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A mixed methods study of secondary distance-learning students: Exploring learning styles

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COLLEGE OF EDUCATION

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2009

ABSTRACT

A Mixed Methods Study of Secondary Distance-Learning Students:
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by

Jennifer M. Roberts

M.A. University of North Alabama, 1996
B.S. University of North Alabama, 1992

Doctoral Study Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education
The Teacher as Leader

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ABSTRACT

Public education in the United States has experienced an increase in distance-learning (DL) opportunities. Because research has focused on student achievement in post-secondary DL programs, little is known about secondary students' experiences. The purpose of the current study was to explore DL applicability within secondary education. Specific research questions addressed by the concurrent mixed methods nested study included examining students' opinions and experiences in a secondary DL course and determining whether individual learning styles were addressed. Structured interviews, group discussions, and a survey were used to gather data over 2 months from 14 students in grades 9 through 12 participating in a state wide Alabama DL program. Surveys were used to assess and match DL activities to Gardner's 8 learning styles. Interviews and discussions explored students' opinions about activities and components and perceptions of their academic achievement. Quantitative data indicated that students reported some activities related to all learning styles with the greatest coverage observed for linguistic methods. Qualitative data were open and axial coded within each research question and the coded data was analyzed to define common DL practices used to meet specific styles and emergent themes related to student perceptions. Triangulation of results showed DL students felt successful based on their participation in a spectrum of activities including interactive video, e-mail, online discussion boards and tutoring sessions, and self-directed learning. The study contributes to positive social change by documenting a variety of strategies employed to successfully engage secondary DL students who present a variety learning styles and challenges related to DL curricular content and modes of delivery.

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To Gina, a very good friend, with whom I have taken numerous stress relieving walks. I have truly found a confidant and supportive friend with whom I can share my passion for improving the quality of education for secondary students.

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SECTION 1: INTRODUCTION TO THE STUDY

Introduction

Students of the 21st century know considerably more about computers than their teachers as "they prefer to access subject information on the Internet, where it is more abundant, more accessible, and more up-to-date" (U.S Department of Education, 2004, p. 4). Progressive teachers, administrators, and superintendents of a "generation of students weaned on the marvels of technology" understand this fact (U.S Department of Education, 2004, p. 3). These same progressive educators strive to find ways to motivate and provide opportunities for their students to succeed in the global economy thus providing fair and equal educational opportunities for all students regardless of where they attend school (No Child Left Behind [NCLB], 2002). The single most important factor in this push to excellence in education is the *No Child Left Behind Act* (NCLB, 2002). Additionally, over the last 5 years, the educational system in the United States has seen an explosion of e-learning or distance-learning opportunities available to schools (U.S Department of Education, 2004). This research study examined students enrolled in a distance-learning course and determined whether their learning styles were being met through the online method of content delivery.

Approximately one-third of public schools in the United States provide some type of virtual or e-learning courses for their students (Setzer & Lewis, 2005). The use of e-learning or distance-learning provides these students with the opportunity to engage in an instructional environment adapted for their needs, wherever and however they require

instruction. In addition, these learning environments give parents a choice of instructional methods for their children (U.S Department of Education 2004). Furthermore, Setzer and Lewis (2005) state that distance-learning programs allow schools to offer students expanded course offerings such as advanced placement or foreign language courses.

Previous studies on distance-learning (Cavanaugh, 2001; Phipps & Merisotis, 1999; Rice, 2006) have revealed there is no difference between online and traditional classroom student achievement. This finding is labeled the "no significant difference phenomenon" and has been noted in adult as well as K-12 distance-learning programs. Additionally, there has been considerable research conducted with adult distance learners (Everett, 1998; Mishra, 2005; Mupinga, Nora, & Yaw, 2006; Phipps & Merisotis, 1999; Russell, 1999). This study is significant in that it examined new ideas of distance-learning research as it explores meeting learning styles of students in grades 9 through 12 enrolled in a distance-learning course. A more comprehensive summary of investigated research related to various online educational libraries and content-related published works on distance-learning as well as the multiple intelligence theory research will be further explored in Section 2.

Problem Statement

Previous studies have demonstrated that using computer technology in the classroom "could motivate students, enhance instruction for special needs students, improve students' attitudes toward learning, and motivate teachers and free them from some routine instructional tasks" (Bialo & Sivin-Kachala, 1999, p. 1). In addition, studies have also shown that technology used as a learning tool "could make a measurable

positive difference in student achievement, attitudes, and interaction with teachers and other students" (Bialo & Sivin-Kachala, 1999, ¶2). As distance-learning courses use technology to deliver content to students and because little is known about distance-learning programs in secondary education, the researcher chose to explore the following question: Does distance-learning provide for the learning styles of secondary students?

This study takes into account the implementation of the multiple intelligence theory as described by Gardner (1983) into a distance-learning program. Technology may help teachers implement the multiple intelligence theory (Lamb, 2001). Furthermore, distance-learning programs may provide students with content flexibility to meet specific learner styles, thus providing equitable educational opportunities and new learning experiences to students in a variety of localities (Cavanaugh, 1999). This mixed methods study integrated these components as it closely examined, through in-depth individual interviews, focus group discussions, and distance-learning surveys, how students' learning styles were met in a distance-learning classroom.

The researcher chose to examine the topic of distance-learning for two reasons. First, this method of content delivery was recently implemented in the state of Alabama, the researcher's home state, in the year 2006. Second, the Alabama State Superintendent, Dr. Joe Morton, has implemented several changes to Alabama's high school diploma. One of the changes is to automatically channel all freshman students into taking advanced diploma course work, which includes enrollment in at least one distance-learning course, to receive an advanced high school diploma. This could be in effect as early as fall of 2008 (Stephens, 2008). The results of this research may benefit teacher

leaders and administrators on state and local levels as it seeks to answer key questions about distance-learning.

Nature of the Study

Online learning is an emerging method of content instruction for the K-12 student. Several studies (Howard, Ellis & Rasmussen, 2004; Mupinga, Nora, & Yaw, 2006; Vincent, 2001) have also demonstrated that technology and multimedia are valuable tools that teachers can utilize to help meet the different learning styles of students. However, there is a lack of research in the K-12 area of distance-learning as many previous studies (Everett, 1998; Mishra, 2005; Mupinga, Nora, & Yaw, 2006; Phipps & Merisotis, 1999; Russell, 1999) have primarily focused on distance-learning in postsecondary schools. The researcher deduced that the reasoning behind this is two-fold: (a) Distance-learning in the K-12 area is an evolving method of content delivery and (b) the student population is highly protected and accessibility to subjects of study is limited.

The specific research design used in this study was a concurrent nested mixed methods study as described by Creswell (2003). This design involves gathering different types of information from the participants during the same time period using purposefully selected qualitative and quantitative instruments. The predominant method used to gather data for this study was qualitative through in-depth formal interviews conducted with participants. Additional data were gathered using quantitative methods. The qualitative data were analyzed using methods as described by Creswell (1998) and included open and axial coding of the interviews to reveal common themes and patterns. The quantitative data were analyzed by calculating the z-scores of the tabulation of the

responses on the distance-learning surveys. This was done in an effort to standardize the distribution of the responses and reveal patterns in the data.

Research Question

The following research questions guided the research process: Do students feel their learning styles are met in a distance-learning course?

Qualitative Research Subquestions

1. How are students' learning styles met in a distance-learning course?
2. What are essential components in a distance-learning course that help meet students' learning styles?
3. What activities do students report as being most helpful in learning content?
4. How do students feel about their achievement with regard to their learning styles being met?

Quantitative Research Question

Are students engaged in activities in a distance-learning course that represent all eight learning styles*?*

An explanation of the evaluation and examination process and the methodology utilized to explore the research questions of this study will be provided in Section 3.

Purpose of the Study

The purpose of this concurrent nested mixed methods study was to examine students' feelings and experiences as they were enrolled in a distance-learning course and determine whether different learning styles were being met through this method of

content delivery. Researchers such as Cavanaugh (1999), Levin (1998), and Rice (2006) have examined distance-learning programs for K-12 and college or university students. They specifically explored characteristics and benefits of implementing a distance-learning program. This study examined meeting students' learning styles as demonstrated in courses that use distance delivery methods of instruction.

Theoretical Framework

The theoretical framework of this study was based on the learning theory of multiple intelligences as developed by Gardner in the 1980s. Gardner suggests eight ways in which people perceive and understand the world, namely verbal-linguistic, logical/mathematical, visual/spatial, bodily/kinesthetic, musical/rhythmic, interpersonal, intrapersonal, and naturalist (Gardner, 1983). The theory of multiple intelligences validates what educators experience everyday in the classroom: "students think and learn in many different ways" (Smith, 2002, ¶4). However, according to Gardner (1999), the first two intelligences, verbal-linguistic and logical-mathematical, are ones typically addressed in the traditional classroom setting.

Gardner discusses the validity of developing and using the multiple intelligence theory in his book *Intelligence Reframed* (1999). During his career working with children and adults, he came to a decisive verity of human nature: "People have a wide range of capacities. A person's strength in one area of performance simply does not predict any comparable strengths in other areas" (p. 31). Therefore, using the multiple intelligences theory in the traditional classroom appears to be a valid, research-based, teaching method. Veenema and Gardner (1996) have also explored using technology to enhance

the multiple intelligences of students and have found that teachers should try to instruct students with methods of which they are familiar and that expand their current mental performance. Additionally, they claim "we should give individuals the opportunity to exhibit their understandings by means of media and representations that make sense to them" (Veenema & Gardner, 1996, ¶11). Furthermore, student achievement in distance-learning or online learning courses has exhibited the *no significant difference* phenomenon in previous research (Cavanaugh, 2001; Phipps & Merisotis, 1999; Rice, 2006; Russell, 1999).

The multiple intelligence theory provides educators with an organizational tool, allowing for reflection on curriculum and assessment practices. This tool, in turn, has "led many educators to develop new approaches that might better meet the needs of the range of learners in their classrooms" (Smith, 2002, ¶4). Thus, this research study explored meeting students' multiple intelligence (MI) styles in the online classroom. If the MI theory works in the traditional classroom, and technology also helps meet student learning styles, and distance-learning courses have exhibited the *no significant difference* phenomenon in student achievement, might it then follow that distance-learning courses also meet student learning styles?

Operational Definitions

The following definitions and terms were used in this research study:

ACCESS distance-learning. Alabama Connecting Classrooms, Educators, and Students Statewide is a distance-learning initiative implemented in January of 2006.

Gatekeepers. School personnel such as administrators, teachers, counselors, and lab facilitators.

An intelligence. An intelligence constitutes "the ways in which individuals take in information, retain and manipulate that information, and demonstrate their understandings (and misunderstandings) to themselves and others" (Veenema & Gardner, 1996, ¶2).

Distance-learning. "Institutional based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (Rice, 2006, p. 426). The student and teacher are geographically separated and the courses must be taken during the regular school day on telecommunication devices to receive instructional materials (Rice, 2006).

Learning style. This term is used interchangeably with an intelligence.

Multiple intelligences theory. Theory of learning developed by Gardner who identified eight intelligences that all possess to some degree. These "intelligences" are ways in which people can perceive or understand problems or situations (Gardner, 1993; Lamb, 2001).

Student achievement – Academic, personal, or mental accomplishments or success in a particular course or subject.

Statewide supplemental program – "Students take individual courses but are enrolled in a physical school within the state. These programs are authorized by the state and overseen by state education governing agencies" (Rice, 2006, p. 427).

Theme – Derived from the analysis of the essence of significant statements made by participants of qualitative research (Creswell, 2003).

Assumptions, Limitations, and Delimitations

1. All students participating in this study have access to technology for delivery of the distance-learning course.
2. This technology was provided to them by the local school or system as part of the ACCESS distance-learning initiative.
3. The students participating in the distance-learning course are enrolled by their choice since enrollment in the online course is not a requirement of the local school or system.
4. All students participating in the ACCESS distance-learning program were scheduled for their online class during the regular school day.
5. Student learners may not value or enjoy using computers and technology as a means of learning new content or curriculum.
6. The participants were honest and forthright with their answers to the researcher's questions.
7. The students were credible participants in this research as they are all enrolled in an ACCESS distance-learning course and have experience with distance-learning.
8. The only distance-learning program in which public secondary students in the state of Alabama may participate is the ACCESS distance-learning program.

This concurrent nested mixed methods study confined itself to examining students participating in the ACCESS distance-learning program. The 14 participating students were in grades 9 through 12 and were enrolled in the ACCESS distance-learning program on a voluntary basis. This program was available to all students in the state of Alabama in grades 9 through 12 regardless of where their school was located.

The distance-learning students in the study participated in formal individual interviews or focus group discussions and completed a distance-learning activities survey to examine students' feelings and experiences to determine whether they felt their learning styles were being met through this method of content delivery. The qualitative method was chosen as the predominant method of study as this type of research "seeks to understand the world from the perspective of those living in it" (Hatch, 2002, p. 7). Every effort was made by the researcher to ensure that the data were gathered in a neutral and non-threatening manner. A limitation of this study is that in the gathering of the qualitative data, the findings could be subject to other interpretations. An additional limitation of this study is the small sample size.

This research study confined itself to students who participated in the ACCESS distance-learning program during the spring semester of 2008. Participating students were scheduled to attend an ACCESS distance-learning lab during their regularly scheduled day.

Additionally, this research study relied on the participating students' perceptions of whether their learning style was met through distance-learning. This may be a potential weakness of the study as students may not fully understand all aspects of learning styles.

While this fact may be a potential weakness or limitation of the study the researcher asked probing questions of the participants in an effort to acquire strong data that accurately depicted the participants' points of view with regard to their experiences and activities in which they participated to meet their learning styles and supplemented those findings with quantitative data from a survey

Significance of the Study

This research is significant because it will provide valuable researched-based evidence as to whether students in grades 9 through 12 feel their individual learning styles are being met in a distance-learning environment and have feelings of success having participated in a distance-learning course. Gardner (1999) claims that classes and schools subjected to the MI theory are effective and "that students are more likely to come to school, to like school, to complete school, and to do well in assessments" (p. 112).

To date, few research studies have focused on learning styles being met in a distance-learning course for high school students since the existing research primarily pertain to higher education (Everett, 1998; Mishra, 2005; Mupinga, Nora, & Yaw, 2006; Phipps & Merisotis, 1999; Russell, 1999). Additionally, the multiple intelligence theory of teaching and learning was developed by Gardner in 1983 resulting in considerable research into this method of teaching and learning over the last 25 years (Bednar, Coughlin, Evans, & Sievers, 2002; Mbuva, 2003; Mupinga 2006). This research project sought to integrate these two concepts, distance-learning and the multiple intelligence theory of teaching and learning, in the context of 9th through 12th grade students. In

addition, this study sought to provide data about students' feelings regarding essential components and activities that students felt were beneficial in meeting their learning styles and resulted in feelings of success. Data gathered offers significant new information as students possess a wide range of learning capabilities that the traditional learning classroom does not always address (Gardner, 1999). Additionally, the findings of this research are noteworthy as distance-learning is becoming more prevalent in secondary education.

Implications for Social Change

This study may create positive social change as this investigation provides a researched-based foundation with regard to the factors that lead to students' learning styles being met and their subsequent feelings of success through the implementation of secondary education distance-learning programs. With this knowledge, teacher leaders and administrators on the state and local levels may benefit as it sought to answer the overarching question about distance-learning programs: Do students feel their learning styles are met in a distance-learning course?

This study may also contribute to positive social change as it provides a researched-based foundation drawn from a high-school setting that affirms the benefits of online courses for student satisfaction. In addition, the results of this research may also benefit higher education institutions. As distance-learning secondary students move from high school to college studies, these results may aide higher education course designers and instructors to incorporate the essential components that the secondary students

reported as being most helpful to learn content and feel successful in the online college courses.

Transition Statement

Using distance-learning for adult education is not a new concept. “Throughout the 1980s, the United States experienced dramatic growth in the use of computer-based technology for instruction” (Bialo & Sivin-Kachala, 1996, p. 1). However, distance-learning in K-12 is a relatively new program, one that deserves closer study. One of the purposes of the *No Child Left Behind Act* (2002) was to establish a system by which state and local school districts will be held accountable for improving student achievement. Distance-learning is an effective, research- based option for the education community to implement in an effort to meeting these new mandates (U.S. Department of Education, 2004).

Research on K-12-based distance-learning continues to expand and includes “both comparative studies and studies that attempt to identify the factors associated with instructional quality and effectiveness” (Rice, 2006, p. 425). This study took the research into distance-learning a step further to examine essential components that secondary students reported as being most helpful to learn content and feel successful in their distance-learning course.

Section 2 will examine literature reviewed by the researcher in preparation for this study. Section 3 will explain the research design used in this study and describe the methods of data collection as well as the data collection instruments. Section 4 will

present the data and its analysis and Section 5 concludes with a summary of the findings of the study.

SECTION 2: REVIEW OF LITERATURE

Introduction

The review of literature will support the perspective that students learn in different ways. “Each learner has a preferred method of processing information, and that preference is referred to as that individual’s learning style” (Rosen, 1997, ¶1) or intelligence.

Several different learning theories may be used by teachers in an effort to best meet the needs of their students and the learning theory that is of interest to this study is the multiple intelligences theory, commonly referred to as MI. This review of literature will begin with the multiple intelligence theory of teaching and learning and then discuss ways that technology can be used to enhance student learning through the use of the multiple intelligence theory. Third, recent research into distance-learning programs will be reviewed as it relates to the educational setting.

The strategy used for researching the literature began with an Internet search of the multiple intelligence theory, distance-learning, and related topics. Next, the researcher examined multiple library databases using keywords associated with the topic of research consequently reviewing numerous journal articles and dissertations. Additionally, the researcher reviewed numerous books related to the topics of the multiple intelligence theory and distance-learning in an effort to fully understand the topic of interest.

The following section is a review of previous research that is related to the area of interest of this study: distance-learning, the multiple intelligence theory, and using technology in the classroom. Previous research (Everett, 1998; Mishra, 2005; Mupinga,

Nora, & Yaw, 2006; Phipps & Merisotis, 1999; Russell, 1999) of distance-learning programs has focused primarily on students of higher education. The researcher attributes this to the highly protected population of K-12 students. Additionally, over the last 25 years, research with regard to the multiple intelligence theory (Bednar, Coughlin, Evans, & Sievers, 2002; Mbuva, 2003; Mupinga 2006) has contributed considerably to the body of knowledge in the method of teaching and learning with a variety of intelligences. This research project sought to integrate these two concepts, distance-learning and the multiple intelligence theory of teaching and learning in the context of 9th through 12th grade students as it explored students' feelings about their learning styles being met and their feelings of success as a result of enrollment in a secondary distance-learning program.

Previous Research Related to Problem Statement

Multiple Intelligence Theory

The Multiple Intelligence Learning Theory was developed by Gardner (1983). He suggested "there are at least eight discrete intelligences, and these intelligences constitute the ways in which individuals take in information, retain and manipulate that information, and demonstrate their understandings (and misunderstandings) to themselves and others" (Veenema & Gardner, 1996, p. 9). Each of these distinct intelligences is comprised of a "set of skills allowing individuals to find and resolve genuine problems they face" (*Multiple Intelligences*, n.d., p. ¶1). Gardner (1983) identified the following eight intelligences:

1. Verbal-Linguistic - The ability to use words and language.
2. Logical-Mathematical - The capacity for inductive and deductive thinking and reasoning, as well as the use of numbers and the recognition of abstract patterns.
3. Visual-Spatial - The ability to visualize objects and spatial dimensions, and create internal images and pictures.
4. Body-Kinesthetic - The wisdom of the body and the ability to control physical motion.
5. Musical-Rhythmic - The ability to recognize tonal patterns and sounds, as well as sensitivity to rhythms and beats.
6. Interpersonal - The capacity for person-to-person communications and relationships.
7. Intrapersonal - The spiritual, inner states of being, self-reflection, and awareness.
8. Naturalist - The ability to interact with the environment and to see the subtle meanings and patterns in nature and the world.

When using the Multiple Intelligence Learning Theory, a teacher might consider the areas in which students can succeed, and develop a lesson according to the students' ability and style of learning. This strategy may be especially helpful to the at-risk or special-needs students who may need to utilize more types of skills or intelligences than are typically addressed in the traditional classroom (Weber, 1992). The teacher assesses what the student can do well, instead of what they cannot do. Guigon (1998) cites Gardner as saying, "It's very important that a teacher take individual differences among kids very seriously… The bottom line is a deep interest in children and how their minds are different from one another, and in helping them use their minds well" (¶1).

When teaching to the multiple intelligences of children, teachers must take into account their curriculum, instruction, and assessment. Gardner (1999) stated that traditional curriculum heavily favors the verbal-linguistic and logical-mathematical intelligences. He suggests a curriculum that ensures that each intelligence is stimulated each day with activities that include the arts and music, self-awareness, communication,

and physical education. A teacher's instructional method should appeal to all the intelligences. Some of these methods may include role-playing, musical performance, cooperative learning, reflection, visualization, and story telling. With regard to assessment, Gardner (1999) encourages assessment methods that "create an environment with inviting resources and let the children demonstrate their spectra of intelligence in as natural a fashion as possible" (p. 137).

Mbuva (2003) explored the implementation of the multiple intelligence theory in the traditional classroom. Through this exploration, Mbuva discovered that the traditional teaching and learning strategies of lecturing to the students is still prevalent among new and veteran teachers alike. He reports that teachers still find it easier to instruct students using direct instruction, expecting the students to all learn the information in the same way. Therefore, Mbuva concluded that "this situation calls for a deeper question on how can teachers effectively meet the instructional needs of the diverse student population in their classrooms" (2003, p. 1). The purpose of developing the multiple intelligences of students is to give students more opportunities to thrive in their learning process. Mbuva recommends that institutions review multiple education issues affecting students' understandings which include "pedagogy, curriculum design and development, teaching and learning strategies, lesson plans conducive to academic learning environments, suitable testing and assessment strategies, and holistic approach to education" (2003, p. 11).

Bednar, Coughlin, Evans, and Sievers (2002) also explored implementing the multiple intelligence theory to improve student motivation and achievement in a

mathematics classroom of kindergarten, third, fourth, and fifth grade students. Multiple sources of data were collected from the students: preschool screenings, parent and student surveys, previous report card grades, and checklists. The researchers concluded that the implementation of Gardner's multiple intelligence theory made teaching and learning more significant to students. Post-intervention data revealed a trend toward student improvement of motivation and achievement with the implementation of the multiple intelligence theory. Improvement in student participation and motivation in mathematics was also noted by the researchers (Bednar et al., 2003).

Haley (2004) investigated the implementation of the multiple intelligence theory in shaping and informing teaching strategies, curriculum development, and alternative forms of assessment with students who are classified as second language learners. The study took place during the 2000-2001 school year with 23 foreign language and English as a Second Language (ESL) teachers and 650 students in grades K through 12 across three states and eight countries. The research began with participating teachers agreeing to create and disseminate instructional strategies and assessment methods to the other participating teachers in the study. These strategies and assessment implemented the multiple intelligence theory and accommodated all eight learning styles as described by Gardner (1999). Data gathered from participants included informal interviews and student and teacher comments. It was concluded that the method in which information was presented and having a choice of instructional strategies did have a positive impact on the achievement of some of the students participating in the study.

Meeting Learning Styles with Technology

With the integration of technology in schools, "teachers become facilitators to students in obtaining information, rather than the source of all knowledge" (Rosen, 1997, p. 2) and students then become more actively engaged in their learning (Hoerr, 2000). When using traditional teaching methods and techniques, it is increasingly difficult for teachers to hold the interest of a child that has been raised on video games and MTV (Tsantis, 2002). Children in the first decade of the 21st century are constantly multi-tasking, so technology seems to be a very useful tool for educators to maintain the interest of students and to meet the needs of students who learn differently. Technology can help educators capitalize on the unique skills students bring to the classroom (Brown, 2000; Tsantis, 2002).

A mixed methods study conducted by Dome (2004) sought to make a connection between the use of technology and the multiple intelligences of 20 students enrolled in a public secondary school. The researcher examined the students as they completed a graduation portfolio using technology instead of a paper-and-pencil version of their portfolio. Data were gathered from demographic surveys, a learning-styles inventory, examination of technology usage, and course completion rate. The findings of this research stated that when students' learning styles corresponded with that of the technology delivery method, students took less time to complete assignments. In addition, this research exhibited a relationship between the use of technology and the students' preferred learning styles and as a result, concluded that technology usage should be sincerely considered as a means to support students' preferred learning styles.

Townsend (1991) examined using laser disc technology in his classroom to enhance the learning styles of his secondary students. The students were given a survey to determine their preferred learning style and aide the researching teacher to plan his lessons based on the learning styles of the students. Townsend found that the teacher's preferred teaching method did not correlate to that of the students' preferred learning styles. He concluded that the students may learn more effectively using their one preferred learning style, but, being exposed to multiple methods of receiving information, which included exposure to multimedia, helps students learn to "gather information, process it, and use it in whatever form it is available" (1991, p. 26).

In a 2008 report by McAllister and Deaver, a research study was presented that examined "the positive effects of a technology integrated curriculum on ninth grade English students with multiple intelligences or different learning styles" as they studied a unit on Homer's *Odyssey* (p. 111). Two separate groups of students were observed. Group 1 was taught and completed assignments using technology tools. Group 2 was taught and completed assignments using traditional methods which did not include technology tools. Both groups were assessed in the same manner. Additionally, four types of student observations were made with both groups of study: a) journaling, b) project sustainment, c) team work, and d) communication and leadership. The study results showed that Group 2 excelled in journaling and the communication and leadership activities while Group 1 excelled in project sustainment and team work activities. As a result, it was suggested that further research be conducted on the learning inconsistencies

of students with different multiple intelligences and students' retention of content knowledge.

Woods (2004) conducted a correlation study of 20 adult students enrolled in a web-based course using the Blackboard, Inc. platform. This study examined several different factors that lead to student efficacy of web-based instruction. One factor examined included students' ratings of the accommodation of their multiple intelligence in order to "derive inference and formulate recommendation for designing courses that effectively accommodate the needs of adults who learn in diverse ways and thus increase student satisfaction by adding dimensionality to the experience of learning for all students" (p. 9). Students were administered an e-mail survey to explore their perceptions regarding web-based instruction. There was a significant correlation that was exhibited between student satisfaction with the web-based instruction and their learning style. Woods recommended that web-based courses should contain multiple activities to accommodate the numerous intelligences of students. Woods also recommended that further study should be conducted as to whether an intense accommodation of every intelligence would result in greater student satisfaction (2004).

A 1996 report by Bialo & Sivin-Kachala (1999) summarized research that addresses the effects of technology on student achievement. Bialo and Sivin-Kachala (1999) noted that technology used in an educational setting results in a "significant positive effect on achievement" (¶6). This positive effect on achievement was demonstrated by students in pre-school through higher education and with both regular and special education students in all core subject areas. Research-based instructional

design software that incorporated interactive video was especially effective for achievement when skills and concepts to be learned included a visual component. Additionally, improvement in academic skills was demonstrated in the "use of online telecommunications for collaboration across classrooms in different geographic locations" (Bialo & Sivin-Kachala, 1999, ¶6).

A mixed-methods study conducted by Spaulding (2007) examined the relationship, differences, and student and teacher perceptions of multimedia-based lessons and student education in a language arts classroom. Spaulding could not substantiate a relationship between using multimedia-based lessons in the classroom and student achievement. The students and teachers believed that multimedia-based lessons helped their academic development. However, the data indicated that positive academic development was not always attained when instruction was enhanced using multimedia.

According to Rosen (1997), multimedia can be a useful tool in meeting the learning styles of the different intelligences, much more than traditional teaching methods. Teachers hear claims that technology in schools will help students to become "more motivated, actively engaged in their learning, better problem solvers, and obtain critical thinking skills" (Rosen, 1997, ¶1). It seems that incorporating technology into the classroom can repair all of the problems that schools are facing. However, educators must still consider the technologies that really help students with their various learning styles (Rosen, 1997).

Lamb (2001) writes that technology can be used to facilitate learning in many of the intelligence areas. She found that no single "right" way will integrate technology into

the classroom; instead, the key is to provide the most effective learning environment for the students (Lamb, 2001).

Linguistic. Linguistic intelligence is one of the easiest in which to incorporate the use of technology (Dickinson, 1998). Strategies or tools such as the utilization of a word processor can help students apply their skills of language, writing, and editing.

While recopying by hand often inhibits an ongoing correction and revision of a student's written work, by using a word processor program, students can see their work in a professional format. They then become more interested in studying and mastering the mechanics of the final format. Students often feel a sense of increased control over their writing and thus develop greater fluency and a more effective writing style (Dickinson, 1998). Lamb (2001) suggests some technological tools that may enhance the learning experience for students with linguistic intelligence: Web development tools for sharing a poem, myth, legend; news articles; PDF files; word processing through the use of various software tools such as Word, Works, or Appleworks for the writing and rewriting processes; brainstorming; listing, reviewing terms, writing definitions, listing ideas; writing a video script; using voice annotations in word processing; using comments in word processing; utilizing desktop publishing tools to create text styles and/or create books; e-mail, discussion lists, forums, or chat boards.

Logical-mathematical. Various computer programs may be used to instruct students in logical and critical thinking skills. Although teaching critical thinking is one of the skills and goals education targets, teachers find it difficult to teach the concepts of critical thinking (van Gelder, 2001). Technology can be a way to attain results in the area

of improving such skills (van Gelder, 2001). Bialo and Sivin-Kachala (1999) suggest that "recent comparisons of traditional mathematical instruction to its computer-assisted counterpart also yielded positive learning results related to the use of technology, including commercially available problem-solving software" (¶6).

Students of differing levels of ability may more effectively learn content as they use or are exposed to programs that give immediate feedback and go far beyond drill-and-practice exercises. Many programs offer demanding prospects that allow students to develop higher-order and critical-thinking skills that are fundamental in developing mathematical/logical skills (Dickinson, 1998).

Games can also be used to strengthen critical thinking and mathematics skills. Logical and mathematical skills, quick decision-making skills, effective reasoning, and higher-order thinking processes are often used in a number of recreational computer games (Dickinson, 1998). Lamb (2001) suggests a list of technological tools that can enhance the learning experience for students with logical/mathematical intelligence: Organizational tools, such as databases, calendars; calculation tools such as spreadsheets; online calculation tools and utilities; scientific equipment such as probes; science and math software; graphing calculators and software; multimedia authoring and desktop presentation software such as PowerPoint; videotaping experiments, demonstrations, or data gathering; webquests; computer-aided designing for problem solving; strategy, logic, and critical thinking software.

A 2003 study conducted by Hagevik investigated the effects of using computer software to improve middle school students' understanding of science content. One

hundred thirty-one students and teachers from nine schools in five counties in North Carolina participated in this research. It was concluded that students learned more about the science content using constructivist online computer games than students not using this method of content delivery. In addition, students were able to better analyze the problem questions having used computer games. Learning the science content, problem solving techniques, experimental design, and data analysis was found to be improved in students who had participated in using computer software to aid students in their learning process.

Visual-spatial. Because of exposure to television, the Internet, and video games, students in 2008 exhibit developed visual-learning skills (Dickinson, 1998). These students seem to enjoy viewing slides, transparencies, movies, and filmstrips in their learning activities. The interactive video disc (IVD) combines into one structure all the diverse media and delivery choices, including slides, lectures, video, and computer-based instruction. A study conducted by IBM in 1986 on the IVD classrooms reported a 30 to 50% increase in learning scores. In addition, it was reported that there was a 300% increase in the number of students reaching mastery level (Dickinson, 1998). Dickenson reports visually oriented students' learning may be enhanced as they interact with technology that is visual in content. There are many visually enhancing graphics programs available for students' use. Rosen (1997) reports that "graphics programs can help develop spatial perceptions and help develop creativity by allowing students to create their own designs" (¶2). Lamb (2001) argued that students who are spatial learners may enjoy activities such as illustrating or creating a storyboard for a project because of

the visualization aspects of such activities. Additionally, Lamb suggests a series of activities that may be used to enhance the visual intelligence: CAD - Computer-Aided Design; animation software; puzzle building tools; drawing or painting programs; timeline making software; imaging software; desktop publishing software such as Publisher; computer-generated charts, graphs, and tables using spreadsheets; web-development tools; digital-drawing pads; video conferencing; websites with visual organizers; using scanners or digital cameras to create visually enhanced educational materials; concept-mapping tools and diagrams software such as Inspiration & Kidspiration.

Body-kinesthetic. Using a computer and other technology devices as learning tools are highly active and interactive processes requiring hand-eye coordination for their operation. Using a keyboard, mouse, joystick, or remote control device gives students the opportunity to become activity involved in their learning. The attractiveness of video games has given students the opportunity to develop skills in making quick decisions and hypothesis testing to totally engage them in a skillful and physical response to the simulated challenges (Dickinson, 1998).

The use of technologies such as video camcorders and film involves and exercises kinesthetic intelligences as students move around in their surroundings to acquire the recordings. In activities such as electronic field trips, students are not actually physically involved, yet students feel as though they are exploring areas of the earth where previously only researchers and scientists have explored (Rosen, 1997; Dickinson, 1998). Technology makes it very easy for students to become an inactive observer or only a

receiver of information. However, there are many activities that allow students to become actively engaged in their learning experiences. (Dickinson, 1998). The following list of technological tools indicates some of the means that can enhance the learning experience for students with body/kinesthetic intelligence as suggested by Lamb (2001): Keyboarding, mouse, joystick, and other devices for movement; scientific probes and microscopes; video production that incorporates skits, dances, sports, role playing, or demonstrations; handheld technological devices such as Palms and Alphasmart.

Musical. Teachers can use music or sound in technology projects or activities to gain students' attention (Rosen, 1997). Many programs can provide students the means to successfully compose their own music, manipulate notes, and create graphical representations of musical concepts on the computer. Many students are so motivated by the music they have created electronically they are stimulated to understand more about the music such as learning harmony, notation, scoring, and reading music. Using technology to support "the learning of music and music-appreciation leads not only to proficiency, but also to in-depth understanding. The development of musical thinking and creativity-musical intelligence itself can thus be enriched and expanded" (Dickinson, 1998, Musical intelligence section, ¶8). Lamb (2001) suggests the following list of technological tools that may enhance the learning experience for students with musical intelligence: Video and audio recorders; sound and music files such; music clips; music composition software, DVDs and CDs; interactive books with audio elements.

Interpersonal. Frequently, students use technology tools alone. Dickinson (1998) reports that both teachers and students often prefer tasks completed by working alone.

However, the process of comprehension and learning is simplified and hastened when students work in pairs or small groups. Interpersonal skills can be enhanced not only through group technology projects within the classroom, but they can be shared with students in classrooms, schools, and around the world through sharing information over a network and the Internet. When students share discoveries, affirmative learning experiences result. A supportive system between students develops as they help each other in solving problems and working collaboratively on assignments. Such skills are increasingly important in the workplace (Dickinson, 1998). The skills in students who are interpersonal learners may be enhanced through activities such as e-mail, chat, word processing, forums, and discussion boards. Other activities may include collaborative or group presentations or video conferencing to develop cross collaborative skills of students (Lamb, 2001).

Intrapersonal. C*o*mputers can help students develop skills at their own pace, thus allowing for individuality in their learning. Students may require help in a specific content area, and computer-aided instruction can allow this student to work on needed skills (Rosen, 1997). Furthermore, technology can also offer the means for students to pursue a specific line of thought, allowing them to make choices, which, in turn, gives them control over their learning and understanding of the subject matter. “Technology can be used to explore and expand intelligence, as students build ‘mental models’ with which they can visualize connections between ideas on any topic” (Dickinson, 1998, Intrapersonal intelligence section, ¶2). Activities that may enhance the interpersonal intelligence may include computer-based journaling or diaries, concept maps, Internet

research that is self-paced, using videos to record personal ideas, and creating multimedia portfolios (Lamb, 2001).

Naturalist. According to Dickinson (1998), as technology becomes increasingly important, teachers and students must realize that technology does not replace human interaction and experiences of the natural world. Technology is, however, a great tool to use to realize the world outside the classroom environment and to help students see how their reactions affect their world (Dickinson, 1998).

Organizations which offer exciting adventures and explorations such as National Geographic, the George Lucas Educational Foundation, and the Globe Program also provide opportunities to engage in online projects and collaborative activities with actual scientists. In this way science topics become more real, students can contribute to scientific research, and students can "learn that science really involves questions, not answers" (Dickinson, 1998, Naturalist intelligence section, ¶8). Using audio recorders and video or digital cameras can assist students in observing their natural surroundings and explore their world. Students may also document their natural surroundings by developing a digital journal or diary though the use of word-processing software. Additional technologies that may help students develop their naturalist intelligence are desktop presentations that may show trends or changes in nature over time or microscope and probes to observe nature up close (Lamb, 2001).

Veenema and Gardner (1996) suggest that it is becoming increasingly difficult to hold the attention and meet the learning styles of students who have been raised in an era marked by the use of technology to entertain, communicate, and learn. As teachers

become increasingly aware of how technology-savvy students are, interactive technology will become a valuable educational tool for teachers, to the extent that educators learn more about how the human mind works (Veenema & Gardner, 1996).

Gardner has outlined eight distinct intelligences. These intelligences determine "the ways in which individuals take in information, retain and manipulate that information and demonstrate their understanding to themselves and others" (Veenema & Gardner, 1996, ¶9). Additionally, "technology can serve as a catalyst to help educators capitalize on the unique skills which each learner brings to the classroom" (Tsantis, 2002, ¶2). As individuals differ from one another, teachers may attempt to tailor their teaching techniques to individual learners. Many educators and researchers assert that technology can be the tool to reach these students (Veenema and Gardner, 1996).

Distance-learning Research

The increase in the enrollment of students in distance-learning courses has perhaps been the greatest change in contemporary education in recent years (Lanier, 2006). Mishra (2005) indicated that learning via distance experiences will prove challenging for educators to harness in an effort to effectively provide a fulfilling educational experience to the learners. Over the last 10 years several studies (Cavanaugh, 2001; Phipps & Merisotis, 1999; Rice, 2006; Russell, 1999) have probed the impact of computer instruction via distance. These studies have considered distance-learning delivery methods such as interactive video conferencing (IVC), video courses, and Internet-delivered courses to determine how they affect achievement, perception of success, and beliefs of whether the students have actually learned the content.

The United States Department of Education National Education Technology Plan (2004) states that this nation's educational institutions have the responsibility to ensure students are adequately prepared to succeed in an increasingly global economy, especially in the areas of math, science, and technology. Their report noted that the explosion of distance-learning courses and virtual schools can complement the traditional classroom. Furthermore, distance-learning or online courses can provide students, parents, and teachers instant feedback to student progress and achievement.

Convenience has been one of the most influential motivating factors to fuel the explosion of distance- learning technology courses being offered in the United States. The use of technology, along with distance-learning, allows students to receive and transmit information anywhere, anytime, thus leading many educational researchers to explore this method of content delivery of distance-learning (U.S Department of Education, 2004).

The traditional brick-and-mortar classrooms are not large enough and cannot continue to grow fast enough to meet the future demand of the upcoming college enrollment. For this reason, many colleges and universities have established distance-learning programs or some type of virtual school (Baggley & Hoon, 2005).

In a study conducted by Leonard and Guha (2001) on the effects of college students' perspectives on distance-learning, 75% of the students reported satisfaction with their online experience and felt distance-learning met their expectations. In addition, 40% responded they had participated more in the online course than in a traditional classroom and 50% of the participants stated that online courses gave them more

opportunities to interact with their peers as compared to the traditional classroom. The researchers reported that students participating in online courses perceived "online teaching and learning to be an exciting and dynamic experience" (Leonard & Guha, 2001, p. 56).

A study conducted by Edwards (2005) examined "learning styles and motivation and their relation to outcomes of two online courses in a graduate nursing program" at Excelsior College (p. 344). The information gathered was used to develop the appropriate types of technologies for use in nursing programs that best meet the different intelligences of the students. In this situation, the results influenced the course design. There were no differences in performance in the online courses between the students' gender or age. A Likert-type survey with a scale ranging from 1 ("not at all true of me") to 7 ("very true of me") was given to the 49 participants in an effort to evaluate their perception of their motivation and learning styles being met with the current online course. The results of this study indicated that the students were motivated in the online course (average score of 5.48) and that their learning styles were being met (average score of 4.72) (Edwards, 2005).

Cavanaugh's study (1999) on the "effectiveness of interactive distance education using videoconferencing and telecommunications in K-12 on academic achievement" (p. 1) revealed that there was a positive effect size in all areas of distance-learning with the exception of foreign language courses. The results of the study supported "the use of interactive distance education to complement, enhance, and expand education options

because distance education can be expected to result in achievement at least comparable to traditional instruction in most academic circumstances" (Cavanaugh, 1999, p. 1).

A study conducted by Stodel, Thompson, and MacDonald (2006) examined what was missing from online courses. The participants of a study reported that they missed the face-to-face interaction when enrolled in an online course. This study provided recommendations to enhance online courses by adding components such as supplementary online dialogue, spontaneity and improvisation, and getting to know other online students involved in online learning.

Deka and McMurry (2006) conducted a study that explored variables that contributed to the different success rates of students in one-way distance teleclasses versus students completing the same traditional class. The study reported that the distance-learning students were less successful than face-to-face students when exam grades were examined. Additionally, the success of distance learners was attributed to two factors: (a) student-initiated contact with the distance-learning teacher and (b) higher reading comprehension and scholastic competence.

Summary

The multiple intelligence theory is a relatively new and still evolving method of teaching and learning as it was only developed in the early 1980s. As new teaching and learning methods are emerging and are affecting the educational system, Gardner continues to refine this theory of teaching and learning (1999). The multiple intelligence theory can be difficult to implement since each student has a preferred method of learning so researchers such as Lamb (2001) contend that technology can give support to teachers

to help meet these learning styles in the traditional classroom. Research previously conducted using the multiple intelligence theory and on distance-learning (Everett, 1998; Mishra, 2005; Mupinga, Nora & Yaw, 2006; Phipps & Merisotis, 1999; Russell, 1999) has primarily dealt with higher education. Additionally, previous multiple intelligence research (Bednar, Coughlin, Evans, & Sievers, 2002; Mbuva, 2003) has primarily been conducted in the traditional classroom.

Section 3 provides a review of literature regarding the methodology chosen for this study. Additionally, Section 3 explains why the specific research methodology was chosen and the procedures for selection of participants as well as the methods for gathering data. Section 3 also explains how data were collected and interpreted.

SECTION 3: METHODOLOGY

Introduction

This study explored if distance-learning courses met student learning styles. This was examined based upon students' perceptions as they were enrolled in a distance-learning course and the results of a distance-learning survey. Technology may help teachers implement the multiple intelligences theory and may provide students with content flexibility to meet specific learner styles which in turn provides equitable educational opportunities and new learning experiences (Cavanaugh, 1999; Lamb, 2001).

Gardner (1993) writes that students learn in a plethora of ways. Individuals differ remarkably among themselves with regard to their particular intelligence based upon the activities in which they participate at any given moment. However, in education, students are to learn required curriculum and yet "there is no reason why they need to be taught in the same way" (p. 73). Gardner writes that the curriculum can be presented in numerous ways using such modes of presentation as books, software, hardware, or other media. "The choice of mode of presentation can, in many cases, spell the differences between a successful and an unsuccessful educational experience" (p. 73). Additionally, educational models are needed that "take seriously individual profiles of intelligence and seek to maximize the educational achievement of each person" (p.72).

This research explored students' feelings and experiences as they were enrolled in a distance-learning course to determine whether different learning styles were being met through this method of content delivery. This was examined through formal individual interviews and focus group discussions that explored the methods in which students

received content, the activities in which they participated, and discussed their feelings of success while enrolled in a distance-learning course. In addition, a distance-learning survey was given to participants to examine the activities in which they participated to determine if the activities encompassed all eight learning styles as described by Gardner and as a result, met the students' learning styles. Therefore, to determine if distance-learning courses meet student learning styles, the researcher explored the methods in which content was delivered, the activities in which students participated, and their feelings of achievement as a result of enrollment in a distance-learning course. The following is an explanation of the design of the study to meet the goals of this research.

Design of the Study

Mixed Methods Study

The specific research design used was concurrent nested mixed methods as described by Creswell (2003). This design involves gathering both qualitative and quantitative data simultaneously. In the nested approach, there is a predominant method that guides the research process. This study gathered primary information through interviews and focus groups with students who participated in a distance-learning course to determine whether distance learning courses provide numerous activities that meet all eight learning styles as described by Gardner (1998). In addition, secondary information was gathered from participants as they completed a survey that asked about activities students participated in during the course.

The predominant method of qualitative data collection was interviews with 14 secondary students who were enrolled in a distance learning program. In addition,

quantitative data were gathered to gain a broader understanding of the specific activities in which students participated while enrolled in a distance-learning course. The process of mixing the data in a single study allowed the researcher to gain perspectives from the different types of gathered data to enrich the description of the participants' experiences in a secondary distance-learning course (Creswell, 2003).

Qualitative data This study used a concurrent nested mixed methods study to collect qualitative and quantitative data simultaneously. The researcher chose to gather qualitative data through interviews and focus group discussions to be the predominant data collection mode because of the interaction between the researcher and the participant allowing the researcher to become increasingly sensitive to participants' feelings about their distance-learning experience. Because of this interaction with the participants, the research was "emergent rather than tightly prefigured" (Creswell, 2003, p. 181) and allowed the researcher to modify the research questions or to refine the questions for the participants as the study progressed.

Quantitative data. A distance-learning survey was given to the 14 participants of this study in order to accurately quantify the number of activities in which the students participated. This was done so that the researcher could determine whether the distance-learning courses in which the students participated provided a variety of activities that met all eight learning styles. Responses were tabulated and z-scores were calculated on the responses in an effort to standardize the responses from the students.

Role of the Researcher

The researcher had past experience with distance-learning courses as a student and as a teacher of online classes. Additionally, the researcher taught at a school where students were enrolled in ACCESS distance-learning courses. Therefore, in an effort not to compromise the findings, “backyard” data were not gathered from the school in which the researcher teaches in an effort to generate confidence in the precision of the results.

Permission to conduct the study was sought from the Institutional Review Board (IRB) at Walden University. The IRB process included all of the researcher-developed consent forms and these forms are listed in the appendix section of this paper. In addition, all relevant “gatekeepers” such as administrative personnel, teachers, and distance-learning facilitators were contacted via phone, e-mail, or letter so that they were fully aware and informed of the research process and the impact that this study might have on participants. A brief summary of the proposed study (Appendix A) was developed by the researcher and delivered to appropriate gatekeepers at the sites for the study. The document addressed the process the researcher planned to follow at the site during the study and listed the potential benefits for participating in the study.

Research Question

This concurrent nested mixed methods research used the following overarching research question to guide the research process: Do students feel their learning styles are met in a distance-learning course?

Qualitative Research Subquestions

1. How are students’ learning styles met in a distance-learning course?

2. What are essential components in a distance-learning course that help meet students' learning styles?

3. What activities do students report as being most helpful in learning content?

4. How do students feel about their achievement with regard to their learning styles being met?

Quantitative Research Question

Are students engaged in activities in a distance-learning course that represent all eight learning styles?

Context for the Study

During the 2007-2008 fiscal school year, approximately 10,000 public education students participated in the ACCESS distance-learning program (Gura, 2007). The population of the study was 6804 students in grades 9 through 12 enrolled in an ACCESS distance-learning course during the spring semester of 2008. The students were scheduled to work on their course in the ACCESS distance-learning lab during the regular school day.

Selection of Participants

The participants were students in grades 9 through 12 who have been enrolled in a distance-learning course. Some of the participants were located at a single site. The researcher conducted eight individual interviews and two focus group discussions with students who have been enrolled in an ACCESS distance-learning course from several different participating ACCESS schools in the state of Alabama over a period of two

months. This duration of the study allowed the researcher to review responses made by participants and modify the interview questions, if needed, to provide the researcher with additional information about topics of interest to the study.

The qualitative design was the predominant method of data collection. Therefore, the participants were selected with purposive sampling from six schools that participate in the ACCESS distance-learning program in northwest Alabama (Lauderdale, Colbert, Madison, Morgan, and Limestone counties). The researcher sent the principals of the selected schools a proposal summary and school cooperation form (Appendix A). The participating schools in the ACCESS distance-learning program were listed on the Alabama State Department of Education's web site with identification of a contact person (typically the principal) and the school phone number. Principals were called to discuss possible participation in the study.

Second, once the researcher received the school cooperation forms (Appendix A) from ACCESS school principals to conduct research on their campus, the researcher sent via e-mail, a school liaison cooperation and confidentiality agreement form (Appendix B). Once the liaison confidentiality forms were returned via e-mail, the researcher worked with the liaisons from the six schools to select two participants from each of four schools for the individual interviews and three participants from two schools for the focus group discussions to obtain a total of 14 participants. The participants were purposively selected based on the fact that they were in grades 9 through 12 and had previously or were currently enrolled in a distance-learning course.

Third, the researcher sent the school liaison the student assent forms (Appendix C) via U.S. Postal Service. The 14 participants were given the assent form (Appendix C) by the liaison for participation in the study. This form conveyed to the participants, their parents, and their school administration that every effort would be taken to protect the students and their anonymity as participants. Once the student and his or her parent consented to have the student participate in the study, both were to sign the student assent form (Appendix C) and return it to the school liaison. The researcher contacted the school liaison about the return of the assent forms and then collected them from the liaison. If a student's parents did not give consent, the researcher and liaison again worked together to select another participant from the same school and repeated the above process until 14 total participants were acquired.

Data Collection

Once the participants were purposively selected for the individual interviews and focus group discussions, the researcher sent the liaisons a packet of information, via the U.S. Postal Service, to disseminate to the participants. The packet contained the research subquestions along with a list of topics for discussion during the interviews or focus group discussions (Appendix D), and the distance-learning survey (Appendix E). This process helped ensure that the researcher and participants were well prepared for the discussions. An appropriate date, time, and place to converse with participants were established by the researcher in conjunction with the participants' gatekeepers.

The researcher e-mailed the participants a reminder of the date, time, and place of the individual interview or focus group discussions. All interview and focus group

conversations were recorded on cassette tape recorder and subsequently transcribed through the use of computer software. Appropriate consent was obtained from participants for such recording procedures (Appendix C).

Data that would address the research subquestions for the study were collected in three ways from participants. Of the six schools selected to participate, two of the schools were purposively chosen, based upon their location, at which to conduct the focus group discussions. The focus groups were comprised of three students each who were all located at single school site. This was done so that the students would not have to travel to another location to participate in the focus group discussions. The participating students from the other four schools were then classified as the individual interview participants.

The researcher asked participants of both the interviews and the focus groups to complete a distance-learning activities survey (Appendix E). The purpose of the distance-learning survey was to determine the types of activities in which the students participated, whether the activities were related to the multiple intelligences, and how often students participated in the activities. The survey was completed at the participants' schools just before the interviews or focus group discussions were conducted. The information gathered from the survey was the last piece of data for the triangulation analysis of the data.

The individual interviews (Appendix D) were conducted with eight students enrolled in an ACCESS distance-learning course. The grades of the students involved in the individual interviews were one 9th grade student, one 10th grade student, and six 12th

grade students. The interviews were conducted in an unobtrusive location, such as an empty office, classroom, or conference room at the school in which the participating student was enrolled. Each student was interviewed once. Information was gathered from the students regarding their experiences as they were enrolled in a distance-learning course. Students talked about what course they were enrolled, how the course was designed, what type of activities in which they participated and enjoyed, and what skills they acquired having been enrolled in a distance-learning course. Table 1 lists the length of each of individual interviews and focus group discussions.

Following the interviews, the researcher conducted two focus group discussions sessions (Appendix D) at two ACCESS distance-learning schools. Different students participated in the focus group discussions and the individual interviews. The first focus group was comprised of two 12th grade students and one 11th grade student. The second focus group was comprised of two 10th grade students and one 11th grade student. Each focus group was interviewed once. The questions asked of the focus groups were the same questions asked in the individual interviews. Therefore, the same type of information was gathered from the students regarding their experiences as they were enrolled in a distance-learning course as stated above. The researcher contacted the appropriate "gatekeepers" to coordinate the logistics of the focus group discussion sessions in their school. The discussions took place in an unobtrusive location such as an office or empty classroom. The length of each of the focus group discussion is listed in Table 1.

Table 1

Individual Interviews or Focus Group Discussion Length per Participant

Participant's Name	Length of Interview
S1	33 minutes
S2	37 minutes
S3	40 minutes
S4	35 minutes
S5	43 minutes
S6	21 minutes
S7	31 minutes
S8	28 minutes
FG1	23 minutes
FG2	35 minutes

Validity of Survey

A pilot distance-learning survey was developed by the researcher. The pilot survey was tested prior to the research study with 15 distance-learning students at the school of the researcher. The students completed the pilot survey during their scheduled class time with the researcher present. The responses from the pilot survey were tabulated by the researcher. The pilot survey was given again at a later date to the same distance-learning students and the responses tabulated. Similar responses were obtained from the

two pilot surveys thus adding to the content validity. In addition, the researcher did not modify the instrument between the pilot testing and the actual research process as students did not exhibit or report any complications in the completion of the pilot survey due to its design.

Data Analysis

First, the researcher transcribed the recorded interviews and focus group discussions into a Word document. Each statement made by the researcher and participants was clearly identified so that the researcher could easily review the interview and focus group discussion transcriptions during other phases of the study.

Second, statements from the interviews, focus group discussions, and the responses on the distance-learning surveys were reviewed by the researcher to examine the participants' experiences and activities in a distance-learning course. One way to find patterns and identify themes in the data is to code the gathered qualitative data from interviews, observations, or questionnaires (Mills, 2003). Therefore, the researcher used the method of open coding to develop a list of codes from the interview and focus group questions. These codes were subsequently identified and color coded within the transcribed interviews and the surveys. Axial coding was used to identify common statements from the interviews allowing the researcher to easily identify common themes from the participants' statements and responses and aided the researcher in the analysis process. The responses from the distance-learning surveys were recorded and z-scores calculated in an effort to standardize the responses of the students. The researcher

identified patterns in the data from the survey and recorded those patterns to use in the analysis process.

Third, the coded statements were organized into meaningful units using a table developed in a second Word document. The researcher reflected on and sought meaning from each of these organized statements. The organized selective coding of statements helped the researcher to notice patterns and search for meaning from the statements of the participants and assisted the researcher in identifying discrepant data. In the event of the collection of discrepant data, the researcher reported these cases that are an exception to or that modify patterns found in the data. The researcher also recorded the patterns from the distance-learning survey in the same Word document to aid in the analysis of all three types of data. The researcher triangulated the individual interviews, focus group discussions data, and the distance-learning activities surveys to cross reference and disclose common themes to validate the accuracy of the findings. The researcher used thick, rich descriptions to convey the findings as the predominant method of data collection were qualitative data.

In addition, a peer reviewer was used to review and confirm the data to decrease the bias. Merriam (2002) states that a peer reviewer is another strategy that can be used to strengthen the internal validity of the findings of the research. The reviewer is one that reads and reviews the research and comments on the findings (p. 26). This would involve asking a colleague to review the "raw data and assess whether the findings are plausible based on the data" (p. 26). The peer reviewer was an educator with 18 years of teaching experience. The reviewer holds a bachelor's and master's degree in secondary education

and is pursuing an educational doctoral degree. The reviewer also had experience with being an online teacher and student and therefore was qualified, knowledgeable, and comfortable with reviewing the data presented from the study.

Validation of Data

To increase the external validity of the mixed data, the researcher used rich, thick descriptions in an effort to convey enough information so that other educators can determine how closely their situations match these data and determine whether the findings can be transferred to their own particular situation (Creswell, 2003; Merriam, 2002). Hatch (2002) states that analysis of qualitative data is a "systematic search for meaning" and a way of processing the data so that they "can be communicated with others" (Hatch, p. 148). The researcher followed the concurrent nested mixed methods analysis procedures described by Creswell (1998). In addition, the researcher triangulated the multiple pieces of collected data, used a peer reviewer to confirm the results, and was involved in all phases of the study, from the design of the study to the checking and interpretation of the data.

Summary

This research study incorporated the concurrent nested mixed methods research as described by Creswell (1998, 2003) and Hatch (2002). Distance-learning students in the state of Alabama shared their experiences and feelings of being enrolled in a distance-learning class through three methods: individual interviews, focus group discussions, and a distance-learning activities survey. The interview and focus group discussions were transcribed and then along with the distance-learning activities surveys were grouped into

meaning units in an effort to find patterns and meaning from the data. The researcher analyzed the three sources of data (individual interviews, focus group discussions, and the distance-learning activities surveys) to uncover common themes and findings. Triangulation of the three data sources was used to verify the findings. Finally, a peer reviewer examined the findings in an effort to decrease bias of the conclusions.

Section 4 presents the findings of the study and section 5 summarizes this research and gives recommendations for further examination into distance-learning.

SECTION 4: PRESENTATION OF FINDINGS

Introduction

Section 4 presents the findings from the study. First, the findings are presented by instrument and subquestion. Second, the process of triangulation of each of the findings from the instruments is explained. Third, the findings of the peer reviewer are presented. Section 4 concludes with a summary of the findings of the research.

Data Analysis

Individual Interviews

Research subquestion 1. An emerging theme to address research subquestion 1, How are students' learning styles met in a distance-learning course?, was that several different types of activities were used or experienced by the participants to learn the content, regardless of the method of delivery. These experienced activities covered all of the eight learning styles listed by Gardner (1999). Some of the activities experienced by the participants included watching videos, using discussion boards, online self-check quizzes, and online games to learn content (flash cards or matching). Students liked to choose the activities in which they participated to learn the content and felt that the online courses provided a greater variety of opportunities to learn in different ways.

> S3: I like receiving content and instruction this way. Me, personally, I have a hard time just reading something and comprehending it, so the video with audio things, that is always helpful to me, because I will start reading and then just kind of race through it.

> S2: We had access to computers. We used computers for our tests and quizzes and used the television to watch our lectures. We also used a digital camera for one of our assignments…I liked the web-based courses because they had the ability to read through the content themselves and explore what topics that they think are important.

> S4: We used the discussions boards. They were part of all our modules…We would have our study notes online, then we read. There is an occasional video, and there is some self-stuff, where you go in and just kind of test yourself on it to see how well you do. So, instead of just reading, there is an occasional video, and of course all the activities are not writing assignments.

> S8: I had a combination of online text, a digital textbook, a hard textbook–an actual textbook, and I also received content through videos. Sometimes [the teacher] used telephone conversations. A little bit of everything!

One negative theme recurred with regard to communication or contact with their instructor. S2 stated, "I really did not like not having a teacher there. That was difficult." This sentiment was repeatedly noted throughout all of the individual interviews with web-based students. S3 said:

> You don't have a teacher who is there with you, so if you have a question, you still have to e-mail it. You might not see it until later on that day or even the next day, so if you have an assignment due and you have a question, sometimes you just have to wing it.

When students were asked by the researcher if they felt that a set time during the week with the instructor to check in and clarify and problems that occur would help alleviate this problem the student stated that a regularly scheduled meeting time would have assisted in making the content easier to comprehend as the students would have been able to clarify problems which they encounter in learning the content.

Research subquestion 2. The first theme that emerged regarding research subquestion 2, What are essential components in a distance-learning course that help meet students' learning styles?, was that students have the flexibility to work on their assignments when they wanted to and at their own pace. Students also liked knowing what assignment were due and when, and not having to wait to get more assignments. They stated that they liked having a pacing guide to know what topics were going to be

covered and the assignment due dates. Students also reported liking the process of self directing their learning activities as is represented in the following statements:

> S6: It gave us a lot more freedom to just learn the subject.
>
> S5: It was not as structured. And it was easier for me to go back and look at stuff and pick it up and learn it and review what I need to.
>
> S8: Probably the best thing was that I loved working at my own pace. You don't have to worry about getting ahead of the class, and the teacher can stay with you wherever you are. So, if you have any questions, and you are two weeks ahead of the other kids, she can be like, "Oh, well! I am glad you are that far ahead; here is what you do." So I really liked that.

Another emerging essential component reported by students was that they liked the fact that content online was easily accessible no matter their location. The online availability also allowed students the ability to turn in assignments electronically. Three of the students reported:

> S6: I liked the ease of receiving your content and taking your tests, with having everything all in one space.
>
> S8: It was easier reading content on the computer, as compare to traditional classroom – but I think it is easier because you can use all the gadgets and functions on the computer. I like the flexibility of distance-learning.
>
> S3: It is a lot easier to type your assignments rather than to write them and be able to turn them in that way.

A different perception was reported by a web-based student who referred to missing online course activities that resulted in the course not meeting the student's preferred learning style:

> S4: I am a big debate person, and I love discussion, and I really miss the interaction between the students and the teacher. The discussion online just doesn't suffice me. I love the IVC or whatever. I like to do that with the teacher once or twice or four times a month, because I feel that we really learn a lot by really hearing the others.

This statement was the only one of its kind from any of the interviewed students.

Research subquestion 3. The first emerging theme that was identified by the researcher that addressed research subquestions 3, What activities do students report as being most helpful in learning content?, was that students reported a plethora of technology activities in their distance-learning course that covered all of the multiple intelligences. Table 2 lists the activities in which students reported participating and felt were particularly helpful in learning the content. The activities students reported are mapped to components of Gardner's eight learning styles (1999).

Table 2

Distance-learning Activities in Which Individual Interview Students Reported Participating

Multiple Intelligences	Activities Named by Research Participants
Linguistic	Online text, discussion boards, e-mail, IVC equipment
Logical/mathematical	Online games – flash cards, matching, crossword puzzles, online quizzes, equation graphing program
Visual/spatial	PowerPoint projects, movies or movie clips, DVD players, projectors, televisions, digital presenters, IVC equipment, digital cameras
Body/kinesthetic	Keyboarding, electronic white boards, tablet notebook
Musical	Sound clips
Interpersonal	Video conferencing- collaborating with students from other schools, discussion boards, e-mail, Elluminate – online tutoring sessions
Intrapersonal	Self-paced Internet research, self-paced learning
Naturalist	Digital cameras – taking pictures of community in which they live

Statements made by participants about technology activities they experienced included:

S3: The repetition and self check quizzes were helpful.

> S2: I like using the technology because it is what I am used to using and what I have been around more.
>
> S4: There were some links where we went to and did like online index cards, matching games, and things, just to learn different literary terms and things like that. And, you could do it as many times and keep reviewing it until you learned it.
>
> S8: I liked having different websites to go to.
>
> S5: I liked using the Elmos [digital presenters] because it helped us to see visually what we were learning.

The second emerging theme related to research subquestion 3 was that students liked having the ability to use technology-related activities to communicate with the teacher and other students. The activities named included e-mail, discussion boards, IVC equipment, the telephone, and online tutoring sessions. The students reported using mostly e-mail to communicate with the teacher and other students. However, numerous other statements were made about technology activities that students used to communicate or learn the content like:

> S3: I liked the oral assessment on the phone – it was interesting – it was helpful to know that there was a real person on the other end.
>
> S4: I liked how we were connected to the other schools so that we can share how each other learn the content.
>
> S6: It was easier to talk to the instructor with e-mail.

IVC students liked the real-time interaction the technology provided with the other students at the distance school. S5 reported that “IVC helped me interact with other students and let me see how they learn material.”

Other students stated:

> S1: I thought it [IVC] was neat because you could interact with somebody so far away. But, then, it was like they were right there with you, and then we could learn from him, and then he could teach us stuff, and it was really neat just to get different opinions from other people that weren't here.
>
> S5: With IVC, we were able to have time to talk with each other and share tips about how we may learn the material like color coding, make columns, or diagrams to help us with our work.
>
> S6: IVC helped me come out of my shell and talk more to others to help me learn the material and get along with other students that are different from me.

The researcher did not notice any statements that were different from those reported by other students about activities that met the students' learning styles or their ability to learn the content.

Research subquestion 4: Again, the researcher reviewed and reflected on statements made by the participants that corresponded to the fourth and last research subquestion: How do students feel about their achievement with regard to their learning styles being met? After reviewing the responses made by the participants in the individual interviews, the researcher concluded that students did not provide information in which to answer the final research subquestion. The researcher feels this occurred because of the manner in which the interview questions were designed. However, the researcher did notice numerous responses made by the participants with regard to having feelings of academic success. The researcher noticed that all of the individually interviewed students felt very successful in their distance-learning course. One student stated, "It was a good learning experience." Other students stated:

> S4: I feel very successful in the class. I am able to do the work without killing myself.

> S2: I am learning a lot but it is not overwhelming like everybody thought it was going to be.

Many students affirmed that it was a good experience, that they were pleased with their distance-learning experience, and would take another online course. However, two students felt they were not adequately prepared for the online quizzes that evaluated content knowledge. They commented that the quizzes and the content were not aligned:

> S3: Quizzes and content didn't match up sometimes. The quiz was actually quite a bit different. I was learning, but it was like I was being tested on what I did not learn.

> S7: The quizzes didn't really ask what the content presented. The quizzes and content may be completely different.

The researcher asked additional probing questions with regard to measures that might be taken to alleviate the issue related to mismatch of course and quiz content theme. Students responded that they would like to see more study guides or graphic organizers that would direct them to key points in the content on which they would be tested.

In addition to students reporting that they like distance learning courses, students also reported that the distance-learning courses helped them become self-directed learners. The students reported that the distance-learning courses were structured so that the students assumed a more responsible role in their learning which resulted in their feelings of achievement. Students reported that feelings of achievement and responsibility occurred as a result of not having a teacher over them all the time making them do their work. Specific student statements made with regard to this theme include:

> S6: [Distance-learning] teaches personal responsibility and self discipline.

S3: I have to do more on my own as opposed to the traditional classroom.

S4: We have to do more studying on our own and review the notes more because we don't have anyone drilling it [the content] in our heads.

Next, the researcher identified statements regarding the area of success or achievement. Students reported having feelings of preparation for higher education having taken a distance-learning course. They said:

S3: I don't know if it is just the online, but I think distance-learning has prepared me [for college] in that I was able to take the tougher class than I would have if we did not have the online education. You know, I was more prepared because I could do that.

S8: Distance-learning gives us an opportunity to advance our studies and take the classes that look better on our transcripts, and gives us an opportunity to take something that we wouldn't offer.

S6: IVC has really helped prepare me for college as it has helped me learn to take notes and has helped me with my learning strategies.

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S7: The quizzes didn't really ask what the content presented. The quizzes and content may be completely different.

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organizers that would direct them to key points in the content on which they would be tested.

Focus Group Discussions

Research subquestion 1. Recurring statements were made by participants with regard to research subquestion 1, How are students' learning styles met in a distance-learning course? Students repeatedly reported having numerous activities, a total of 17, in which to participate to learn the content and meet their learning style. Students discussed watching videos, taking online self-check quizzes, writing essays, reading text from books and from the computer, and using the tablet notebooks to complete assignments.

Two students from FG1 stated that they wanted to actually see the teacher lecture via IVC or through an online tutoring site like Elluminate. They did not like having to read the text to receive the content. They reported that they would like to see the teacher lecture and take notes from those lectures. One student from FG1 reported:

> I like lectures. But online, I don't get that at all.

Research subquestion 2. The researcher identified two distinct and unifying ideas reported by participants relating to research subquestion 2: What are essential components in a distance-learning course that help meet students' learning styles? Students liked the structure of the course, particularly the freedom to work at their own pace. They liked having the guides to help them pace themselves throughout completing their coursework. Students also reported liking the online structured outlines that correlated with the textbook for the online course.

> FG1: I like the freedom to work at your own pace. If you are behind, you are not really behind, and if you want to work ahead, you can.

> FG2: I liked it. I mean like, it was all right there and laid out for me to do.
>
> FG1: It is a whole new level of freedom. It is also like a college student. You don't have a teacher over your back the whole time.

The second distinct and unifying idea noticed by the researcher was that students would like to see more activities that incorporated live interaction with the teacher. Some students reported that they would like to meet with the teacher online in a chat room to discuss the week ahead. They wanted to have a real discussion with teacher and not just communicate through e-mail. Students who were taking web-based courses stated:

> FG2: It was, like, kind of a little frustrating, because I did, like, have a few questions, and I could not get answers on e-mail.
>
> FG1: I had to rely on e-mail to get answers from the teacher, and sometimes, you might not get in too deep, and then you had to wait on her reply, and by that time, you have to have a test where you needed the information.

Research subquestion 3. Students reported 17 different activities in which they engaged to help them learn the content. This addresses research subquestions 3: What activities do students report as being most helpful in learning content? The activities specifically mentioned by the students included watching videos, watching the teacher use the Elmo (digital presenter), completing online quizzes, playing online matching games to learn the content, and using tablet laptops. One student stated:

> FG2: I want to emphasize the laptops, because – I don't know – it was just interesting, because you could write on it, and you could just do all kinds of stuff with it – like, I don't know, I like doing notes and doing all that stuff on the tablet. That was cool!

The second recurring topic discussed that was noticed by the researcher was that students liked being able to see the teacher, whether it be via IVC or by watching an online video, to receive and learn the content. One student in FG 1stated:

> It would have been just like she was teaching us [in class]; you know, I mean, you are watching her do it, and like, it is showing up on the video – like it is showing her and what she is writing.

One focus group included math students who expressed their opinions about the importance of being able to actually see and hear the teacher work out and explain problems:

> FG2: For me, I am one of those students who have to see it worked out, because I am not really good at math. I am a pretty good student in other courses, but I am not really good at math. But, if I can see it worked out like that, that is the only way I can learn how to do it, so it would have been hard to have text only.

Research subquestion 4. Lastly, the researcher examined statements that were made by the students regarding the final research subquestion: How do students feel about their achievement with regard to their learning styles being met? After reviewing the responses made by the participants in the focus group discussions, the researcher concluded that there was no evidence from the responses in the qualitative data to support answering the last and final research question. However, the researcher did notice several statements made by the students with regard to their feelings of achievement or success in the course. The students' consensus on their feelings about achievement was that, overall, the online course was a good experience. Students stated that they really liked it and they felt they learned a lot. However, one of the focus group participants did comment that he felt that fellow traditional classmates were learning more about current events as compared to distance-learning students:

> FG1: You have no current events. Like, we haven't even talked about the election. We talk about elections in general, but…in a government class, you would say something about the candidate or something.

Another theme was noticed by the researcher with regard to the students who took the web-based courses. Two of the students felt that they were not adequately prepared for the quizzes and tests. When asked by the researcher what suggestions the students had to alleviate this problem, one student stated that study guides incorporated into the course that identified key points in the content being tested would be helpful. One student stated:

> FG1: A lot of the time with the quizzes, we are not given information that is going to help us on the quizzes. When we get to the quizzes, we don't know anything at all, so we have to work at it as best we can.

Distance-learning Survey

Before the interviews and focus group discussions, the researcher administered a distance-learning survey (Appendix E) to all 14 participants. The survey listed numerous activities in which the students could have participated. Students were asked to choose activities in which they participated thus allowing the researcher to explore if distance-learning provided enough of a variety of technology activities to meet student learning styles.

First, the researcher reviewed the responses on the distance-learning surveys. After careful examination of the surveys, the researcher developed an EXCEL spreadsheet (Appendix I) to aid in the tabulation and analysis process of responses from the surveys. The spreadsheet tabulated the number of activities in which each student participated from each of the multiple-intelligence style categories. The quantitative data were analyzed by calculating the z-scores of the tabulation of the responses on the

distance-learning surveys. This was done in an effort to standardize the distribution of the responses and reveal patterns in the data. The researcher then reviewed and assessed the meaning of the results and developed a table (Table 3) that illustrates the results.

Table 3

Distance-learning Surveys Tabulation and Analysis

Multiple Intelligence	Mean number of activities in which students marked on the survey in which they participated	Z-Score
Linguistic	6.71	+2.54
Logical/mathematical	1.35	-0.42
Visual/spatial	2.43	+0.17
Body/kinesthetic	1.14	-0.54
Musical	1.00	-0.62
Interpersonal	2.14	+0.01
Intrapersonal	1.00	-0.62
Naturalist	1.14	-0.54
Mean	2.12	
Standard Deviation	1.81	

The researcher noted several patterns in the survey data. The first pattern that the researcher detected was that 7 of the 8 intelligences fell within ±0.62 standard deviation of the mean. Next, the linguist intelligence fell +2.54 standard deviations above the mean. The researcher attributes this outlier to the numerous linguistic activities in which students may participate as a result of using word processing, reading and processing web information, reading PDF files, e-mail, and discussions boards in the distance-learning course. The third and final pattern the researcher noted was the fact that the musical and interpersonal intelligences had z-scores that feel the farthest below the mean with a -0.62 z-score. The standardization of the responses with the utilization of z-scores exhibits a pattern that falls well with the normal bell-shaped curve.

The survey was administered to distance-learning students to help the researcher answer the quantitative research question: Are students engaged in activities in a distance-learning course that represent all eight learning styles*?* Gardner (2003) states that to seek maximization of student achievement in an educational setting, activities are needed that take seriously individual profiles of intelligences of the students. This may be achieved by providing students a plethora of activities in which to participate through a choice of mode of presentation of material. The results of the survey led the researcher to conclude that distance-learning students are provided numerous activities in which to participate to meet the eight learning styles as described by Gardner (1999).

Triangulation of Data

The researcher used methodological triangulation to validate the analysis and findings of the three data sources: (a) individual interviews, (b) focus group discussions,

and (c) distance-learning surveys. First, the common themes from each of the sub-questions and each of the data sources were organized into a table in a Word document (Appendix J). Second, the researcher read and re-read these common themes in an effort to obtain a general sense of the information and obtain an overall meaning from the data. Finally, the researcher analyzed the points at which the common themes coincided to derive an accurate description of the participants' feelings and therefore determine if the overall research question was answered.

Peer Reviewer

A peer reviewer was used to review and confirm the data to decrease any bias that the researcher may have with regard to distance-learning as the researcher is a distance-learning student herself. Merriam (2002) states that a peer reviewer is another strategy that can be used to strengthen the internal validity of the findings of the research. The reviewer is one that reads and reviews the research and comments on the findings. This would involve asking a colleague to review the "raw data and assess whether the findings are plausible based on the data" (p. 26). The reviewer read and re-read the transcriptions of individual interviews and focus-group discussions in addition to reviewing the distance-learning surveys. The peer reviewer also examined the common themes that the researcher identified.

The peer reviewer agreed with the themes that were identified by the researcher. The peer reviewer suggested revisions for the wording of the common themes to strengthen the description of the correlation of the common themes to the research subquestions of this study.

Summary

Three pieces of data were gathered and analyzed from the students in grades 9 through 12 to explore if learning styles are met in a secondary distance-learning course. This was explored as students participated in an individual interview or focus group discussion and completed a distance-learning survey.

Gardner (2003) states that students learn in different ways and these differences are called a person's learning style or intelligence. He states that education ought to be structured so that it will remain responsive to the differences of students in an effort to "ensure that everyone receives an education that maximizes his or her own intellectual potential" (p. 71). In addition, Gardner recommends providing students with a wide range of activities and modes of presentation of curriculum to meet all of their learning styles.

In summary, students reported numerous activities in which to participate to learn the content. The activities were aligned with Gardner's (1998) eight learning styles and included watching online videos, reading online text, composing essays on the computer, using technology to explore the environment, taking online quizzes and receiving instant feedback, and communication with other distance-learning students and their teacher using e-mail, discussion boards, and IVC equipment. In addition, the students made numerous statements about their feelings of success and achievement as a result of having been enrolled in a distance-learning course. The students reported having developed self directed learning skills and feelings of taking responsibility for their own learning experience. Students reported that having these essential skills would greatly

benefit them as they pursue higher education learning. Therefore, the researcher concluded that the overarching research question was answered as participating students did feel that their learning styles were met as a result of enrollment in a distance learning course.

SECTION 5: SUMMARY, CONCLUSIOINS, AND RECOMMENDATIONS

Introduction

Distance-learning is an emerging method of content instruction for the K-12 student. However, there is a lack of research in the K-12 area of distance-learning because previous studies have primarily focused on distance-learning in postsecondary schools. Additionally, numerous studies (Howard, Ellis & Rasmussen, 2004; Mupinga, Nora & Yaw, 2006; Vincent, 2001) have demonstrated that technology and multimedia are valuable tools that teachers can utilize as means to meet students' different learning styles. This study incorporated both of these areas of interest: distance-learning and the multiple intelligence theory of teaching and learning.

After examination of previous studies on distance-learning and the multiple intelligence theory, the researcher set out to examine students' feelings about being enrolled in a distance-learning course to determine whether they felt their learning styles were being met through this method of content delivery. The researcher selected a concurrent nested mixed methods study, as described by Creswell (2003), as the research methodology. The qualitative method was chosen to be the predominant method of inquiry to establish a detailed examination of the distance-learning classroom influences as a means to meet high-school students' learning styles. In addition, a distance-learning survey was used to give quantifiable data to supplement the findings from the qualitative data.

Research Question

The data collected in this study closely examined whether students felt distance-learning courses met their learning styles through the following overarching question: Do students feel their learning styles are met in a distance-learning course?

Qualitative Research Subquestions

1. How are students' learning styles met in a distance-learning course?
2. What are essential components in a distance-learning course that help meet students' learning styles?
3. What activities do students report as being most helpful in learning content?
4. How do students feel about their achievement with regard to their learning styles being met?

Quantitative Research Question

Are students engaged in activities in a distance-learning course that represent all eight learning styles*?*

The purpose of this concurrent nested mixed methods study was to examine students' feelings and experiences as they were enrolled in a distance-learning course and determine whether different learning styles were being met through this method of content delivery. Several researchers such as Cavanaugh (1999), Levin (1998), and Rice (2006) have examined distance-learning programs for K-12 and college or university students. They specifically explored characteristics and benefits of implementing a distance-learning program. This study examined meeting students' learning styles as

demonstrated in courses that use distance-delivery methods of instruction. Qualitative and quantitative data were gathered concurrently through formal individual interviews, focus-group discussions, and a distance-learning activities survey.

The results of this study found that students reported numerous activities in which to participate and learn the content. The activities were matched with all eight learning styles as described by Gardner (1998). These activities included watching online videos, reading online text, composing essays on the computer, using technology to explore the environment, taking online quizzes and receiving instant feedback, and communication with other distance-learning students and their teacher using e-mail, discussion boards, and IVC equipment. The researcher also identified numerous statements made by participants about their resulting feelings of success and achievement having been enrolled in a distance-learning course. The students reported having developed self directed learning skills and feelings of taking responsibility for their own learning experience. Students reported that having these essential skills would greatly benefit them as they pursue higher education learning. Therefore, the researcher concludes that the participating students did fell that their learning styles were met as a result of enrollment in a distance learning course.

Interpretation of Findings

The theoretical framework of this study was based on the learning theory of the multiple intelligences developed by Gardner in the 1980s who offered eight ways in which people perceive and understand the world: verbal-linguistic, logical/mathematical, visual/spatial, bodily/kinesthetic, musical/rhythmic, interpersonal, intrapersonal, and

naturalist (1983). Gardner (1999) indicated that the first two intelligences, verbal-linguistic and logical-mathematical, typically find expression in the traditional classroom setting. Additionally, students may participate in technology activities in which learning is facilitated through many of the multiple intelligences (Lamb, 2001). This study examined students enrolled in distance- learning courses to determine if their learning styles were met with this method of content delivery.

Qualitative Data

Research subquestion 1. The researcher learned that students' learning styles were met in a distance-learning course. This result was obtained from the triangulation of all three data sources. Students reported participating in 23 learning events that resulted in meeting all eight of the learning styles.

Research subquestion 2. The researcher identified two specific components that were in a distance-learning course that helped meet students' learning styles. The first component that the students reported was that of having the flexibility to work at their own pace to complete their course work. Students liked not having a teacher over them all the time telling them what to do. Students reported liking the freedom to do their work at their own pace, in their own time that distance-learning provided.

Another component of distance-learning courses that students reported as being helpful to learn the content was the ability of having easy access to the content as it was all online. Students reported that involvement in school activities which took them away from the classroom did not affect their success or learning the content as the course

content, instructions, assignments, and the availability of turning in assignments were always accessible and available on line.

Research subquestion 3. All 14 of the students reported that distance-learning provided numerous activities in which to participate to learn the content. The activities in which students reported participating included reading content online, taking online self check quizzes, watching videos, using the tablet notebooks, and communicating with the teacher or other students using e-mail, IVC equipment, and discussion groups.

The 14 students responded that they liked using the IVC equipment, telephone, e-mail, discussion boards, and online tutoring sessions and that these activities were most helpful to learn the content. The 14 students liked the interaction with other students and the teacher that these activities provided. Only 1 of the 14 students interviewed responded that they really missed the real-time, in-class lectures that they had previously experienced in a traditional classroom. The student stated that he probably would have enjoyed enrollment in an IVC course instead of a web-based course to meet that specific learning need.

All 10 of the web-based students discussed wanting to be able to have immediate contact with their teacher while the students are in their scheduled online course. Students stated that they would frequently fall behind on their work as they waited on responses from their teacher about questions or problems they encounter during learning the content.

Research subquestion 4. After reviewing the responses made by the participants in the individual interviews and focus group discussions, the researcher concluded that

there was no evidence from the responses in the qualitative data to support answering the last and final research subquestion. The responses from all 14 participants with regard to their achievement were that they did feel successful in their online courses regardless of their grades. This feeling of achievement was also expressed as they discussed having developed self-directed learning skills. The 10 web-based students reported that they became more responsible for their own learning and, as a result, learned the content and succeeded in the course. They attributed this to the fact that they did not have a teacher in the classroom, standing over them, instructing them on what to do. In addition, these students also felt that they would be better prepared for higher education having been in this type of learning environment. This was validated by the fact that 6 of the 14 students had taken courses at local colleges and therefore, were able to make an accurate comparison.

Quantitative Data

After tabulation of the distance-learning survey responses and the analysis of the z-scores, the researcher accepted the alternate hypothesis: Students experience numerous activities in a distance-learning course that meet all eight learning styles. This information must be reviewed with caution as the sample was small (14 participants). However, students surveyed were enrolled in all core disciplines of study (math, science, English, history) and on average, reported that all eight learning styles were met in the classes in which they were enrolled.

The analysis of all of the data revealed that students reported that the course in which they were enrolled contained multiple activities in which to participate. As a result

of having numerous activities from which to choose to participate and learn the content, the students felt successful. Therefore, the researcher concludes that the participating students did feel that their learning styles were met in a distance learning course after analysis of the quantitative and qualitative data. This data must be reviewed with caution as the sample of students and the types of classes in which they were enrolled was limited. However, the students were enrolled in courses that covered all of the core disciplines of study (math, science, English, and history).

Implications for Social Change

This study is significant as it explored whether students in grades 9 through 12 enrolled in a distance-learning program felt that their individual learning styles were met with this method of content delivery. Previous research on learning styles being met in a distance-learning course has primarily pertained to higher education. Additionally, Gardner's research on the multiple intelligence theory has spawned considerable research into teaching and learning methods (Bednar, Coughlin, Evans, & Sievers, 2002; Mbuva, 2003; Mupinga 2006). This study sought to integrate these two areas, distance-learning and the multiple intelligence theory of teaching and learning, to the 9th-12th grade educational area.

Gardner (2003) states that through multiple activities and modes of presentation of data that students' learning styles can be met. This will result in students' feelings of success, maximizing one's own intellectual potential. This study offers data that students who participated in this study felt that distance-learning is an appropriate method of teaching and learning for students in grades 9 through 12 with regard to meeting learning

styles. This information must be reviewed with caution, however, as this sample size is limited. However, this is an important finding for the educational system in the state of Alabama since 9th grade students in the academic year 2009-2010 who are seeking an academic diploma will be required to successfully complete at least one online course. Therefore, this information will be disseminated via e-mail to Alabama teacher leaders and administrators on the state and local levels to validate that distance-learning programs do contain essential components that address student learning styles and do provide students with the means for successful completion of challenging academic content. This study may contribute to positive social change since it provides a researched-based foundation drawn from a high-school setting that affirms the benefits of online courses for student satisfaction and achievement.

In addition, the results of this research may also benefit higher education institutions. As distance-learning secondary students move from high school to college studies, these results may aide higher education course designers and instructors to incorporate the essential components that the secondary students reported as being most helpful to learn content and feel successful in the online college courses.

Recommendations for Action and Further Study

This concurrent nested mixed methods study contributes to the growing body of knowledge about distance-learning in secondary education. Suggestions for additional investigations of secondary students enrolled in distance-learning courses include the following: First, additional research should explore methods that would increase interaction between the online student, the teacher, and other online classmates. An

examination of activities or components to be added to web-based courses that enhance communication between the teacher and students would enhance meeting the interpersonal intelligence of students. One activity that could potentially meet this learning style would be an online student lounge or chat room to converse with other students and the teacher in an effort clear up questions and concerns that may arise throughout the course.

Second, the web-based students reported that they did not like having to wait for feedback from the teacher on problems that they encounter in the course. Not having a teacher readily available to answer questions that arise during their scheduled learning time slowed down their progression through the course. Students stated that waiting even as little as 24 hours, in some courses, was a waste of precious time since they could not proceed with course content until questions were answered. When students were asked by the researcher what they felt would alleviate this problem, students stated that having the teacher online or on IVC during their scheduled class time to answer questions that arise would be most beneficial. Students also suggested a regularly scheduled meeting time every week to check in and ensure that they were on the correct track in completing the course assignments and tasks. Therefore, the researcher suggests that additional research be conducted to further explore methods that are effective in meeting this learning need of the students.

Third, future research of secondary education distance-learning programs should include a larger sample to enable extended generalizability to the data. This would enable future researchers to answer the research questions with more comprehension.

Reflection and Summary

This study was conducted in partial fulfillment of a doctoral degree program offered by a distance-learning doctoral program at Walden University. Additionally, the researcher is a secondary educator in the state of Alabama and has been involved in a new method of content delivery to secondary students with the ACCESS distance-learning program at her school. This employment prompted the researcher to want to explore distance-learning programs.

The researcher was aware that her own enrollment and involvement in distance-learning programs might bias her view of the study findings. As the researcher entered into the role of the researcher, she was excited about exploring this new and emerging method of content deliver to secondary students since she had enjoyed her doctoral distance-learning experience. Every effort was made by the researcher to set aside predetermined beliefs about the experiences of the secondary distance-learning students. Therefore, the researcher followed predetermined procedures to alleviate any bias in the results. The researcher did not know the participants of the study and backyard data were not gathered. Additionally, the researcher enlisted the help of a peer reviewer to validate and give confidence to the accuracy of the findings.

Based on the data analysis, the researcher provided a precise snapshot of the components and activities that distance-learning programs provide to meet a specific group of secondary students' learning styles. Some of the activities included watching online videos, using tablet notebooks, reading online content, playing online games to learn content, and taking online quizzes. Students also liked having the options of

communicating with their teacher via e-mail, telephone, IVC, and discussion boards. Students did report concern about accessibility of their teacher which sometimes resulted in students being delayed in continuing in their assignments and learning the content. Students reported that having a teacher online to answer questions encountered while they were in class would be beneficial in keeping them on task.

Additionally, this study provided evidence that students felt successful about their enrollment in a distance-learning classroom. Students reported that, regardless of their grade at the completion of the course, they felt that the distance-learning classroom was a good experience as it helped them develop self-directed learning skills as well as becoming more responsible students. Participants also reported that they felt better prepared for higher education having taken an online course and developing these essential skills.

The online secondary students examining during this study felt that the distance-learning classroom in which they were enrolled provided them with the flexibility that students of the 21st century have come to rely upon in this computer infused generation of learners: flexibility to pick and choose activities that cover all of the multiple intelligences in which to participate to learn content, flexibility to receive and submit content anywhere, anytime, and flexibility to self-direct their own learning experience resulting in developing skills that lead them to feel successful in their distance-learning experience and become successful in their future higher education.

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Appendix A

Proposal Summary

Hello. My name is Jennifer Marshall Roberts and I am a student pursuing an Educational Doctorate Degree in Teacher Leadership at Walden University. As one of the requirements for this degree, I plan to conduct a research study in my area of interest which is distance-learning. The purpose of this study is to examine if student learning styles are being met in a distance-learning classroom. The information gathered in this study may be used to inform distance-learning administrators of effective learning methods and components of these new learning programs for high school students.

I have found there is a lack of research in secondary education with regard to distance-learning due to the highly protected nature of this population. However, research-based evidence that distance-learning programs do or do not met students' learning styles is needed.

I am contacting you to ask if you would allow, at most 3 of, your distance-learning students to participate in this study.

ABOUT THE PROJECT:
If you agree for your school to join this project, I will ask the following of you, the school liaison, and the selected participant students:

- Principal:
  - Return this cooperation form to the researcher via U.S. Postal Service in the attached self addressed stamped envelope.
  - Nominate a liaison to work with the researcher.
- Liaison:
  - Compile a list of students that have taken distance-learning courses. The researcher will randomly select 2-3 students from this list to participate in the student activities.
  - The liaison will hand the Student Assent Form to the selected students.
  - The liaison will collect the Student Assent Forms and contact the researcher. The liaison and the researcher will coordinate the date, time and place for the researcher and participant to complete the individual interviews or focus group discussions the distance-learning activities surveys.
- Student Participants:
  - Complete and return the Student Assent Form.
  - Complete an anonymous distance-learning activities survey (duration is 10-20 minutes)
  - Complete an individual or group interview (duration is 30-60 minutes)

- All of these activities will take place at the student's home school during a non-academic or non-core class and the individual interviews and focus group discussions will be audiotape recorded.

The students' identities will be kept strictly confidential and all attempts will be made to reduce the potential for any kind of problems to occur. Additionally, please recommend a school liaison so that we may coordinate dissemination and collection of required paperwork and scheduling of interviews of participants.

I will appreciate your assistance in my endeavors to improve our educational system through this planned research regarding this emerging method of content delivery. Please complete the following school cooperation form if you will consent to your school participating in this research study and return it to me in the attached envelope.

Jennifer Marshall Roberts
3516 Locker Lane
Florence, AL 35634
Tigers22@comcast.net
256-768-2546
256-412-5870

Proposal Summary-Page 2

School Cooperation Form

Please return this form in the self addressed stamped envelope.

I give my consent to having _____ School participate in the distance-learning research study.

Principal:_____

Phone Number:_____

E-Mail Address:_____

Signature:_____

Date:_____

Please recommend a school liaison:

Name:_____

E-Mail Address:_____

Appendix B

Liaison Cooperation and Confidentiality Agreement

Researcher Name: Jennifer Marshall Roberts
Researcher E-mail Address: tigers22@comcast.net
Researcher Phone Number: 256-768-2546
Walden Research Participant Advocate E-mail Address: IRB@waldenu.edu

Dear _____,

Your principal has recommended you to serve as a liaison to me as I conduct research about distance-learning. Below is a list of activities that will be needed from your for the completion of this research.

- Liaison:
  - Compile a list of students that have taken distance-learning courses. The researcher will randomly select 2-3 students from this list to participate in the student activities.
  - The liaison will hand the Student Assent Form to the selected students.
  - The liaison will collect the Student Assent Forms and contact the researcher. The liaison and the researcher will coordinate the date, time and place for the researcher and participant to complete the individual interviews or focus group discussions the distance-learning activities surveys.

All information gathered from students must be kept confidential. Therefore, I am required to obtain a confidentiality agreement from you. Please sign and return the following page in the self-address stamped envelope if you agree to serve in this capacity during this research project.

I look forward to working with you and I thank you in advance for assistance in this study. If you have any questions about your role, please feel free to contact me at the information listed below.

Jennifer Marshall Roberts
Tigers22@comcast.net
256-768-2546 or 256-412-5870

Liaison Cooperation and Confidentiality Agreement
Page 2

Please return this signed form in the attached self-address stamped envelope.

I agree to keep all information collected during this research project completely confidential. All collected data will be submitted to the researcher.

Name:_____

Signature:_____

Date:_____

Appendix C

Student Assent Form

Hello, my name is Jennifer Marshall Roberts and I am doing a project to learn about distance-learning courses and how they met student learning styles. I am asking you to join my project. I picked you for this project because you have taken an ACCESS distance-learning course.

WHO I AM:
I am a student at Walden University. I am working on my doctoral degree. I teach math distance-learning courses and I want to see how students fell about having taken a distance-learning course. The purpose of the study is to examine if student learning styles are being met in a distance-learning classroom. The data I collect may be used to help improve these new learning programs for high school students.

ABOUT THE PROJECT:
If you agree to join this project, you will be asked to:

- Take this form to your parent or guardian so that they can review what you will be asked to do. If they approve of you doing this project, they are to sign this form. You will then return this form to _____(This will be filled in with the name of the school liaison) by _____(date will be filled in here) and the consent forms will be returned to me, the researcher.
- You will be contacted by me via e-mail or _____(school liaison) and we will set up a time to met at your school so that you can complete the following:
    - Complete an anonymous distance-learning activities survey (time to complete is 10-20 minutes)
    - Participate in an individual or group interview (time to complete is 30-60 minutes)
    - All activities will take place at your home school during a non-academic or non-core class. The interviews and focus group discussions will be audiotape recorded.

IT'S YOUR CHOICE:
You don't have to join this project if you don't want to. You won't get into trouble with your school, teacher, or lab facilitator if you say no. If you decide now that you want to join the project, you can still change your mind later just by telling me. If you want to skip some parts of the project, just let me know.

There will be a minimal risk to you as all activities will take place at your home school. It is possible that being in this project might take time away from your free time. But this project might help others that may take a distance-learning course in the future.

PRIVACY:
Everything you tell me during this project will be kept private. That means that no one else will know your name or what answers you gave. The only time I have to tell someone is if I learn about something that could hurt you or someone else.

ASKING QUESTIONS:
You can ask me any questions you want. If you think of a question later, you or your parents can reach me at tigers22@comcast.net or 256-768-2546 or my professor at Lorraine.Miller-Nara@waldenu.edu. If you or your parents would like to ask my university a question, you can call Dr. Leilani Endicott. Her phone number is 1-800-925-3368, extension 1210.

You may keep this form for your information.

Researcher: Jennifer Marshall Roberts
Researcher E-mail Address: tigers22@comcast.net
Researcher Phone Number: 256-768-2546
Walden Research Participant Advocate E-mail Address: IRB@waldenu.edu

Student Assent Form
Page 3

If you would like to help me with this project, please return this form to _____(The school liaison name goes here)by _____(date goes here).

Please sign your name below if you want to join this project.

Name of Student:_____

Signature of Student:_____

E-Mail Address:_____

Parent/Guardian:_____

Parent/Guardian Signature:_____

Address:_____

_____

Name of Researcher: Jennifer Marshall Roberts

Researcher Signature:_____

Appendix D

Interview Protocol - Interview and Focus Group Questions

Welcome the participant(s).
Thank them for agreeing to do the individual interview or focus group discussion.
Ask participant(s) if they have any questions.
Ensure that participants received the interview or focus group discussion questions prior to the meeting.
Inform participants that what they say will remain anonymous.
Inform participants that they have the right to stop the interviews at any time.
Inform participants that they will receive a copy of the transcriptions and they can make any corrections that they wish.
Inform participants that the interviews will last between 20-60 minutes.
Ask participant if it is ok to record the session.
Begin the recorder.
Start interview or focus group discussions.

Research Subquestions

1. How are students' learning styles met in a distance-learning course?
2. What are essential components in a distance-learning course that help meet students' learning styles?
3. What activities do students report as being most helpful in learning content?
4. How do students feel about their achievement with regard to their learning styles being met?

Interview Questions

1) What have you liked about being enrolled in a distance-learning course?

2) What have you disliked about being enrolled in a distance-learning course?

3) Tell me how the materials are presented in your distance-learning course (text, audio, video, et cetera). How do you feel about receiving instruction in this manner?

4) What types of technology do you use to help you complete your course work?

5) What communication tools have you used and in what ways have you used them to learn the content?

6) How do you feel that the content has been presented so that you may learn the material?

7) What activities did you participate in that helped you learn the content? How did you feel about these activities?

8) What activities did you participate in that did not help you learn the content? How did you feel about these activities?

9) What online activities did you enjoy or not enjoy?

10) What activities did you enjoy or not enjoy that required you to create a piece of work (PowerPoint, Windows Movie Maker, Paint, et cetera)?

11) How do you think distance-learning courses could be redesigned in an effort to meet your learning styles?

12) What other activities should have been added or deleted from the course?

13) How do you feel about your success in your current online course?

14) Why would you or would you not take another online course?

Appendix E

Distance-learning Activities Survey

Please bubble in the activities in which you have participated during your enrollment in your ACCESS distance-learning course.

Linguistic:

- PDF files
- Word processing (Word, Works, Appleworks)- writing, rewriting, process writing
- Brainstorming, listing, review terms, writing definitions, listing ideas, writing a video script
- Voice annotation in word processing
- Using comments in word processing
- Desktop publishing (Publisher, Pagemaker) - the text aspect, bookmaking
- Desktop presentation (PowerPoint, Astound) - the text organization aspect
- Story-creation software (poems, essays, letters)
- Multimedia authoring (HyperStudio) - the text aspects
- Audio recorders and digitizers - recording oral histories and interviews
- Video recording - text aspect
- Storytelling, news program, interview, scripting, choral reading, retelling, speaking, debating, dramatizing
- Email
- Discussion lists and forums - discussing, debating
- Chats
- Reading and interpreting web information
- Electronic reference tools - encyclopedia, dictionaries
- CD-ROM Interactive books on CD, e-books, and text-based software

Logical/Mathematical

- Organizational tools (databases, calendars)
- Calculation tools (spreadsheets)
- Online calculation tools and utilities
- Scientific equipment (probes)
- Science and math software
- Spreadsheets
- Statistics
- Graphing calculators and software
- Multimedia authoring (HyperStudio) animation
- Videotape - experiments, demonstrations, data gathering Animation - demonstrate an experiment
- Desktop presentation (PowerPoint) - show results
- Online data collection

- Problem solving software
- Webquests
- Computer-aided design - for problem solving
- Strategy, logic, and critical thinking software

Visual

- CAD - Computer-Aided Design
- Animation software
- Puzzle building tools
- Draw programs - Illustrator, CorelDraw
- Paint programs - Photoshop, Paint, KidPix, AppleWorks
- Timeline making - Tom Snyder's Timeliner
- Imaging software - Fireworks
- Desktop publishing (Publisher, Pagemaker) - layout aspect
- Desktop presentation (PowerPoint, Astound) - visual layout aspect
- Computer-generated charts, graphs, and tables (Graph Action; Graph Club)
- Spreadsheets for charts and graphs
- Web development tools
- Digital drawing pads
- 3D and morphing software
- Multimedia authoring (HyperStudio)
- Map making tools (Tom Snyder's Mapmaker)
- Video conferencing
- Scrapbooking, photo albums, and slide shows
- Visual information materials: photographs, clipart, charts, graphs, tables
- Color-code projects and ideas
- Match pictures to vocabulary words
- Websites with visual organizers or use color
- Visual Artwork
- Scanner
- Digital Camera
- Concept Mapping Tools and Diagrams (Inspiration & Kidspiration)

Body/Kinesthetic

- Keyboarding, mouse, joystick, and other devices for movement
- Scientific probes and microscopes
- Video production - skits, dances, sports, role playing, demonstrations
- Animation - Macromedia Flash
- Claymation - sequence of movement
- Handheld Palms and Alphasmart - you can carry them everywhere
- Virtual Field Trip - using and creating
- Lego Logo and Robotics - other construction kit projects
- Digital still and video cameras - skits, plays, role-playing, demonstrations

Musical

- Video and audio recorders - digitize singing, musical instruments
- Sound and music files
- Music clips
- Music generation software
- Animation - Macromedia Flash
- Music composition software
- DVDs and CD-audios
- Interactive books with audio elements
- Audio notation in word processors

Interpersonal

- E-mail projects
- Chat
- Word processing - chain writing, group editing, peer writing, brainstorming
- Listservs, forums, and discussions
- Video and teleconferencing
- Group decisions software - Tom Snyder's decision
- Webquests with collaborative elements
- Video recording - sharing with others through skits, debates, role plays
- Collaborative computer software or games
- Group presentations (PowerPoint)
- Telecommunications projects
- Peer tutoring

Intrapersonal

- Computer-based journaling
- Concept maps(Inspiration and Kidspiration) - idea webs
- Problem solving software - self paced software Internet research - self paced
- Word processing - brainstorming, diaries, journals Video projects - record personal ideas
- Multimedia portfolios

Naturalist

- Audio and video cameras - record natural world
- Digital cameras - record natural world, field trips
- Word processing - journaling, natural information
- Data organization and calculation (database, spreadsheet) - observations
- Desktop presentations (Powerpoint) - show trends and changes over time
- Use microscopes and probes - nature up close

This is an original survey created by Jennifer Roberts with resources taken from Lamb (2001) http://eduscapes.com/tap/topic68.htm.

Appendix F

Interview Questions Color Coded

Research Subquestions

1. How are students' learning styles met in a distance-learning course? 3 & 7 Yellow=LrnStyMet
2. What are essential components in a distance-learning course that help meet students' learning styles? 1, 2, and 3 Blue=EssComp
3. What activities do students report as being most helpful in learning content? 4, 5, 9, 10, 11, and 12 Red=Act2LCon
4. How do students feel about their achievement with regard to their learning styles being met? 6, 7, 8, 13, 14 Green=AchWStyMet

Interview Questions
Welcome and Wrap Up of Interview: Gray=WelRap
Student Introduction and the courses they are taking: Gray=StuInt

1) What have you liked about being enrolled in a distance-learning course? Blue=EssComp

2) What have you disliked about being enrolled in a distance-learning course? Blue=EssComp

3) Tell me how the materials are presented in your distance-learning course (text, audio, video, et cetera). How do you feel about receiving instruction in this manner? Red=Act2LCon

4) What types of technology do you use to help you complete your course work? Red=Act2LCon Yellow=LrnStyMet

5) What communication tools have you used and in what ways have you used them to learn the content? Red=Act2LCon

6) How do you feel that the content has been presented so that you may learn the material? Green=AchWStyMet

7) What activities did you participate in that helped you learn the content? How did you feel about these activities? Yellow=LrnStyMet Green=AchWStyMet

8) What activities did you participate in that did not help you learn the content? How did you feel about these activities? Green=AchWStyMet

9) What online activities did you enjoy or not enjoy? Red=Act2LCon

10) What activities did you enjoy or not enjoy that required you to create a piece of work (PowerPoint, Windows Movie Maker, Paint, et cetera)? Red=Act2LCon

11) How do you think distance-learning courses could be redesigned in an effort to meet your learning styles? Red=Act2LCon

12) What other activities should have been added or deleted from the course? Red=Act2LCon

13) How do you feel about your success in your current online course? Green=AchWStyMet

14) Why would you or would you not take another online course? Green=AchWStyMet

Appendix G

Mapping for Individual Interviews

Research Subquestions	IFGQ# = Interview/Focus Group Question Number DLAS = Distance-learning Activity Survey	Emerging Themes
1. How are students' learning styles met in a distance-learning course?	• Watched video on a DVD player. Now they are online – followed her on notes with her lecture. • Quizzes online. • Liked the access courses better because you can pick and choose what activities that you learn from. • Liked to be able to choose a video or reading a lesson. • Liked self pacing yourself • Mostly text. • Some video or audio • Text on the homepage with links to other websites. • Liked receiving instruction in this manner with the video and audio. • When just reading I drift off. • Used digital camera, video, text • Projects • Rented a movie and wrote about it. • Made timelines including pictures using Word pasted in pictures and info from the internet. • Liked using the technology to complete the assignments and having it readily available. • A little bit easier to type your assignments instead of write them out. • I like receiving content and instruction this way. Me, personally, I have a hard time just reading something and comprehending it, so the video with audio things–that is always helpful to me, because I will	1. The participants reported 28 different technology activities to learn the content. 2. Web-based students would like more interaction via Interactive Video Conferencing (IVC). (table continued)

	start reading and then just kind of race through it. • we took a picture and inserted it into the document, and–you know– answered a few questions about it. • We did have to watch a few videos and write about them • A lot different from the traditional classroom • I would paste in pictures that I had searched for on the Internet • There were some links where we went and did like online index cards, matching games, and things just to learn different literary terms and things like that. And you could do it as many times, and keep reviewing it until you learned it. • self-checks and just keep reviewing • Distance-learning teaches personal responsibility, because a lot of times in a classroom, you know, you had the teacher looking over your shoulder and always, you know, prodding you along. But in the computer lab, it is all on you. Teaches self discipline • Use discussion boards - but, only to do assignments • Talked to teacher on the phone • Talked to other students via e-mail • Have study notes online • Occasional videos • Online self-check quizzes Online self assessment quizzes. • Used e-mail to communicate with other students. • Used the IVC equipment to communicate with the other students. • Liked the teacher using the digital presenter to visually show us how to do some of the content. • IVC helped me interact with other	(table continued)

	students and let me see how they learn material. • We did PowerPoint presentations. I liked that a lot because I like to learn visually. • Used Word • Watched videos • Sound clips • Computer recording software • Word searches on the computer • External links to online activities • E-mail • Discussion Boards • Online puzzles to learn the content • Matching activities online • External links that took us to other websites that helped with the lessons. • Liked taking tests online. Not as cluttered as in the classroom. Everything was right there for you. Liked the interaction and the back ad forth with the e-mail. • Used a digital presenter • Used laptops to do the research • Used PowerPoint • Copied pictures from the Internet and put in PowerPoint • Less stressful • More relaxed atmosphere • Used SmartBoard	
2. What are essential components in a distance-learning course that help meet students' learning styles?	• Different than anything we had on campus. • We could work at our won pace. • Didn't have an overwhelming amount of work though because of pacing guide. • Didn't like when the tech wouldn't work. • Didn't like not having a teacher there to answer our questions.	1. Liked being able to work at your own pace. Self-directed learners 2. Content is easily accessible and easy to turn in since it is online. (table continued)

	• Communication is important – communication was difficult without the correct equipment • e-mail response needed to be in a timely manner. • A lot easier to work at home • Very accessible • Easier to type your assignments • Easier to read on the computer. • Liked the ability to print off the content and highlight • Can use functions on the computer • I like the discussions boards to discuss different ideas. • Allows for greater self expression than in the traditional classroom. • You don't have a teacher that is there to immediately help you. You may have to "wing it." • Felt unprepared for the quizzes as the quizzes may not have a good review like in the traditional classroom. • Did better on the writing assignments. • Reviews were online as part of the content. Take this self check quizzes for review. • a lot easier to work at home • It is also a lot easier to type your assignments rather than to write them and be able to turn them in that way. • it was easier reading content on the computer, as compared to traditional classroom - but I think it is easier because you can use all the gadgets and functions on the computer. • it is good to discuss • you don't have a teacher who is there with you, so if you have a question, you still have to e-mail it. You might not see it until later on that day or even the next day, so if you have an assignment due and you have a	3. Students expressed the need for communication with a teacher when problems arise. (table continued)

	question, sometimes you just have to wing it, I guess. • I like the flexibility of distance-learning. • Can work at own pace • Do not have to wait to get more assignments • Teacher is clear about when assignments are due • I can work on my assignments when I feel good. • Miss interaction with other students – face-to-face interaction • Would like having the discussion with the teacher on IVC to get to know them better. • Teacher introduces herself via e-mail at the beginning of the year. • I think the class is set up very well. It covers the material and it challenges you to really study. • Online self assessment quizzes. • Used Word documents and make an occasional chart in our Word documents. • Would like to meet with our teacher every week online or with IVC. Maybe every week or on Fridays or some scheduled time of the week. • Did not like that the students were not on the same schedule which made me stressed which caused some disagreement between our schools as we may have covered different content. • Liked using the Elmos because it helped us to see visually what we were learning. • I would like to see the content online to help us keep together with the content with the other IVC schools. • It gave us a lot more freedom to just learn the subject. It is easy for you to	(table continued)

	learn stuff like that. • Not as structured. Easy to go back and look at stuff and pick it up and learn it and review what I need to. • It was harder to get questions answered • I liked being able to pick and choose what activities to do. • Liked the ease of receiving your content and taking your tests, with having everything all in one space. • Would like more videos. • Having a face-to-face teacher would have been good for some of the lessons. • Liked meeting people from other schools. • Got to go to the other school and go on a field trip with them. • Not as structured as a traditional classroom.	
3. What activities do students report as being most helpful in learning content?	• All of the quizzes were online • Received notes of the lectures to follow along. • Watched lectures on DVD – tv • Computers – laptops • Watched movies for assignments to get a lesson across. • Headsets to talk to teacher. • Digital camera – take a picture of historical landmarks. • IVC equipment used in the math class. • e-mail • Headsets • Elluminate • Discussion boards – participated in that a lot liked it. • Used word and Publisher to complete projects. • Enjoyed watching clips of videos or movies that related modern day back to history	1. 28 technology activities are listed to receive and learn content. These included using the tablet laptops, e-mail, word processing, online quizzes, and online video clips. 2. Students liked using the technology to communicate with the teacher. (table continued)

	• Enjoyed getting to work outside to do the digital project and walking outside. • Could have used MovieMaker I like using the technology because it is what I am used to using and what I have been around more. • Computer • Word • Internet with searches • Laptop notebook computer • I have to be resourceful • Used digital cameras and reflected on the pictures • Printers to print out • Very different from the traditional classroom. • Really liked learning the technology and the distance-learning courses really helped me with my technology skills since we used them everyday. • Used e-mail and discussion boards. • e-mails to talk with teacher • Discussions are between the students to post and respond to other students. • Elluminate sessions – we could talk to the teacher that way. • Oral assessments on the phone – it was interesting – it was helpful to know that there was a real person on the other end. • Online index card matching to learn different literary terms – beneficial. Could do it numerous times to learn the content. • Incorporated pictures and word together with research. Interesting research projects. • Repetition and self checks were helpful • Would like to see more repetitive or drill and practice to learn the content. • Mostly text	(table continued)

	• Watch a video • Some audio • A little bit of everything • Do research on the internet • All of the documents we turn in I typed on Microsoft Word. • We did have to watch a few videos and write about them • Learned a lot about technology • Used e-mail, discussion boards quite a bit • so you, of course, are posting your own opinion and your own discussion, but you are also reading the others' and are responding to them. • Oral assessments were interesting. It was helpful to me, because sometimes on the computer, you kind of, you know, it is hard to remember that there is a real person on the other side of it, you know–a real teacher. That is helpful. • I watched the movie and then wrote about it. • I would paste in pictures that I had searched for on the Internet • The timelines were a lot easier to complete using the technology and it was a lot better. • There were some links where we went and did like online index cards, matching games, and things just to learn different literary terms and things like that. And you could do it as many times, and keep reviewing it until you learned it. • Used digital cameras to complete an activity • videos are always good • self-checks and just keep reviewing • Used discussion boards	(table continued)

	• Talked to teacher on phone • Used e-mail to talk to other students • Have study notes online • Occasional videos • Liked doing online self assessment quizzes or surveys. • Online self-check quizzes • Student likes class discussions and web-based courses do not have that. • Would love to use MovieMaker but did not use it in our course. • It gets monotonous reading every day. • Would like to see more interaction. It helps to challenge me to talk about the content. • Would like to get out into the community more – maybe do interviews. • Liked how we are connected to the other schools so that we can share how each other learn the content. • Just received content through the teacher • Used the laptops and digital presenters • Used e-mail to communicate with other students. • With IVC, we were able to have time to talk with each other and share tips about how we may learn the material like color coding or make columns, or diagrams to help us with our work. • I liked the camera and how it zoomed in on us, and it got us interacting with each other and getting us to know each other. That helped a lot. • Having the laptops allows us to get on different helpful websites to study. • Used Word to create and submit tests that we made to the teacher. • Would like to see more activities that gets us up and moving around.	(table continued)

	• I liked the IVC class because it was not boring like a traditional classroom. • Other students from the IVC schools were very encouraging and motivated me. • I liked having different websites to go to • IVC helped me come out of my shell and talk more to others to help me learn the material and get along with other students that are different from me. • Mostly text • Some videos • Some sound clips • Used basic recording software on the computer. • Word searches on the computer • Online exercises • External links to online activities • Used mostly e-mail to communicate with the teacher • Used Discussion boards to master the foreign language • Go used to using e-mail to communicate with teacher. • Easier to talk to instructor with e-mail • Used a digital presenter • Used laptops to do research • Used PowerPoint • Used the laptop to write on • Copied pictures from the Internet and put in PowerPoint • Communicated with other students through e-mail. • Internet research • Computers make it easier to do the research.	(table continued)

	• IVC classes I can interact with people more and do more projects and not just sit there and listen to the teacher (like in a traditional class). • More of an active learner.	
4. How do students feel about their achievement with regard to their learning styles being met?	• Material has been presented in a way that has helped a lot • Straight forward presentation. • You have so many different links and supplementary materials that you can use to learn the content. • All of the different activities really helped me learn the content. • Provide with plenty of activities that are provided to me through the distance-learning course that I don't get bored. • I get to do other activities than just using the book to learn content like in the traditional class. • Definitely helped with succeed in my other classes. It has helped me with my other traditional classes. • I feel that having had online courses in high school has prepared me for my college environment. • More challenging content. • Teaches self discipline. • Content was presented so that I learned a lot in this manner. • Quizzes didn't really ask what the content presented. • Quiz and content may have been completely different. • Did not like to learn vocabulary the way it was presented. Teacher modified the assignments though. • Was pretty pleased with my grade in the course. • Content was difficult in which the time that we had to do the course. • Very time consuming but it was an AP Course.	1. All 14 students felt successful in the course. 2. Distance-learning courses have helped students to be self-directed learners and be more responsible for their own learning experience. 3. Students feel more prepared for higher education having taken an online course. 4. Students did not feel prepared for their online quizzes or tests. (table continued)

	• I would take another online course. • These classes aren't offered here and gives us an opportunity to take these classes. • Has prepared me more than a traditional class because of having all of the technology. • Teaches personal responsibility and self discipline. • Since I was able to take the tougher classes, I will be better prepared to take the harder classes in college. • 3-5 words to describe online courses: Helpful, educational, self-discipline, challenging, thought-provoking • multiple choice/true or false kind of things I did not do very well on • a lot of times I felt like I didn't really know it was supposed to be on the quiz, • written assignments–I did better on • I learned a lot • Quizzes and content didn't match up sometimes. • the quiz was actually quite a bit different • I was learning, but it was like I was being tested on what I did not learn • It was a good learning experience. • I would like to se more repetitive activities to help me learn the content. • I was pretty pleased, I guess, with my grade • I would take another online course, basically for the reason that going through a small school here–and of course. • I can take a tougher class that is going to prepare me better, and so it is just beneficial to me. • I don't know if it is just the online, but I think distance-learning has	(table continued)

	prepared me in that because I was able to take the tougher class than I would have if we did not have the online education. You know, I was more prepared because I could do that. • I can go back and read content as much as I need to in order to get the content. • Definitely continue with the quizzes. Those [self- check quizzes] have been really helpful. They reinforce the points made. That way, we know what to look for on our tests. • We have to do more studying on our own and review the notes more. Because we don't have anyone drilling it in our heads by talking to us • I feel very successful in the class. I am able to do the work without killing myself. • I am learning a lot but it is not overwhelming like everybody thought it was going to be. • It is just the difference in my mindset to get in here and work hard on it. • I have to do more studying on my own as opposed to the traditional classroom. • Distance-learning gives us an opportunity to advance our studies and take the classes that look better on our transcripts, and gives us an opportunity to take something that we wouldn't offer. • I would take another class online in college especially since I am use to the process. • It has helped me use the internet more effectively. • I can do (the work) at home. It is the same content–no matter where you	(table continued)

	are. You can do it whenever you feel like it, which is great • I liked having the teacher in the room to help us learn the content. • I still use some of the learning strategies today that I learned from the other IVC schools. • It was a good change (from the traditional classroom). It helped me to study different ways. • Students are excited about the class. • IVC has really helped prepare me for college as it has helped me learn to take notes and has helped me with my learning strategies. • Had an easy time with the less structure so I found it easy. • Prepares me for college because the format it about the same. • It just set me up [for college] so I know I don't have somebody always there reminding me. I have to remember it myself, so that gets me ready. • Teaches personal responsibility and self discipline. • Less stressful. • More time to do your work. • Class was fun because I got to meet new people and use technology. • And that will get me a little ahead of other people if they haven't had 'em.	

Appendix H

Mapping of Focus Group Discussions

Research Subquestions	IFGQ = Interview/Focus Group Question Number DLAS = Distance-learning Activity Survey	Emerging Themes
1. How are students' learning styles met in a distance-learning course?	• Used Word for essays. • Used online matching games. • Watched videos • Read book • Online self check quizzes • It was interesting seeing others, like what they had to say. That was cool. • Would like to see the teacher lecture and have students take notes on the lectures either online or through IVC • E-mail • Discussion boards • Elluminate • Online Calculator • Digital Presenter • Online Internet searchers • Laptops	1. Students reported 17 activities in which to participate to learn the content and meet their learning style such as watching videos, taking online self check quizzes, writing essays, reading text from books and from the computer, and using the tablet notebooks to complete assignments.
2. What are essential components in a distance-learning course that help meet students' learning styles?	• I like the freedom to work at your own pace. If you are behind, you are not *really* behind, and if you want to work ahead, you can. • You don't have a teacher over your back the whole time. • They put on there like all of your Module I work has to be done by today, and if not done, they closed out that module. • I like a teacher in the classroom. • I like class discussions. • Would like to see more interaction with our instructor. • Some video clips	1. Students liked the structure of the course which allowed them the freedom to work at their own pace. 2. Students would like to see more activities that incorporated live interaction with the teacher.

(table continued)

	• I like how the online course has the work outlines to go with the book. • Used a computer • Used Elluminate • Would like IVC course better to have more interaction with the teacher. • Liked meeting the teacher online in a chat room to talk about the week and had a real discussion. Meet every day for 10 minutes on IVC. • Distance-learning courses need to provide enough structure for young adults, and yet enough freedom that you can feel free to work at your own pace. • I feel like if I was at the other school–our school is fine, because she is right there with us, but I feel like sometimes that the other school–well, you might know this better, because you took it like just here–but like, it seemed like–I don't know–maybe they didn't get the help that we got, you know? Because it is hard for–it would be like hard if you were a student–it would be like hard to raise your hand, because you know, like, everybody is watching you, and you kind of like, I don't know, I would think it would be harder if you were on the other end. • Did not like asking questions on IVC • It was like kind of a little frustrating, because I did like have a few questions, and I could not get answers on e-mail...	(table continued)

	• It (web-based) would have been okay. I would still like for her to come in, you know, because there are a lot of different kinds of problems. You never know what you are going to get, so... • Materials were presented in only text. • I liked it. I mean like, it was all right there and laid out for me to do. • I actually have a little online program that helps you learn. • Calculator • One student reported that in their online math course, it was difficult and time consuming to type out the math problems and that using a tablet laptop would have been helpful.	
3. What activities do students report as being most helpful in learning content?	• I like lectures. But online, I don't get that at all. • Different links to go to • We have chapters to read in our book • Some videos • I like how the online course has the work outlines to go with the book. • Used Elluminate to talk to the teacher about content • Elluminate • Digital presenter • Used internet for research papers. • Had to rely on e-mail to get answers from the teacher, and sometimes, you might not get in too deep, and then you had to wait on her reply, and by that time, you have to have a test, where you needed the information. • Liked the little quizzes – self check quizzes – to learn the content. • Liked online matching games to	1.Students reported 17 activities in which to they engaged to help them learn the content. These included watching videos, watching the teacher use the Elmo (digital presenter), completing online quizzes, playing online matching games to learn the content, and using tablet laptops. 2. Students liked being able to see the teacher, whether it be via IVC or by watching an online video, to receive and learn the content. (table continued)

	learn content. • Did not like reading all those chapters out of the book. • I want to emphasize the laptops, because–I don't know-it was just interesting, because you could write on it, and you could just do all kinds of stuff with it–like, I don't know, I like doing notes and doing all that stuff on the tablet. That was cool. • Many external links. • Teacher recorded videos and put them online for students to watch her lessons. • It would have been just like she was teaching us; you know, I mean, you are watching her do it, and like it is showing up on the video–like it is showing her and what she is writing, so... • Talked with the other students via e-mail [I would like to have] more interaction with the other students, because that kind of got on my nerves, I guess because I did not really know them. If we had known them more, it would have been better. Like, we would not have been so scared to ask questions. • I actually have a little online program that helps you learn. • Calculator • I liked having the teacher in the class better. For me, I am one of those students who have to see it worked out, because I am not really good at math. I am a pretty good student in other courses, but I am not really good at math. But if I can see it worked out like that, that	(table continued)

	is the only way I can learn how to do it, so it would have been hard to have text only. Well, I guess it is kind of intimidating • I don't think the other kids did as well as us, because they did not have the teacher there. • They would get distracted, like she would be teaching, and we could hear them talking in the background, because, you know, they didn't really have the teacher right there. • I guess when it comes to math, if I don't see somebody work it out, I am not going to get it. • Students reported that they would have liked to have project to do on PowerPoint or Movie Maker. But in the math class, that was not in the course. • Yeah, I mean not a lot of projects, but like something creative that would help me out with a lesson	
4. How do students feel about their achievement with regard to their learning styles being met?	• Not prepared for the quizzes. • Would like to see the course redesigned to better prepare you for the quizzes. • Did not feel prepared for the tests or quizzes. Would like to see study guides identifying key points • Learning a lot • Would like more personal interaction to learn the content better and understand better. • I really thought it was easier on the computer. • I felt I did good. • I liked having the teacher in the class better. For me, I am one of those students who have to see it worked out, because I am not really good at math. I am a pretty	• Overall, it was a good experience. • Students felt that they were not adequately prepared for the online quizzes and tests. (table continued)

	good student in other courses, but I am not really good at math. But if I can see it worked out like that, that is the only way I can learn how to do it, so it would have been hard to have text only. • I think I did good. • I really liked it. I mean, it helped me a lot • I don't think the other kids did as well as us, because they did not have the teacher there. • Yes, overall, I really liked it. It was fun • But in distance-learning, sometimes the other schools would not like keep their minds on it, so we could hear what they were saying. • I think it is easier to do when you are by yourself. If you are not by yourself, you can get distracted, but if you are by yourself, you can make yourself work.	

Appendix I

Distance-learning Surveys Tabulation and Analysis

Multiple Intelligence	Individual and Focus Group Student Responses	Number of Activities in Which Students Reported Participated	Percentage of Activities on the Distance-learning Survey in Which Students Participated
Linguistic	Student 1 = 11	11	61%
	Student 2 = 12	12	67%
	Student 3 = 12	12	67%
	Student 4 = 9	9	50%
	Student 5 = 8	8	44%
	Student 6 = 2	2	11%
	Student 7 = 2	2	11%
	Student 8 = 4	4	22%
	Student 9 = 1	1	6%
	Student 10 = 9	9	50%
	Student 11 = 9	9	50%
	Student 12 = 7	7	39%
	Student 13 = 2	2	11%
	Student 14 = 6	6	33%
	Average =	6.71	37%
Logical/mathematical	Student 1 = 0	0	0%
	Student 2 = 2	2	13%
	Student 3 = 2	2	13%
	Student 4 = 1	1	6%
	Student 5 = 0	0	0%
	Student 6 = 2	2	13%
	Student 7 = 0	0	0%
	Student 8 = 2	2	13%
	Student 9 = 1	1	6%
	Student 10 = 5	5	31%

(table continued)

	Student 11 = 3	3	19%
	Student 12 = 1	1	6%
	Student 13 = 0	0	0%
	Student 14 = 0	0	0%
	Average =	1.36	8%
Visual/spatial	Student 1 = 3	3	12%
	Student 2 = 6	6	23%
	Student 3 = 6	6	23%
	Student 4 = 2	2	8%
	Student 5 = 0	0	0%
	Student 6 = 2	2	8%
	Student 7 = 1	1	4%
	Student 8 = 1	1	4%
	Student 9 = 0	0	0%
	Student 10 = 3	3	12%
	Student 11 = 3	3	12%
	Student 12 = 2	2	8%
	Student 13 = 1	1	4%
	Student 14 = 4	4	15%
	Average =	2.43	9%
Body/kinesthetic	Student 1 = 1	1	11%
	Student 2 = 2	2	22%
	Student 3 = 2	2	22%
	Student 4 = 1	0	0%
	Student 5 = 1	1	11%
	Student 6 = 1	1	11%
	Student 7 = 1	1	11%
	Student 8 = 1	1	11%
	Student 9 = 1	1	11%
	Student 10 = 1	1	11%
	Student 11 = 2	2	22%
	Student 12 = 1	1	11%
	Student 13 = 1	1	11%
	Student 14 = 1	1	11%
	Average =	1.14	13%
Musical	Student 1 = 2	2	22%
	Student 2 = 2	2	22%

(table continued)

	Student 3 = 2	2	22%
	Student 4 = 0	0	0%
	Student 5 = 0	0	0%
	Student 6 = 3	3	33%
	Student 7 = 0	0	0%
	Student 8 = 0	0	0%
	Student 9 = 1	1	11%
	Student 10 = 2	2	22%
	Student 11 = 2	2	22%
	Student 12 = 0	0	0%
	Student 13 = 0	0	0%
	Student 14 = 0	0	0%
	Average =	1.00	11%
Interpersonal	Student 1 = 4	4	33%
	Student 2 = 6	6	50%
	Student 3 = 6	6	50%
	Student 4 = 2	2	17%
	Student 5 = 1	0	0%
	Student 6 = 1	1	8%
	Student 7 = 1	1	8%
	Student 8 = 1	0	0%
	Student 9 = 1	1	8%
	Student 10 = 3	3	25%
	Student 11 = 4	4	33%
	Student 12 = 2	2	17%
	Student 13 = 1	0	0%
	Student 14 = 1	0	0%
	Average =	2.14	18%
Intrapersonal	Student 1 = 2	2	40%
	Student 2 = 3	3	60%
	Student 3 = 3	3	60%
	Student 4 = 0	0	0%
	Student 5 = 0	0	0%
	Student 6 = 1	1	20%
	Student 7 = 0	0	0%
	Student 8 = 0	0	0%
	Student 9 = 0	0	0%

(table continued)

	Student 10 = 4	4	80%
	Student 11 = 0	0	0%
	Student 12 = 0	0	0%
	Student 13 = 0	0	0%
	Student 14 = 1	1	20%
	Average =	1.00	20%
Naturalist	Student 1 = 1	1	17%
	Student 2 = 3	3	50%
	Student 3 = 3	3	50%
	Student 4 = 0	0	0%
	Student 5 = 0	0	0%
	Student 6 = 0	0	0%
	Student 7 = 1	1	17%
	Student 8 = 0	0	0%
	Student 9 = 0	0	0%
	Student 10 = 4	4	67%
	Student 11 = 1	1	17%
	Student 12 = 0	0	0%
	Student 13 = 0	0	0%
	Student 14 = 3	3	50%
	Average =	1.14	19%

Appendix J

Triangulation of Common Themes from Data

Individual Interviews	Focus Group Discussions	Distance-learning Survey
28 different types of activities were used to learn the content – matched with all 8 learning styles	17 different types of activities were used to learn the content – matched with all 8 learning styles	An average of 16 types of activities were used to learn the content – matched with all 8 learning styles
All 14 students liked using IVC equipment, telephone, e-mail, discussion boards, and online tutoring sessions were very helpful. Liked the interaction these activities provided.		All 14 students used e-mailing to communicate with other students or the instructor.
The 6 web-based students reported liking the flexibility of working at their own pace.	The 4 web-based students reported liking the flexibility of working at their own pace.	All scores fell within ±0.62 standard deviations of the mean.
Easy access to content since it was all online		
Would like more interaction with the teacher. Would like to meet with them on a scheduled basis	Would like more interaction with the teacher. Would like to meet with them on a scheduled basis	
Students felt successful and that it was a good experience.	Students felt successful and that it was a good experience.	
Developed self-directed learning skills and responsibility		
One student feel better prepared for higher education having taken an online course		
2 Students did not feel prepared for their online quizzes or tests	2 Students did not feel prepared for their online quizzes or tests	
	Web-based students wanted to actually have the teacher online for lectures everyday like with IVC.	

Appendix K

Confidentiality Agreement with Peer Reviewer

Please return this signed form in the attached self-address stamped envelope.

I agree to keep all information collected and viewed during this research project completely confidential. All data and documents will be returned to the researcher.

Name:_____

Signature:_____

Date:_____

Appendix L

Mapping of Qualitatively Gathered Data

Research Subquestions	IFGQ = Interview/Focus Group Question Number DLAS = Distance-learning Activity Survey
1. How are students' learning styles met in a distance-learning course?	IFGQ 3) Tell me how the materials are presented in your distance-learning course (text, audio, video, et cetera). How do you feel about receiving instruction in this manner? IFGQ 7) What activities did you participate in that helped you learn the content? How did you feel about these activities? DLAS
2. What are essential components in a distance-learning course that help meet students' learning styles?	IFGQ 1) What have you liked about being enrolled in a distance-learning course? IFGQ 2) What have you disliked about being enrolled in a distance-learning course? IFGQ 3) Tell me how the materials are presented in your distance-learning course (text, audio, video, et cetera). How do you feel about receiving instruction in this manner? DLAS
3. What activities do students report as being most helpful in learning content?	IFGQ 4) What types of technology do you use to help you complete your course work? IFGQ 5) What communication tools have you used and in what ways have you used them to learn the content? IFGQ 9) What online activities did you enjoy or not enjoy? IFGQ 10) What activities did you enjoy or not enjoy that required you to create a piece of work (PowerPoint, Windows Movie Maker, Paint, et cetera)?

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	IFGQ 11) How do you think distance-learning courses could be redesigned in an effort to meet your learning styles? IFGQ 12) What other activities should have been added or deleted from the course? DLAS
4. How do students feel about their achievement with regard to their learning styles being met?	IFGQ 6) How do you feel that the content has been presented so that you may learn the material? IFGQ 7) What activities did you participate in that helped you learn the content? How did you feel about these activities? IFGQ 8) What activities did you participate in that did not help you learn the content? How did you feel about these activities? IFGQ 13) How do you feel about your success in this online course? IFGQ 14) Why would you or would you not take another online course?