often	733	44.6	44.6	100.0
Total	1642	100.0	100.0	

Note:

Question 10020

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	467	28.4	28.4	28.4
Sometimes	632	38.5	38.5	66.9
Often	543	33.1	33.1	100.0
Total	1642	100.0	100.0	

Note:

Question 10021

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	307	18.7	18.7	18.7
Sometimes	704	42.9	42.9	61.6
Often	631	38.4	38.4	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AD

LEARNING STYLE QUESTIONS 22-24

Question 10022

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	154	9.4	9.4	9.4
Sometimes	778	47.4	47.4	56.8
Often	710	43.2	43.2	100.0
Total	1642	100.0	100.0	

Note:

Question 10023

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	337	20.5	20.5	20.5
Sometimes	646	39.3	39.3	59.9
Often	659	40.1	40.1	100.0
Total	1642	100.0	100.0	

Note:

Question 10024

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	444	27.0	27.0	27.0
Sometimes	820	49.9	49.9	77.0
Often	378	23.0	23.0	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AE

LEARNING STYLE QUESTIONS 25-27

Question 10025

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	752	45.8	45.8	45.8
Sometimes	663	40.4	40.4	86.2
Often	227	13.8	13.8	100.0
Total	1642	100.0	100.0	

Note:

Question 10026

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	104	6.3	6.3	6.3
Sometimes	400	24.4	24.4	30.7
Often	1138	69.3	69.3	100.0
Total	1642	100.0	100.0	

Note:

Question 10027

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	167	10.2	10.2	10.2
Sometimes	493	30.0	30.0	40.2
Often	982	59.8	59.8	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AF

LEARNING STYLE QUESTIONS 28-30

Question 10028

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	843	51.3	51.3	51.3
Sometimes	562	34.2	34.2	85.6
Often	237	14.4	14.4	100.0
Total	1642	100.0	100.0	

Note:

Question 10029

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	341	20.8	20.8	20.8
Sometimes	658	40.1	40.1	60.8
Often	643	39.2	39.2	100.0
Total	1642	100.0	100.0	

Note:

Question 10030

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	944	57.5	57.5	57.5
Sometimes	477	29.0	29.0	86.5
Often	221	13.5	13.5	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AG

LEARNING STYLE QUESTIONS 31-32

Question 10031

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	172	10.5	10.5	10.5
Sometimes	540	32.9	32.9	43.4
Often	930	56.6	56.6	100.0
Total	1642	100.0	100.0	

Note:

Question 10032

	Frequency	Percent	Valid Percent	Cumulative Percent
Seldom	166	10.1	10.1	10.1
Sometimes	642	39.1	39.1	49.2
Often	834	50.8	50.8	100.0
Total	1642	100.0	100.0	

Note:

APPENDIX AH

MULTIVARIATE TESTS

Multivariate Tests[c]

Effect		Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	**Pillai's Trace**	.984	98329.024	1.000
	Wilks' Lambda	.984	98329.024	1.000
	Hotelling's Trace	.984	98329.024	1.000
	Roy's Largest Root	.984	98329.024	1.000
SECTCAT	**Pillai's Trace**	.053	92.163	1.000
	Wilks' Lambda	.053	92.163	1.000
	Hotelling's Trace	.053	92.163	1.000
	Roy's Largest Root	.053	92.163	1.000

Note:

a. Computed using alpha = 0.5
c. Design: Intercepts + SECTCAT

APPENDIX AI

LEVENE'S TEST FOR EQUALITY OF ERROR VARIANCES

Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
Visual	.000	1	1640	.997
Auditory	.079	1	1640	.779
Tactile	1.517	1	1640	.218
Kinesthetic	6.055	1	1640	.014

Note:

APPENDIX AJ

GENDER CROSSTABULATION

Gender * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Gender	**Male**	**Count**	618	108	726
		Expected Count	574.0	152.0	726.0
		Residual	44.0	-44.0	
		Std. Residual	1.8	-3.6	
		Percentage	48.4	32.0	
	Female	**Count**	658	230	888
		Expected Count	702.0	186.0	888.0
		Residual	-44.0	44.0	
		Std. Residual	-1.7	3.2	
		Percentage	51.6	68.0	
Total		**Count**	1276	338	1614
		Expected Count	1276.0	338.0	1614.0

Note:

APPENDIX AK

AGE GROUP CROSSTABULATION

Age Group Status * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Age Group Status	Less than 25	Count	1030	149	1179
		Expected Count	934.5	244.5	1179.0
		Residual	95.5	-95.5	
		Std. Residual	3.1	-6.1	
		Percentage	80.0	44.2	
	26-35	Count	140	92	232
		Expected Count	183.9	48.1	232.0
		Residual	-43.9	43.9	
		Std. Residual	-3.2	6.3	
		Percentage	10.9	27.3	
	36-45	Count	82	49	131
		Expected Count	103.8	27.2	131.0
		Residual	-21.8	21.8	
		Std. Residual	-2.1	4.2	
		Percentage	6.4	14.6	
	46-55	Count	27	43	70
		Expected Count	55.5	14.5	70.0
		Residual	-28.5	28.5	
		Std. Residual	-3.8	7.5	
		Percentage	2.1	12.7	
	56-65	Count	7	4	11
		Expected Count	8.7	2.3	11.0
		Residual	-1.7	1.7	
		Std. Residual	-.6	1.1	
		Percentage	0.5	1.2	
	Over 65	Count	2	0	2
		Expected Count	1.6	.4	2.0
		Residual	.4	-.4	
		Std. Residual	.3	-.6	
		Percentage	0.1	0.0	
Total		Count	1288	337	1625
		Expected Count	1288.0	337.0	1625.0

Note:

APPENDIX AL

MARITAL STATUS CROSSTABULATION

Marital Status * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Marital Status	Married	Count	169	142	311
		Expected Count	246.8	64.2	311.0
		Residual	-77.8	77.8	
		Std. Residual	-5.0	9.7	
		Percentage	13.2	42.5	
	Separated	Count	12	2	14
		Expected Count	11.1	2.9	14.0
		Residual	.9	-.9	
		Std. Residual	.3	-.5	
		Percentage	0.9	0.6	
	Widowed	Count	5	4	9
		Expected Count	7.1	1.9	9.0
		Residual	-2.1	2.1	
		Std. Residual	-.8	1.6	
		Percentage	0.4	1.2	
	Divorced	Count	37	25	62
		Expected Count	49.2	12.8	62.0
		Residual	-12.2	12.2	
		Std. Residual	-1.7	3.4	
		Percentage	2.9	7.5	
	Never Married	Count	1061	161	1222
		Expected Count	969.7	252.3	1222.0
		Residual	91.3	-91.3	
		Std. Residual	2.9	-5.7	
		Percentage	82.6	48.2	
Total		Count	1284	334	1618
		Expected Count	1284.0	334.0	1618.0

Note:

APPENDIX AM

DEPENDENT CHILDREN CROSSTABULATION

Dependent Children * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Dependent Children	0	Count	1063	190	1253
		Expected Count	991.4	261.6	1253.0
		Residual	71.6	-71.6	
		Std. Residual	2.3	-4.4	
		Percentage	82.7	56.0	
	1	Count	114	58	172
		Expected Count	136.1	35.9	172.0
		Residual	-22.1	22.1	
		Std. Residual	-1.9	3.7	
		Percentage	8.9	17.1	
	2	Count	66	54	120
		Expected Count	95.0	25.0	120.0
		Residual	-29.0	29.0	
		Std. Residual	-3.0	5.8	
		Percentage	5.1	15.9	
	3	Count	31	28	59
		Expected Count	46.7	12.3	59.0
		Residual	-15.7	15.7	
		Std. Residual	-2.3	4.5	
		Percentage	2.4	8.3	
	4	Count	9	6	15
		Expected Count	11.9	3.1	15.0
		Residual	-2.9	2.9	
		Std. Residual	-.8	1.6	
		Percentage	0.7	1.8	
	5	Count	2	3	5
		Expected Count	4.0	1.0	5.0
		Residual	-2.0	2.0	
		Std. Residual	-1.0	1.9	
		Percentage	0.2	0.9	
Total		Count	1285	339	1624
		Expected Count	1285.0	339.0	1624.0

Note:

APPENDIX AN

ETHNIC OR RACE BACKGROUND CROSSTABULATION

Ethnic or Race Background * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Ethnic or Race Background	Asian American	Count	57	10	67
		Expected Count	53.1	13.9	67.0
		Residual	3.9	-3.9	
		Std. Residual	.5	-1.0	
		Percentage	4.5	3.0	
	Black/African American	Count	79	20	99
		Expected Count	78.5	20.5	99.0
		Residual	.5	-.5	
		Std. Residual	-.1	-.1	
		Percentage	6.2	6.0	
	White/Caucasian	Count	970	282	1252
		Expected Count	992.6	259.4	1252.0
		Residual	-22.6	22.6	
		Std. Residual	-.7	1.4	
		Percentage	76.1	84.7	
	Native American	Count	6	5	11
		Expected Count	8.7	2.3	11.0
		Residual	-2.7	2.7	
		Std. Residual	-.9	1.8	
		Percentage	0.5	1.5	
	Pacific Islander	Count	11	0	11
		Expected Count	8.7	2.3	11.0
		Residual	2.3	-2.3	
		Std. Residual	.8	-1.5	
		Percentage	0.9	0.0	
	Other	Count	16	8	24
		Expected Count	19.0	5.0	24.0
		Residual	-3.0	3.0	
		Std. Residual	-.7	1.4	
		Percentage	1.3	2.4	
	Hispanic-Any Race	Count	135	8	143
		Expected Count	113.4	29.6	143.0
		Residual	21.6	-21.6	
		Std. Residual	2.0	-4.0	
		Percentage	10.5	2.4	
Total		Count	1274	333	1607
		Expected Count	1274.0	333.0	1607.0

Note:

APPENDIX AO

HISPANIC ORIGIN CROSSTABULATION

Hispanic Origin * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Hispanic Origin	Yes	Count	160	11	171
		Expected Count	135.8	35.2	171.0
		Residual	24.2	-24.2	
		Std. Residual	2.1	-4.1	
		Percentage	12.5	3.3	
	No	Count	1118	320	1438
		Expected Count	1142.2	295.8	1438.0
		Residual	-24.2	24.2	
		Std. Residual	-.7	1.4	
		Percentage	87.5	96.7	
Total		Count	1278	331	1609
		Expected Count	1278.0	331.0	1609.0

Note:

APPENDIX AP

INCOME LEVEL CROSSTABULATION

Income Level * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Income Level	Under $12499	Count	138	19	157
		Expected Count	122.5	34.5	157.0
		Residual	15.5	-15.5	
		Std. Residual	1.4	-2.6	
		Percentage	12.3	6.0	
	12500-14999	Count	53	7	60
		Expected Count	46.8	13.2	60.0
		Residual	6.2	-6.2	
		Std. Residual	.9	-1.7	
		Percentage	4.7	2.2	
	15000-17499	Count	48	6	54
		Expected Count	42.1	11.9	54.0
		Residual	5.9	-5.9	
		Std. Residual	.9	-1.7	
		Percentage	4.3	1.9	
	17500-19999	Count	20	9	29
		Expected Count	22.6	6.4	29.0
		Residual	-2.6	2.6	
		Std. Residual	-.6	1.0	
		Percentage	1.8	2.8	
	20000-22499	Count	37	6	43
		Expected Count	33.5	9.5	43.0
		Residual	3.5	-3.5	
		Std. Residual	.6	-1.1	
		Percentage	3.3	1.9	
	22500-24999	Count	55	8	63
		Expected Count	49.1	13.9	63.0
		Residual	5.9	-5.9	
		Std. Residual	.8	-1.6	
		Percentage	4.9	2.5	
	25000-29999	Count	43	14	57
		Expected Count	44.5	12.5	57.0
		Residual	-1.5	1.5	
		Std. Residual	-.2	.4	
		Percentage	3.8	4.4	
	30000-34999	Count	48	15	63
		Expected Count	49.1	13.9	63.0
		Residual	-1.1	1.1	
		Std. Residual	-.2	.3	
		Percentage	4.3	4.7	

			SECTCAT		
			Traditional	Online	Total
	35000-39999	Count	47	19	66
		Expected Count	51.5	14.5	66.0
		Residual	-4.5	4.5	
		Std. Residual	-.6	1.2	
		Percentage	4.2	6.0	
	40000-49999	Count	77	31	108
		Expected Count	84.2	23.8	108.0
		Residual	-7.2	7.2	
		Std. Residual	-.8	1.5	
		Percentage	6.9	9.9	
	50000-59999	Count	99	26	125
		Expected Count	97.5	27.5	125.0
		Residual	1.5	-1.5	
		Std. Residual	.2	-.3	
		Percentage	8.8	8.2	
	60000-74999	Count	123	53	176
		Expected Count	137.3	38.7	176.0
		Residual	-14.3	14.3	
		Std. Residual	-1.2	2.3	
		Percentage	11.0	16.8	
	75000-over	Count	332	103	435
		Expected Count	339.3	95.7	435.0
		Residual	-7.3	7.3	
		Std. Residual	-.4	.7	
		Percentage	29.7	32.7	
Total		Count	1120	316	1436
		Expected Count	1120.0	316.0	1436.0

Note:

APPENDIX AQ

EMPLOYMENT STATUS CROSSTABULATION

Employment Status * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Employment Status	Full-time status	Count	410	202	612
		Expected Count	484.1	127.9	612.0
		Residual	-74.1	74.1	
		Std. Residual	-3.4	6.5	
		Percentage	32.1	59.8	
	Part-time status	Count	711	89	800
		Expected Count	632.8	167.2	800.0
		Residual	78.2	-78.2	
		Std. Residual	3.1	-6.0	
		Percentage	55.6	26.3	
	Homemaker	Count	38	27	65
		Expected Count	51.4	13.6	65.0
		Residual	-13.4	13.4	
		Std. Residual	-1.9	3.6	
		Percentage	2.9	8.0	
	Not working for pay	Count	116	19	135
		Expected Count	106.8	28.2	135.0
		Residual	9.2	-9.2	
		Std. Residual	.9	-1.7	
		Percentage	9.1	5.6	
	Retired	Count	4	1	5
		Expected Count	4.0	1.0	5.0
		Residual	.0	.0	
		Std. Residual	.0	.0	
		Percentage	.3	.3	
Total		Count	1279	338	1617
		Expected Count	1279.0	338.0	1617.0

Note:

APPENDIX AR

OCCUPATIONAL STATUS CROSSTABULATION

Occupational Status Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Occupational Category/DOT	Business owner or manager	Count	71	11	82
		Expected Count	64.8	17.2	82.0
		Residual	6.2	-6.2	
		Std. Residual	.8	-1.5	
		Percentage	5.6	3.3	
	Clerical worker	Count	105	36	141
		Expected Count	111.5	29.5	141.0
		Residual	-6.5	6.5	
		Std. Residual	-.6	1.2	
		Percentage	8.3	10.8	
	Sales representative	Count	104	14	118
		Expected Count	93.3	24.7	118.0
		Residual	10.7	-10.7	
		Std. Residual	1.1	-2.2	
		Percentage	8.3	4.2	
	Service worker	Count	148	6	154
		Expected Count	121.8	32.2	154.0
		Residual	26.2	-26.2	
		Std. Residual	2.4	-4.6	
		Percentage	11.8	1.8	
	Skilled laborer or foreman	Count	63	14	77
		Expected Count	60.9	16.1	77.0
		Residual	2.1	-2.1	
		Std. Residual	.3	-.5	
		Percentage	5.0	4.2	
	Professional	Count	66	76	142
		Expected Count	112.3	29.7	142.0
		Residual	-46.3	46.3	
		Std. Residual	-4.4	8.5	
		Percentage	5.2	22.9	
	Educator	Count	38	24	62
		Expected Count	49.0	13.0	62.0
		Residual	-11.0	11.0	
		Std. Residual	-1.6	3.1	
		Percentage	3.0	7.2	

			SECTCAT		
			Traditional	Online	Total
	Student	Count	443	54	497
		Expected Count	393.0	104.0	497.0
		Residual	50.0	-50.0	
		Std. Residual	2.5	-4.9	
		Percentage	35.3	16.2	
	Homemaker	Count	29	19	48
		Expected Count	38.0	10.0	48.0
		Residual	-9.0	9.0	
		Std. Residual	-1.5	2.8	
		Percentage	2.3	5.7	
	Retired	Count	3	1	4
		Expected Count	3.2	.8	4.0
		Residual	-.2	.2	
		Std. Residual	-.1	.2	
		Percentage	.2	.3	
	Other	Count	188	78	266
		Expected Count	210.3	55.7	266.0
		Residual	-22.3	22.3	
		Std. Residual	-1.5	3.0	
		Percentage	15.0	23.4	
Total		Count	1258	333	1591
		Expected Count	1258.0	333.0	1591.0

Note:

APPENDIX AS

STUDENT STATUS CROSSTABULATION

Student Status * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Student Status	Full-time status	Count	912	126	1038
		Expected Count	822.2	215.8	1038.0
		Residual	89.8	-89.8	
		Std. Residual	3.1	-6.1	
		Percentage	70.8	37.3	
	Part-time status	Count	376	212	588
		Expected Count	465.8	122.2	588.0
		Residual	-89.8	89.8	
		Std. Residual	-4.2	8.1	
		Percentage	29.2	62.7	
Total		Count	1288	338	1626
		Expected Count	1288.0	338.0	1626.0

Note:

APPENDIX AT

EDUCATIONAL LEVEL CROSSTABULATION

Educational Level * SECTCAT Crosstabulation

			SECTCAT		
			Traditional	Online	Total
Educational Level	High School Graduate	Count	399	25	424
		Expected Count	335.4	88.6	424.0
		Residual	63.6	-63.6	
		Std. Residual	3.5	-6.8	
		Percentage	31.2	7.4	
	Some College Courses Taken	Count	739	226	965
		Expected Count	763.3	201.7	965.0
		Residual	-24.3	24.3	
		Std. Residual	-.9	1.7	
		Percentage	57.8	66.9	
	Associate Degree	Count	85	26	111
		Expected Count	87.8	23.2	111.0
		Residual	-2.8	2.8	
		Std. Residual	-.3	.6	
		Percentage	6.7	7.7	
	Bachelor's Degree	Count	30	33	63
		Expected Count	49.8	13.2	63.0
		Residual	-19.8	19.8	
		Std. Residual	-2.8	5.5	
		Percentage	2.3	9.7	
	Master's Degree	Count	21	27	48
		Expected Count	38.0	10.0	48.0
		Residual	-17.0	17.0	
		Std. Residual	-2.8	5.4	
		Percentage	1.6	8.0	
	Doctorate/Professional Degree	Count	5	1	6
		Expected Count	4.7	1.3	6.0
		Residual	.3	-.3	
		Std. Residual	.1	-.2	
		Percentage	.4	.3	
Total		Count	1279	338	1617
		Expected Count	1279.0	338.0	1617.0

Note:

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