

THE COMPARABILITY OF HEALTH EDUCATION SKILL ACQUISITION
BETWEEN UNDERGRADUATE STUDENTS ENROLLED IN TRADITIONAL AND
ONLINE HEALTH EDUCATION COURSES

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF HEALTH SCIENCES

BY

KATHLEEN G. ALLISON, B.S.Ed., M.P.H.

DENTON, TEXAS

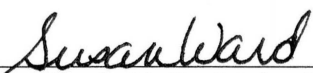
AUGUST 2005

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

June 20, 2005

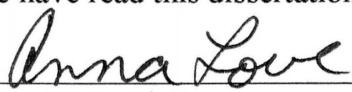
To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Kathleen Glass Allison entitled "The Comparability of Health Education Skill Acquisition between Undergraduate Students Enrolled in Traditional and Online Health Education Courses." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment for the degree of Doctor of Philosophy with a major in Health Studies.

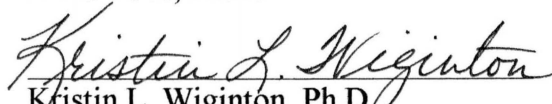


Susan Ward, Ph.D., Major Professor

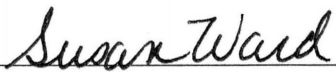
We have read this dissertation and recommend its acceptance.



Anna Love, Ph.D.

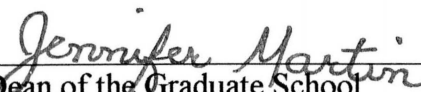


Kristin L. Wiginton, Ph.D.



Susan Ward, Ph.D., Department Chair

Accepted:



Dean of the Graduate School

ACKNOWLEDGEMENTS

"We don't accomplish anything in this world alone ... and whatever happens is the result of the whole tapestry of one's life and all the weavings of individual threads from one to another that creates something." Sandra Day O'Connor

I have been blessed to be surrounded by many wonderful people who have made this accomplishment possible and who have enriched my life beyond measure.

I extend my gratitude to the faculty members within the Department of Health Studies, Texas Woman's University. I have been challenged to go beyond my comfort zone, to examine issues from other vantage points, and to present information in new ways. I have learned from each of you how to be a better health educator, a better instructor, and a better person. I would like to especially thank Dr. Susan Ward for guiding me through my graduate career at Texas Woman's University. Without your support, I would not have been able to complete my studies. I would also like to acknowledge Dr. Anna Love and Dr. Kristin Wiginton for sharing their time and expertise in the dissertation process.

I would like to thank the many individuals at Lock Haven University of PA who supported me throughout my doctoral program. In particular, I would like to acknowledge Dr. Mary Rose-Colley for allowing flexibility in my work schedule. All of you have been a great support system. Thank you.

Traveling for classes has not been easy. I would like to thank my mother, Christina Glass, for providing me with the freedom to travel to Texas and the freedom to

know that Kelsey and Carter were happy and well when I was in class. I love you, Mom. I couldn't have done it without you. Thank you also for always believing in me.

My family has supported me endlessly through the thick and thin of this accomplishment. To my husband, Dwayne, thank you for your endless support and love during this process. You believed in me even when I didn't believe in myself. Thanks for tolerating my travels and my late hours. I love you. This accomplishment is a tribute to you and our relationship. To my children, Kelsey and Carter, thanks for reminding me that there is more to life than school and work. You are my greatest blessings, and being your mom is my most important role in life. I love you both.

ABSTRACT

KATHLEEN G. ALLISON

THE COMPARABILITY OF HEALTH EDUCATION SKILL ACQUISITION BETWEEN UNDERGRADUATE STUDENTS ENROLLED IN TRADITIONAL AND ONLINE HEALTH EDUCATION COURSES

AUGUST 2005

As web-based instruction becomes more prevalent in professional health education preparation programs, measures of quality need to be implemented to insure that program standards and health education skill acquisition by students are maintained. The purpose of this study was to examine if differences existed in the acquisition of health education skills between students enrolled in online and traditional undergraduate health education courses. The study was conducted utilizing a post-test, quasi-experimental design. Data was collected from course project grading rubrics based upon the core responsibilities of entry-level health educators. The course projects examined were contained within four courses offered in the traditional and online learning environments during the Fall 2004 and Spring 2005 semesters and represented the health education skills of assessing individual and community needs, acting as a resource person, planning effective health education programs, and evaluating the effectiveness of health education programs. Inter-rater reliability relating to these skills was determined. Statistical analyses indicated that no statistical differences existed in course project scores representing the health education skills of assessing individual and community needs and

planning effective health education programs. Statistical results of course project scores representing the health education skills of acting as a resource person and evaluating the effectiveness of health education programs were statistically different. Students in the online condition scored statistically significantly higher than their traditional counterparts on the course project relating to the health education skill acting a resource person.

Students in the traditional condition scored statistically significantly higher on the course project related to evaluating the effectiveness of health education programs. Inter-rater reliability for these two skills was not statistically correlated; therefore the results were met with caution. A one-way multivariate analysis of variance found that the scores relating to health education skill acquisition did not differ across the courses. A χ^2 analysis found that the levels of attainment did not statistically differ between traditional and online health education students. The results of this study indicated that health education skill acquisition was comparable between students enrolled in traditional and online undergraduate health education courses during the Fall 2004 and Spring 2005 semesters.

TABLES OF CONTENTS

ACKNOWLEDGEMENTS	iii
ABSTRACT	v
LIST OF TABLES	ix
Chapter	Page
I. INTRODUCTION	1
Statement of Purpose	2
Research Questions	2
Hypotheses	3
Delimitations	5
Limitations	6
Assumptions	7
Definitions of the Terms	7
Importance of the Study	8
II. LITERATURE REVIEW	9
Online Instruction as an Instructional Medium in Higher Education	9
Assessment of Online-based Education	12
Importance of assessment	12
Assessment in the literature	13
Characteristics of online learners	24
Commonly Reviewed Aspects of online instruction	26
General aspects of quality online courses	27
Interaction and communication	27
Learning styles	31
Access, technology, and hypermedia	33
Expectations	34
Constructivism as a Theoretical Basis in Online Education	34
Defining constructivism in the online environment	34
Authentic assessment	37
Rubrics as a tool for authentic assessment	39
Health Education Skills as a Basis for Program Assessment	40
Summary	41

III.	METHODOLOGY	43
	Population and Sample	44
	Protection of Human Participants	45
	Data Collection Procedures.....	45
	Sampling	45
	Instrumentation	46
	Data analysis	49
	Summary	50
IV.	RESULTS	54
	Results Related to Each Hypothesis	55
	Hypothesis One	55
	Hypothesis Two	57
	Hypothesis Three	58
	Hypothesis Four	59
	Hypothesis Five	60
	Hypothesis Six	61
	Hypothesis Seven.....	62
	Summary	65
V.	CONCLUSIONS AND RECOMMENDATIONS	68
	Summary	69
	Conclusions.....	70
	Research question one.....	70
	Research questions two.....	71
	Research question three	72
	Research question four.....	72
	Research question five	73
	Research question six.....	74
	Research question seven	74
	Discussion and Implications	76
	Recommendations.....	80
	REFERENCES	82

LIST OF TABLES

Table	Page
1. Results of Pearson Correlations for HS 1373, HS 3073, HS 3083	52
2. Statistical Tests Conducted by Hypothesis	53
3. Age and Hours Spent on Outside Responsibilities by Instructional Format	56
4. χ^2 Analysis of Selected Demographic Variables	57
5. Summary of Statistical Analyses of Health Education Skill by Instructional Format	61
6. Mean Scores and Standard Deviations of Scoring Variables by Instructional Format	64
7. Follow-up Analyses of Variance for Content, Composition, and Combined Scores	64
8. Course and Content Grades by Format	66
9. χ^2 Analysis of Course and Content Grades	67
10. Summary of Null Hypotheses and Conclusions	76

CHAPTER I

INTRODUCTION

Web-based instruction is becoming an established instructional medium in higher education. According to the 1999 National Survey of Information Technology in Higher Education, 47% of institutions of higher education offered at least one online course (CHEA, 2003). Researchers from the National Center for Education Statistics (NCES) found the number of online courses nearly doubled between the 1994-1995 and 1997-1998 school years (Lewis, Snow, Farris, & Levin, 1999). An updated study for the NCES indicated that 90% of institutions offering distance education courses utilized asynchronous computer-based instruction as the primary mode of distance education instruction; and 88% of the institutions surveyed plan to initiate or increase use of asynchronous computer-based instruction (Waits & Lewis, 2003). In addition to increased offerings, the Sloan survey found that 13% of students enrolled in institutions offering online courses participated in at least one online course (Allen & Seaman, 2003). This same study revealed that Academic Officers held favorable attitudes toward the learning outcomes of online courses (Allen & Seaman, 2003). As the number of online course and program offerings increase, institutions have begun to seek methods to assess the quality of programs to remain accountable to their students and their accrediting bodies.

Statement of Purpose

The purpose of this study was to determine if skill attainment as defined within *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured according to course specific grading rubrics was similar between students enrolled in traditional undergraduate health education courses and students enrolled in online undergraduate health education courses offered within the same department at Texas Woman's University.

Research Questions

The researcher examined the following research questions.

1. Were students enrolled in the traditional undergraduate health education courses from the same population as students enrolled in the online undergraduate health education courses?
2. Was skill attainment related to assessing individual and community needs for health education different for students enrolled in the traditional undergraduate community health education course and students enrolled in the online undergraduate community health education course?
3. Was skill attainment related to acting as a resource person for health education and communicating health education needs different for students enrolled in the traditional undergraduate seminar course and students enrolled in the online undergraduate seminar course?
4. Was skill attainment related to planning health education programs different for students enrolled in the traditional undergraduate program planning health

- education course and students enrolled in the online undergraduate program planning health education course?
5. Was skill attainment related to evaluating the effectiveness of health education programs different for students enrolled in the traditional undergraduate program evaluation health education course and students enrolled in the online undergraduate program evaluation health education course?
 6. Was there a difference in the writing skills between students enrolled in the traditional undergraduate health education core skills courses and students enrolled in the online undergraduate health education core skills courses?
 7. Was there a difference in the levels of attainment of health education skills as described by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured utilizing course rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University between students enrolled in the traditional undergraduate health education courses and students enrolled in the online undergraduate health education courses?

Hypotheses

The researcher tested the following hypotheses at a .05 significance level.

Hypothesis 1: There will be no statistically significant difference in the demographic characteristics of age, race/ethnicity, gender, family responsibilities, and past/current employment for undergraduate students enrolled in the traditional health education core

skills courses and the students enrolled in the online health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 2: There will be no statistically significant difference in skill attainment related to assessing individual and community needs for health education for undergraduate students enrolled in the traditional community health education course and the students enrolled in the online community health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 3: There will be no statistically significant difference in skill attainment acting as a resource person for health education and communicating health education needs for undergraduate students enrolled in the traditional health education seminar course and the students enrolled in the online health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 4: There will be no statistically significant difference in skill attainment related to planning health education programs for undergraduate students enrolled in the traditional program planning health education course and the students enrolled in the online program planning health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 5: There will be no statistically significant difference in skill attainment related to evaluating the effectiveness of health education programs for undergraduate students enrolled in the traditional program evaluation health education course and the students enrolled in the online program evaluation health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 6: There will be no statistically significant difference in the writing skills as measured by the analytic portions of the health education skills grading rubrics between students in the traditional undergraduate health education course and students enrolled in the online undergraduate health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Hypothesis 7: There will be no statistically significant difference in the level of attainment of health education skills as described by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured utilizing course rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University between students enrolled in the traditional undergraduate health education core skills courses and students enrolled in the online undergraduate health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Delimitations

The researcher established the following delimitations for this study.

1. The participants were limited to those students enrolled in undergraduate health education core skills courses in the Fall 2004 and Spring 2005 semesters.
2. The results of the study were based upon those students who completed the courses by the end of the Spring 2005 semester.
3. The study was conducted utilizing a quasi-experimental post-test only design. The researcher did not measure intra-group changes in knowledge; inter-group initial knowledge bases were not compared.

4. The study compared the scores earned on culminating projects within four courses representing a subset of the competencies of entry-level health educators. The course grades were not used for comparison.

Limitations

The researcher acknowledged the following research limitations.

1. Although students were accepted into the online and traditional programs, the students selected their preferred method of instruction when applying to the undergraduate health education program. Randomization of participants was not possible.
2. Students who withdrew from the courses may have differed from each other. Because the data was not available until after the semesters' completion and the participants remained unknown to the researcher, it was not possible to determine whether those who withdrew differed from each other or from those who remained in the courses.
3. Students must have a minimum of 3.0 out of 4.0 to be eligible to be enrolled in the online undergraduate health education program at Texas Woman's University; students must have a 2.5 out of 4.0 grade point average to be enrolled in the traditional undergraduate health education program at Texas Woman's University.

Assumptions

The researcher made the following assumptions for this study.

1. The content and major projects between the traditional and online courses were similar.

2. The inter-rater reliability established prior to the study remained consistent throughout the Spring 2005 semester.
3. Students selected the educational format that best met their learner needs.

Definition of the Terms

Authentic assessment - An assessment based upon real life competencies, i.e. the knowledge and skills needed in a criterion situation in professional life (Gulikers, Bastiaens, & Kirschner, 2004).

Online instruction - For this study, online instruction was defined as an instructional mode in which 80% or more of course content was disseminated using web-based technology (Allen & Seaman, 2003).

Rubric - For this study, a rubric was defined as a grading scheme that utilizes descriptive behavioral anchors to identify levels of achievement and allows for a basis of comparison (Montgomery, 2002; Moskal, 2000). There were two basic types of rubrics: holistic rubrics, rubrics that examined the overall student product; and analytic rubrics, rubrics used as scoring schemes for a particular component of a product, e.g. grammar (Montgomery, 2002; Moskal, 2000).

Health education skills - Health education skills in this study were defined as the responsibilities outlined within *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996). The skills included: assessing individual and community needs for health education; planning effective health education programs; implementing health education programs; evaluating effectiveness of health education programs; coordinating provision of health education

services; acting as a resource person in health education; and communicating health and health education needs, concerns, and resources.

Importance of the Study

Program accreditation is seen as the “primary quality assurance measure in higher education” (Allegrante et al., 2004). As web-based instruction becomes more prevalent in professional health education preparation programs, strategies of assessment need to be institutionalized and quality measures need to be overtly demonstrated to insure that skill acquisition by students and program standards are maintained. Demonstration of program quality also has potential implications regarding the certification of future health educators. A recent recommendation by the National Task Force on Accreditation in Health Education (Allegrante et al., 2004) is to strongly link program accreditation with individual certification by making eligibility for individual certification contingent upon graduation from an accredited health education program. The findings of this study contribute to the expanding research bases in methods of web-based program assessment and in the area of assessing comparability between traditional and computer-mediated instruction within education, most notably the profession of health education.

CHAPTER II

LITERATURE REVIEW

This chapter provides a foundation for examining the comparability of health education skill acquisition in the online and traditional environments. A brief introduction to distance education will be presented with an emphasis on the establishment of the online platform as an educational medium in at the college level. Research examining the efficacy of online instruction across many disciplines will be reviewed. The research reviewed will also provide insight into characteristics of quality online courses and the types of learners who fare well in the medium. Constructivism, a theoretical basis for many online courses, will be defined; and authentic assessment and the use of rubrics as an extension of the constructivist philosophy will be presented. Lastly, the examination of health education skill acquisition based upon the framework of the core responsibilities and competencies of health educators will be presented as a standard for program, course, and individual assessment within health education.

Online Instruction as an Instructional Medium in Higher Education

Distance learning has been part of education since the mid-1800's (Phipps & Merisotis, 1999; Phillips, 1998; Stadtlander, 1998). Initial courses were offered via correspondence. As technologies have changed, so have the instructional media used for distance education. Media used include mail, audiotapes, pre-recorded videotapes, interactive videoconferencing, satellite conferencing, and the Internet (Matthews, 1999; Phillips, 1998; USGAO, 2002).

Web-based instruction has become a more established instructional medium within the past decade. Testimony to the United States Senate Committee on Health, Education, Labor, and Pensions by the United States General Accounting Office (U.S. GAO) indicated that during the 1999-2000 academic year, an estimated 1.5 million of the 19 million postsecondary students in the United States participated in a distance education course (USGAO, 2002). The number has been increasing; an estimated 1.9 million participated in an online course in the fall of 2003 (Allen & Seaman, 2004). According to the 1999 National Survey of Information Technology in Higher Education, 47% of institutions of higher education offered at least one online course (CHEA, 2003). Researchers from the National Center for Education Statistics (NCES) found the number of online courses nearly doubled between the 1994-1995 and 1997-1998 school years (Lewis, Snow, Farris, & Levin, 1999). An updated study for the NCES indicated that 90% of institutions offering distance education courses utilized asynchronous computer-based instruction as the primary mode of distance education instruction; and 88% of the institutions surveyed plan to initiate or increase use of asynchronous computer-based instruction (Waits & Lewis, 2003). In addition to increased offerings, the Sloan survey found that 13% of students enrolled in institutions offering online courses participated in at least one online course (Allen & Seaman, 2003). This same study revealed that Academic Officers held favorable attitudes toward the learning outcomes of online courses. This was especially true for academic officers at public institutions (Allen & Seaman, 2003). And nearly 75% of academic leaders believed that online learning outcomes would be comparable to or superior to traditional instruction within the next

three years in spite of the fact that many surveyed currently rated online education as slightly inferior to traditional instruction (Allen & Seaman, 2004).

Maddux (2004) reviewed myths regarding online education. A myth he dispelled was that online education is a fad. He contended that because both use of the Internet and the demand for online education are increasing, the number of course and program offerings will, in turn, increase. Indeed, the majority of institutions (53.6%) have identified online education as a critical aspect of their long-term strategies, most notably for institutions offering associates, masters and doctoral/research degrees (Allen & Seaman, 2004). Maddux (2004) also emphasized that online education will be a type of instructional strategy in higher education rather than a replacement for traditional higher education (Maddux, 2004). Burbules and Callister (2000) stated that providing access to students has long been a mission of many institutions, therefore incorporating online alternatives does not deviate from a university's purpose. As they reviewed the influences of technology and globalization on higher education in their essay, they also noted that faculty should accept the presence of changing technologies. They stated that faculty completely shunning new technologies puts "their institutions, their students, and their long-term employment viability in jeopardy" (p. 274). Not all in higher education share this view. Schank (2000) dismissed the increase in distance education courses as an effort to promote a university's mission, increase access, or explore new educational methodologies. His stance was that the increase is fear-driven: fear that other institutions will have more prestige or generate more student revenue. Regardless of the impetus, the web-based instructional medium will remain a prominent force in higher education.

Assessment of Online-based Education

Importance of assessment

Accreditation is seen as the gold standard in the approval process for institutions of higher education and the programs within the institutions. Institutional accreditation is conducted by six regional accrediting boards in the United States (Phillips, 2004). The accrediting bodies maintain similar standards, thus credits earned from one university are able to be transferred to another (Phillips, 2004), even to those in other regions. The assessment of online education is a necessity for institutions of higher education to ensure student learning outcomes in the educational medium. The regional accrediting bodies support the use of technologies as another instructional strategy. Their focus on accountability to quality outcomes remains, and they stress that institutions' "assessment of student achievement and evaluation of the overall program take on added importance as new techniques evolve" (MSACHE, 2002). The regional accrediting bodies accredit institutions and not individual programs. However, institutions must receive approval from the regional accrediting bodies to have programs with more than 50% of a program offered through distance learning (MSACHE, 2002).

The regional commissions responsible for accreditation of programs emphasize the importance of accountability and characteristics of instruction regardless of the type of delivery. These include interactivity between students and faculty, planned curricula, responsibility toward consumer, continued improvement of quality as it relates to learner outcomes, and continuous peer review (MSACHE, 2002).

The federal government has a vested interest in the effectiveness of online education and monitors the efforts of the accrediting bodies. Many students participating in distance education programs participate in federal student aid programs. As the largest provider of student financial aid, the federal government relies upon the regional accrediting bodies to ensure that educational subsidies are utilized by students for quality educational programs (USGAO, 2002).

Assessment in the literature

Although research on the effectiveness of Internet-based education is in its infancy (Arbaugh, 2000), a growing number of studies comparing online and traditional approaches to the same content have found that student achievement is similar in the online and traditional environments. This section of the paper will review a number of studies comparing student achievement in online and traditional environments. Although not emphasized within this document, other variables included within the studies, e.g. student satisfaction and time on task, will be presented within the context of the studies presented.

A meta-analysis conducted by Allen, Mabry, Mattrey, Bourhis, Titsworth, and Burrell (2004) indicated that educational effectiveness remained for courses included within their analysis when changing the instructional mode from traditional to distance learning. Although the focus of this paper is online distance education, distance learning in the Allen et al. study included all instructional technologies in which the students and instructors were not present in the same locations. When comparing instructional modes, the researchers separated the synchronous from asynchronous courses, i.e. those that

represent online courses, as well as the content focus of courses. Learning outcomes in asynchronous courses did not differ significantly from their traditional counterparts. Additionally, no significant difference in learning outcomes was found in natural science and education distance education courses included in the meta-analysis (Allen et al., 2004). The researchers acknowledged that quality of courses was not considered in the meta-analysis, nor were learner characteristics such as age, gender, or number of years of education.

Erwin and Rieppi (1999) compared the use of multi-media in a large lecture section with traditional smaller lecture sections. Although the multi-media course was not offered via distance, the study pertains to this researcher's topic because it provides support for teaching quantitative and verbally-oriented content in a web-based environment. The researchers found that the students in the multi-media sections were from the same population as the traditional course students. However, the students in the multimedia sections outperformed their traditional counterparts (Erwin & Rieppi, 1999).

A study by Davies and Mendenhall (1998) compared students in the online and traditional environments for an introductory health course. The same content was provided in both deliveries of the course. The researchers reported that online students in their study felt less prepared for testing. However, this was not evidenced in the student scores; performance between the two groups of students did not differ significantly. Although the study showed no significant differences in the learning achieved, it should be noted that students did not complete the full course online or in the traditional environment. Students were rotated, thus the comparisons were made based upon

modules within the course. Additionally, students self-selected to be part of the treatment group (39 students out of 96 in attendance when asked to join the study). A positive aspect of the study was the scores were categorized by student participation in the courses, as identified by the students, before being compared. There was a significant difference in how the students preferred to finish the course; 57% of students preferred the traditional mode, while 16% preferred the online mode. Twenty-seven percent indicated no preference (Davies & Mendenhall, 1998). A weakness of the online version of the course within this study was the lack of meaningful discourse. Students were not required to participate in a discussion board or to work collaboratively on assignments. As indicated in the next section of this chapter, students learn within a social context; interaction as a means to reflect and evaluate information has been identified as an integral aspect of quality learning in the online environment (Alley & Jansak, 2001; Palloff & Pratt, 2003; Priest, 2000).

Thirunarayanan and Perez-Prado (2002) examined the acquisition of skills of pre-service teachers relating to knowledge, skills, and disposition for working with elementary students whose primary language is not English. The researchers designed the study to reduce self-selection bias. Although the researcher did not randomly assign students to online or the traditional course, the students (29 in the online section; 31 in the traditional section) were unaware of whether they were registering for an online or traditional course. The decision regarding which section would be online and which would be traditional was made after registration had closed (Thirunarayanan & Perez-Prado, 2002). The researchers utilized a pre-test, post-test design to examine knowledge

differences prior to the course. Student scores were not statistically different. Other measures to control for extraneous variables included: the same instructor taught the sections of the online and traditional courses; content was similar; and assignments were the same. Delivery of information differed due to the technology being used.

Johnson, Aragon, Shaik, and Palma-Rivas (1999) compared learning outcomes of graduate students enrolled in a human resource course. The researchers also examined student ratings of the course and instructors, course interaction, support, structure and self-efficacy between students enrolled in online and traditional versions of the same course. No significant differences were found between student satisfaction, encouragement by instructor, and most notably, the quality of course projects used as evidence of students' knowledge and skill attainment. Significant differences were found in favorable opinions by traditional students relating to the ability to work as a team, communication with peers, and instructional support (Johnson et al., 1999). Although the number of study participants was small ($n = 19$ in each group), a strength of the study was that the reviewers of the student projects were not aware that the papers were from different sections of the same course. The authors reviewed these data in another article and theorized that the explanation for the higher ratings of student satisfaction in the traditional environment may be due to the personal connection that was fostered with direct contact (Johnson et al., 2000). Despite the higher ratings for student-student interaction and student-instructor interaction in the traditional section, the learning outcomes were similar, thus the effectiveness of the course was deemed similar.

A quasi-experimental study of education graduate students conduct by Liu (2005) found that quiz scores and test scores for a research methods course were significantly different for online students when compared to traditional students. Online students performed at a higher level (Liu, 2005). The course's content, requirements and activities were consistent across the courses. Unlike other courses presented in this section, the feedback evaluation scores by students regarding the course were not significantly different. The researcher's review of qualitative information provided from the student evaluations revealed that the online students appeared to be more motivated. The students also stated that they felt as though they learned more than they would have in the traditional environment. A limitation with this study, as with many others, was that the students self-selected into the course and the number of participants was low (n=22 in online group; n=21 in traditional group).

Buckley (2003) compared the learning outcomes for an undergraduate nursing nutrition course offered in a traditional mode, a web-enhanced mode, and a web-based distance education mode. The mid-term exam, final exam, and course grades were not significantly different between the three offerings. The online course, however, did have significantly different course evaluation scores, i.e. lower course evaluation scores. The web-enhanced course evaluation scores were the highest. Summer, Waigandt, & Whittaker (2005) found similar results when comparing course grades and student satisfaction in an introductory statistics course. They found no significant differences in course grades, but did find that the students in the online section were significantly less satisfied with the course.

Stadtlander (1998) discussed his experience with his first online education in 1996. Student course evaluations of the instructor were significantly different, i.e., lower for the online version of the graduate level seminar course. Stadtlander conjectured that this was likely due to the perceived lack of instructor involvement and the type of course evaluation instrument used. The student performance, however, was not affected by the medium. Stadtlander stated, "the overall performance at least met, if not exceeded, that of the traditional classroom seminar course," (p. 147).

Gagne and Shepherd (2001) compared the effectiveness of an introductory accounting course offered in the traditional and online environments. The performance of the students at the end of the class did not differ. According to the authors, the course utilized in this study differed from previously published studies in that the study had a larger number of students in the online and traditional sections. The actual number of students was not indicated in the published work. The baseline knowledge of the online students was slightly higher in the study due to a prerequisite for the online section that was not required for the traditional students. The ending performance was equivalent.

A post-test control group study examining the learning outcomes and time on task for problem-based learning (Dennis, 2003) found that students in online groups achieved similar outcomes to those in face-to-face groups participating in a physical therapy program. A detractor for the online tutorials was identified, however. The online groups spent more time on task than the face-to-face groups for the same learning outcomes. The difference in time remained significant even after controlling for additional time from technological problems (Dennis, 2003). Therefore, although learning outcomes were not

significantly different, there was a significantly greater amount of time required for the online group to attain similar learning outcomes as the traditional group.

Dutton, Dutton, and Perry (2001) examined student outcomes of engineering students completing a course on-campus and online. The researchers did not find a significant difference in learner outcomes between the two instructional modes, even when adjusting for differences in maturity and effort. They did find a difference in drop out rate, with a higher percentage of online students dropping the course when compared to their on-campus cohort. This difference was not significantly different, however, when the researchers controlled for effort and maturity level. Those with low effort and those considered to be lifelong students versus undergraduate students had higher drop out rates than those with more effort and those considered undergraduate students (Dutton, Dutton, & Perry, 2001).

Dominguez and Ridley (2001) examined the effectiveness of online instruction by comparing student preparation levels in face-to-face advanced courses when the prerequisite could have been taken as an online or traditional course. The researchers did not find a significant difference in the advanced course grades between students who had participated in previous online courses and those who had not, indicating that prerequisite information was obtained in the courses whether students took them online or face-to-face.

Kekkonen-Moneta & Moneta (2001) examined conceptual learning in addition to factual learning in their spring 2000 study. In this study, the researchers compared overall learning outcomes and satisfaction for the same course offered in the online and

traditional environments. Student learning outcomes did not differ between the online (n=105) and traditional students (n=180). However, when the researchers separated the factual scores from the conceptual scores in the overall learning outcomes, they found that, although the scores did not differ for the factual scores, the traditional students scored significantly higher on the scores representing conceptual learning. The researchers theorized that this may be due to the culture of Hong Kong students, i.e. students are other-regulated and tend to be non-exploratory learners (Kekkonen-Moneta & Moneta, 2001). This may indicate that students enrolled in online courses need to be acculturated to the online learning environment.

In a study conducted by Brown and Liedholm (2002), online students did not fare comparatively with traditional counterparts despite the higher academic qualifications, i.e. higher ACT scores and more credits, of the virtual students. In their study, students participated in a traditional (n=363), online (n=89), or hybrid (n=258) version of the same course. Their results indicated that there was no significant difference on knowledge level questions for the three groups. However, as the complexity of questions increased, online students' scores decreased in comparison to the traditional and hybrid students. The researchers noted that students in the live section spent more time on the course than the hybrid or online students. Another point of interest is that women in the study appeared to be less affected by the online environment than males.

Anderson's and Mercer's (2004) descriptive study did not find differences in conceptual learning. The researchers examined the application of course content into nursing practice by students who participated in online instruction only, students who

participated in a mix of online and traditional instruction, and students who participated in traditional instruction only. They found no statistically significant differences in the incorporation of community concepts, i.e. community assessment, analysis, and program planning, in the students' nursing practices.

A lack of randomization has been seen as a weakness of studies regarding online education (Phipps & Merisotis, 1999; Poirer & Feldman, 2004). Poirer and Feldman (2004) conducted an experimental study to address this shortcoming. Their study also required that all evaluations of student learning outcomes occur under the same conditions, i.e. identical exams in a proctored, traditional classroom testing situation. Although the number of students in the online and traditional versions of the course were small ($n=12$ and $n=11$), the online students scored a higher percentage on exam questions than the students participating as part of the larger ($N=477$) traditional lecture class. Scores on papers completed as part of the course did not differ between the two groups. Students reported spending the same amount of time on reading and studying for exams. Students in the online section reported higher instructor satisfaction and higher satisfaction regarding student-instructor interaction than their traditional counterparts.

Junaidu and Al Ghamdi (2004) compared online and traditional student learning outcomes for a Data Structures class. This study differed from those previously reviewed in that online students did not self-select into the course. All students were required to take the online version during three school years. Student grades were compared by semester, i.e. fall semester grades were compared with fall semester grades, spring semester grades were compared with spring semester grades. The learning outcomes were

similar for each of the two groups. Two exceptions should be noted: a slightly higher percentage of students in the online sections earned A+ than the face-to-face sections; and the drop out rate was significantly higher in the online sections (24%) than the traditional sections (13%). Another notable observation by the researchers included that more content was covered in the online sections. The researchers stated that student ability was the predictor for student success, not the mode in which the course was offered, indicating comparability of the two versions (Junaidu & Al Ghamdi, 2004).

Ridley and Husband (1998) were concerned with the comparability of rigor between online and traditional courses. The researchers hypothesized that if rigor was higher in the traditional courses, then students in the online courses would earn higher grades in the online courses. The researchers examined the course grades for 100 students who completed at least one online and one traditional course at the same institution. The students' grades in the two environments were compared. The researchers did not find a statistically significant difference in the grades earned online and offline, thus it would appear that the rigor was similar.

Ramage (2002) reviewed literature relating to Thomas Russell's *No Significant Difference* phenomenon, an annotated bibliographic source summarizing studies of the effectiveness of distance education. Russell surmised from his literature review that no statistically significant difference existed in most studies relating to distance education. Ramage (2002) was critical of Russell's work, stating that Russell overemphasized the medium rather than the methodologies found within the courses and programs being compared.

Phipps & Merisotis (1999) reviewed much of the literature as well, including those reviewed in Russell's *No Significant Difference* in their report, *What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education*. They stated that some of the studies conducted regarding online education may be influenced by the novelty effect, in which persons succeed because they are doing something new, or the John Henry effect, in which the comparison groups or instructors may perform at a higher standard as the result of feeling threatened or challenged.

Not all students are successful in the online environment. Because the onus of responsibility for learning is on the student, the student must be able to self-regulate, as well as be independent and self-motivated (Phipps & Merisotis, 1999). This indicates that online education is unlikely to replace traditional education because many students desire the social interaction of the traditional classroom (Maddux, 2004).

Drop out rates are typically higher in the online environment when compared to the traditional environment (Dutton, Dutton, & Perry, 2002; Snell & Mekies, 1999; Turner & Crews, 2005). Possible reasons include lower technology and self-direction skills. Another potential reason noted by researchers was that students underestimated the amount of work involved in an online course (Turner & Crews, 2005).

Despite the fact that online programs do not meet the needs for all students, the studies reviewed in this section indicate that web-based learning may be a comparable instructional medium to be incorporated into university programs. The research suggests that the instructional strategies and student habits carry more weight toward student

learning outcomes than the medium through which information is presented. Online instruction holds great potential, particularly for those students who may have barriers to access, including distance, hours of employment or family demands.

Characteristics of Online Learners

In the U.S. General Accounting Office's report to the U.S. Senate (2002), Cornelia Ashby testified that students participating in distance education programs tend to differ from traditional students. They are more likely to be older, female, married, have higher incomes, and be employed full-time and taking classes part-time. Minority students were found to participate in distance education courses at a lower rate than White students. This same report indicated that the majority of courses being taken by distance education students were in business, humanities, and education (USGAO, 2002). These characteristics may influence success in the online environment.

Some studies have found that women may be more likely to participate in asynchronous Internet-based discussions than men (Arbaugh, 2000; Jackson, Ervin, Gardner, & Schmitt, 2001). Hoskins and van Hooff (2005) did not find this in their study of web-based learning tools. However, participation is a mediating variable in success in an online instructional venue, and as such, needs to be considered when evaluating success in the online environment.

Age has been associated with achievement in higher education, with older students achieving at higher levels than traditional, younger students, i.e. 18-20 years of age (Hoskins, Newstead & Dennis, 1997). The authors postulated that non-traditional students may create a self-selection bias in studies relating to online education.

A study by Thiele, Allen, and Stucky (1999) reviewed how well online instruction was received by undergraduate and graduate level nursing students. The graduate level nursing students were more comfortable asking questions of the instructor and were more confident in their problem-solving skills than the undergraduate students; many of the undergraduate students were concerned that “they missed important information” (Thiele, Allen, & Stucky, 1999). Thus, although both groups studied were successful in their courses, the graduate level students felt more comfort with the instructional delivery. It is notable that collaborative efforts were successful in both courses.

Dutton, Dutton, & Perry (2002) examined the characteristics of students who enrolled in online engineering courses and whether or not these students differed from those enrolled in the traditional courses. They also analyzed factors that affect student performance in the online environment. The online students in their study were significantly different when examining age, the online students were older, and when examining student classification, a larger percentage of the classroom students were enrolled as traditional undergraduate students while the online students were non-degree seeking or post-baccalaureate students (Dutton, Dutton, & Perry, 2002). The higher drop out rates did appear to be associated with these factors. The authors examined outside responsibilities and found that employment and childcare responsibilities were greater for online students than for traditional students. Other differences between the students included that online students had a longer commute to campus and were more experienced with computers (Dutton, Dutton, & Perry, 2002).

Hoskins and van Hooff (2005) examined the relationship students' age, gender, academic ability and learning/motivation orientation with the use of a web-based learning environment. This study of 110 second-year psychology undergraduates found that age is a predictor in students' use of online learning technologies. The authors speculated that the mature students had superior academic abilities and higher achievement orientation, i.e. ability to work independently and to assess academic demands, that influenced participation in the online technologies, most notably asynchronous discussion, a variable correlated with final grades in the online course investigated.

Diaz and Cartnal (1999) compared learning styles of students enrolled in an online and traditional health education course. They found that the students enrolled in the online course were more independent in their learning styles than their traditional course counterparts. They also found that despite the independent learning style of the online learners, they also exhibited dependent learning styles, i.e. working collaboratively, when the work was structured collaboratively by the instructor (Diaz & Cartnal, 1999). Their study participants were similar to those found in other studies. A greater number of students were non-traditional, enrolled on a part-time basis, had more college credits completed, and slightly more likely to be female than male (Diaz & Cartnal, 1999).

Commonly Reviewed Aspects of Online Instruction

Online education is not for all learners or all instructors (Christianson, Tiene, & Luft, 2002; Lorenzetti, 2005; Maddux, 2004; Navarro, 2000). This section will review some of the factors that facilitate or hinder quality online instruction, including student-

student and student-instructor communication, learning styles, access, understanding of technology and hypermedia, and expectations.

General aspects of quality online courses

Alley and Jansak (2001) examined prominent aspects of quality online education. They utilized qualitative methods of interviews, round-table discussions, and email correspondence with professionals within higher education, as well as course analyses. They identified the following key aspects of quality online courses: construction of knowledge in which students practice and apply information; students' responsibility for learning; motivation of students; reflection of material; activities that encourage students' learning styles; experiential learning; incorporation of social and individual learning opportunities; student identification of previously learned misconceptions; relation and application of previously learned information to newer information to increase understanding of the fundamental information; and the recognition that learning is not linear in fashion. Vrasidas & McIsaac (2000) also indicated that a variety of evaluation measures are required in a quality online course.

Interaction and communication

Learner interaction is necessary for a quality online experience, and meaningful discourse is seen as an essential aspect of constructivist pedagogy (Littleton & Whitelock, 2004). Quality online courses incorporate collaborative strategies, synchronous and asynchronous discussion, and email communication to introduce differing perspectives into the course. These strategies also increase social interaction and

support the growth of a learning community (Benbunan-Fich & Hiltz , 2003; Lorenzetti, 2005; Lucas, 2001; McIsaac et al., 1999; Perez-Prado & Thirunarayanan, 2002).

The discussion board can be utilized as a tool for accommodating and structuring information. The instructor plays a key role in guiding the discussions and sparking more productive discussions within the medium (Suler, 2004). Suler (2004) introduced recommendations to enhance the quality of discussions in the online environment. These strategies can be viewed as discussion board set up strategies or discussion board implementation strategies. Suler's online course recommendations include providing clear guidelines for posting expectations, including information on frequency and depth; providing tutorials for use of the discussion board software; setting ground rules for privacy, confidentiality and respect; creating different rooms for different topics; and allowing students to modify postings. His course implementation recommendations include having the instructor act as facilitator and not as expert; posting different web links or questions to push the conversation forward rather than supplying information; emailing students independently of the board to encourage board discussion; and modeling appropriate text talk (Suler, 2004). An advantage of online discussion is that because electronic records are maintained for discussions, assessment of discussion and participation levels can be incorporated into student assessment (Lucas, 2001).

Perez-Prado and Thirunarayanan (2002) extended their initial quantitative study to include qualitative measures. Analysis of journal entries and follow up interviews indicated that peer interaction played a role in learning and course satisfaction. The instructor was concerned that the emotional impact of some of the discovery activities

integrated into the traditional course were not realized by students in the online course. However, the instructor was pleased with the increased interaction with the online students. The authors recommended further study for courses designed to increase empathy and impact the affective domain (Perez-Prado and Thirunarayanan, 2002).

Flowers, Jordan, Algozzine, Spooner, and Fisher (2004) evaluated differences in students' perceptions of the effectiveness of online and traditional courses and instructors. The participating students were enrolled in a graduate level special education program. The traditional students (n=176) rated the course and the instructor as more effective than the off-campus distance education students (n=261) and the on-campus distance education students (n=106). The students stated they felt less challenged and less motivated to learn, had less exposure to differing opinions, and felt less strongly about contribution of the course toward professional growth than the traditional students indicated. The off-campus students also indicated that the instructor seemed less prepared, provided less help, and promoted less interest in the class than traditional students stated (Flowers et al., 2004).

Chamberlin (2001) discussed differences between online and traditional learning environments. He stated that the biggest differences centered on communication, content delivery, and flexibility. Communication is virtually impossible to avoid in the online classroom, in spite of the lack of immediate feedback from the receiver of communications. Students may feel less inhibited in the online environment, and introverts are able to communicate after contemplation. These communication differences were also noted by Turner and Crews (2005) and McIsaac et al. (1999). A potential

benefit of asynchronous communication is that greater reflection and higher cognitive skills may be reached. Another potential benefit is that all classmates are perceived as equals (Benbunan-Fich & Hiltz, 2003).

Littleton and Whitelock (2004) noted that feedback regarding student communication and contributions to online discussion play an important role in promoting participation, particularly as it relates to enthusiasm toward participation and confidence in participation. Beard and Harper (2002) found that although the students in their study stated that they would take another web-based course, they would have liked more interaction with the instructor (Beard & Harper, 2002). Benbunan-Fich & Hiltz (2003) found that, for online courses, students' perception of learning increased with perceived increase in instructor access.

Content delivery needs to change in the online environment. However, there is increased flexibility in the method of teaching. The amount of content can also be increased in the online environment (Chamberlin, 2001). Selected methods of instruction must include active learning because the student is responsible for his or her own learning.

Some students may lack the motivation or ability to move forward in an online constructivist environment (Lorenzetti, 2005; McLoughlin, 2002). The quality aspects that support student learning in the traditional environment can be incorporated into the online environment. The support provided in a learning environment, known as scaffolding, includes reflective thinking, meaningful discourse on emerging issues, feedback from peers and the instructor, and social support for dialogue (McLoughlin,

2002). McLoughlin (2002) identified dimensions of scaffolding. These are goal orientation in which students learn how and when to access and request assistance; adaptability, in which assignments may be used to enhance socialization or competence with an area of a course; accessibility, in which tutorials or frequently asked questions areas are incorporated to assist in self-directed learning tasks; alignment, in which goals and assessment are consistent; experiential value, in which students practice new ideas; collaboration, in which students are encouraged to work cooperatively and interact; constructivism, in which students are directed to additional information for student knowledge needs; learning orientation, in which students are active participants; multiplicity, in which different aspects of the learning process are supported, and granularity, in which scaffolds are made to reflect the level of the assignment, and then fragment (McLoughlin, 2002).

Some researchers have found that perceptions of student-instructor interactions may differ from the instructor's vantage point. McIsaac, Blocher, Mahes, and Vrasidas (1999) found that instructors perceived higher quality interactions within the online environment compared to instructor-student interactions in the traditional classroom. Students in this same study stated that frequent feedback was necessary to decrease feelings of isolation (McIsaac et al., 1999). Student communications in the online environment tended to be more goal-oriented.

Learning styles

Ross and Schulz (1999) examined learning styles, as defined by *The Gregorc Style Delineator*™, and student achievement utilizing computer-aided instruction.

Although the study did not focus on Internet-based classes, the authors theorized that computer-based instruction may not be appropriate for learners who are peer-oriented learners. Additionally, use of computer technology requires sequential thinking in order to students to navigate the computer system and in turn, access content (Ross & Schulz, 1999). The needs for peer orientation and self-efficacy for course navigation point toward the importance of incorporating peer-oriented constructivist interactions within web-based classes to accommodate different learning styles and providing a tutorial for effective use of computer tools.

Aragon, Johnson, and Shaik (2002) also explored whether or not learning style preferences affected student outcomes. The researchers assessed the preferred learning styles of online and traditional graduate students enrolled in the same human resource development course. The traditional students reported the greater use of support techniques and materials and indicated a higher preference for learning by doing than the online students. The online student scores revealed that the online students were more reflective and had a higher preference for abstract conceptualization in comparison to their traditional peers. Despite learning preference differences, student outcomes were similar between the two groups of students (Aragon, Johnson, & Shaik, 2002).

Retention of information is based upon use and experimentation. Quality courses are performance based, i.e. they incorporate real-life, goal-based scenarios that allow students to fail, retry multiple times, and ultimately succeed (Schank, 2000). Schank also contends that seat hours are not the constraint in the online environment as they are in the

traditional classroom. "Time doesn't matter, but achievement does" (Schank, 2000, p. 13).

Access, technology, and hypermedia

The characteristics of online courses, i.e. attending class at non-standard times, self-pacing of learning, and the ability to reach large geographic areas, enable the medium to potentially increase access to students while decreasing the expenses associated with traditional face-to-face instruction (Matthews, 1999; Hoskins & van Hooff, 2005). Institutions must recognize, however, that technology problems, such as web congestion, electronic test site failures, and password protection problems, exist in the online learning environment. Professional development regarding not only the pedagogy but the use of course software is needed for faculty in the process of course development and implementation. As such, quality online education requires that reliable technical support be available to instructors and students prior to and during the implementation of a course (Ciavarelli, 2003; Maddux, 2004; Navarro, 2000).

Instructors of quality online courses promote the access of information at hand, most notably the World Wide Web. The World Wide Web is a tool for students to access real world information (Gabbard, 2000). Gabbard (2000) cautions that "hypermedia may not be the optimum environment for all learners" (p. 106), this is most apparent in students that are not intrinsically motivated. Quality online instructors incorporate use of the web and cue students to access new information (Gabbard, 2000; McLoughlin, 2002). Increasing computer technology does not equate with additional learning. Zhao (1998)

emphasized that deliberate planning is essential for technology to be successfully incorporated into a course or program of study.

Expectations

Christianson, Tiene, and Luft (2002) conducted interviews and a survey with undergraduate nursing faculty. Seventy-six percent of the study's participants found the online teaching experience to exceed their expectations, and that of the participants interviewed, all stated that any nursing course could be taught online. The participants emphasized, however, that skills-based courses would be best taught in a hands-on traditional setting.

It is noteworthy that online courses do not save money or time. A substantial amount of time is required for the development and implementation of distance education courses. The increased development time, the different assessment strategies of student achievement and the increased interaction between instructors and students make online distance education time and labor intensive (Christianson, Tiene, & Luft, 2002; Maddux, 2004; Navarro, 2000; Turner & Crews, 2005).

Constructivism as a Theoretical Basis of Online Education

Defining constructivism in the online environment

Vrasidas and McIsaac (2000) state that the "real strength of CMC [computer-mediated communication] lies on the premises of constructivist epistemology," (p. 105). Constructivism is an educational theory that embraces multiple representations of knowledge. Knowledge exists within a social and cultural context, thus individuals build their understanding of information upon their social and cultural contexts as well as the

contexts in which the information is presented (Gabbard, 2000; Jonassen et al., 1995; McGuire, 1996; McLoughlin, 2002). In this theory of learning, students learn by constructing their own meaning. This differs from the traditional view in which students absorb information (Edwards & Edwards, 1999). The brain actively interprets the information, and goes beyond merely comprehending presented information (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Students interact with the content, their peers, and the instructor in order to form the information.

The instructional style of a constructivist learning environment is goal-oriented and learner-centered; teachers act as facilitators, assisting students in connecting previously learned facts and promoting a new understanding for students (Brooks & Brooks, 1993; Christianson, Tiene, & Luft, 2002; McLoughlin, 2002; Scheurman, 1998). Student errors can be seen by instructors as the students' "current level of development" (Biggs, 1996, p. 349). Physical interaction with new information and materials is incorporated into the course structure with dialogue occurring between peers as well as with the instructor. Questioning by the instructor is open-ended and is intended to encourage discussion, advanced inquiry, and potential contradiction (Brooks & Brooks, 1993; NCREL, n.d.). The student-student and instructor-student communications provide opportunities for the construction of "credible reality" for the students (Sherman, 2000, p. 53).

Online students must take an active leadership role in their education; while instructors must integrate activities within the courses that promote reflection (Bostock, 1998; Ciavarelli, 2003; Jonassen et al., 1995). It is essential that instructors provide

frequent feedback as well as provide frequent opportunities for student feedback in the online environment because visual and audible cues are lost in instructor-student and student-student interactions (Vrasidas & McIsaac, 2000). Constructive learning theorists contend that information constructed by students is more transferable and useful than other learned information. The contextual support of the constructivist environment enhances this transferability, especially when information is encountered in multiple contexts (Cobb, 1999). However, construction of knowledge is a guided, rather than an automatic, process.

Constructive approaches within distance education include computer-mediated communication, i.e. computer conferencing, discussion boards and email; computer-supported collaborative work, including group editing, group projects, and group decision-making; case-based learning environments, presenting realistic problems or events that may have multiple solutions and require problem-solving and decision-making strategies; and computer-based cognitive tools, including spreadsheets and databases (Jonassen et al., 1995). Because the online classroom is found on the World Wide Web, the World Wide Web is able to be incorporated as a tool in the students' search for additional information (Gabbard, 2000). Hypermedia, such as the World Wide Web, has the strong potential to be promoted by instructors for active learning processes by students. Students can build informational realities, rather than merely receiving the instructors' realities, thus expanding learning opportunities for students (Biggs, 1996).

A constructivist approach requires the learner to find, analyze and synthesize information (Lucas, 2001) and authentic assessment is critical (Bostock, 1998; Jonassen

et al., 1995). Scheurman (1998) cautions that “as with any educational reform, there must be standards and criteria for what constitutes a reasonable student construction in order to avoid rampant relativism in what counts as acceptable” (p.9).

Authentic assessment

The current focus of higher education is the development of competent professionals (Gulikers, Bastiaens, & Kirschner, 2004). As such, the approach to education and assessment has evolved. A form of authentic assessment, known as competency-based assessment, has evolved as a means of examining essential skills for given professions (Cummings & Maxwell, 1999). Multiple choice tests fail to assess authentically. They are diagnostic of “the ability to cram facts that the teacher told you into your head for short periods of time” (Schank, 2000, p.13). This type of assessment fails to examine whether or not students are capability of transferring the information to real life situations. Instructors cannot be confident that the application of knowledge to practice is made when information is assessed out of its applicable context (Biggs, 1996).

Authentic assessment is conducted differently than traditional assessment. Student achievement is more likely to be evaluated utilizing portfolios or products similar to those produced in the professional field, e.g. grant applications, research papers, story boards, short films, or market analysis reports. According to Tepper (2004), authentic assessment is tied directly to curriculum and pedagogy. Instruction, learning and assessment are aligned when meeting educational goals (Biggs, 1996). This indicates that assessment should be based upon performance levels of emergent to proficient based upon real-life situations and novel contexts (Biggs, 1996).

Authentic assessment is intended to be a measure of authentic achievement (Cummings & Maxwell, 1999). Authentic achievement implies higher order thinking skills and intrapersonal construction and integration of knowledge (Cummings & Maxwell, 1999). The importance lies in the assessment of the students' achievement

Authentic assessment is based upon simulated, real-world activities in which students "replicate real-world performances" (Svinicki, 2004, p. 23). Authentic assessments reflect real world skills that require problem solving; solutions are divergent, reflect the skills of the content area, and simulate the complexity, as well as the physical and social context of real life skills. The assessments require higher level skills, and feedback and practice are essential (Bostock, 1998; Ciavarelli, 2003; Gulikers, Bastiaens, & Kirschner, 2004; Svinicki, 2004; Wiggins, 1998). Assessment within a real world context allows the teacher to examine whether integration of the skills necessary to complete the assignment has occurred (Cummings & Maxwell, 1999). Other benefits of authentic assessment include transference of skills from the classroom to the real world, increased understanding of the content that should be mastered, concrete products for evaluation and demonstration of mastery, increased predictive validity, increased construct validity, increased consequential validity, i.e. the effects of assessment on instruction, teaching and student learning, and a greater ability for students and faculty to assess progress as well as obtain information that could be used for improving instruction (Gulikers, Bastiaens, & Kirschner, 2004; Svinicki, 2004; Wiggins, 1990; Wiggins, 1998). Drawbacks include time and effort required to complete and evaluate the assignments, consistent and comparative grading, and a paradigm shift on the part of the students who

are now being evaluated under different criteria than in the past (Gulikers, Bastiaens, & Kirschner, 2004; Svinicki, 2004). Riley and Stern (1998) related the potential concern of a lower intellectual quality when utilizing authentic assessment. They noted, however, that in order to be successful in real world scenarios, a fundamental knowledge base was essential. Another concern found within the literature was the perceived potential for decreased external validity. Students may not be able to transfer the skills to real world scenarios others than those faced within the actual assessment (Cummings & Maxwell, 1999). Therefore, it is essential that the salient aspects of performances be maintained within assessment more so than on the real world tasks themselves (Cummings & Maxwell, 1999).

Rubrics as a tool for authentic assessment

A rubric is a grading tool that utilizes descriptive information as a basis for assessment and contains specific criteria to determine proficiency levels (Brookhart, 1999; Montgomery, 2002). This attribute allows rubrics to enhance rater-reliability, particularly when behavioral anchors are clearly stated within the rubrics (McDermott & Sarvela, 1999). Another attribute of rubrics is that rubrics allow for the assessment of real world problems, tasks, and challenges similar to those faced by experts (Ciavarelli, 2003; Montgomery, 2002). As such, the rubric serves as a more appropriate assessment tool for the application of skills such as those relating to the real-life tasks of health educators. Rubrics and the criteria for assessment are distributed to students prior to completion of assignments. This guides instruction, learning and evaluation (Gulikers, Bastiaens, & Kirschner, 2004).

Health Education Skills as a Basis for Program Assessment

The core roles and responsibilities of health education specialists as outlined in *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) serve as the foundation for programmatic and individual credentialing in the field of health education (Hayden, 2000). Although the responsibilities do not dictate a particular curriculum, they do relate the competencies that each individual program in the higher education setting must address and the core skills that certified health education specialists (CHES) should possess.

The roles and responsibilities were the result of a role delineation process that spanned more than two decades and continues today (Nolte & Hamburg, 1993; Pollock & Carlyon, 1996; Taub, 2004). The resulting seven responsibilities were process-oriented skills that reflect the work done by health educators across work settings. The seven skills are assessing individual and community needs for health education; planning effective health education programs; implementing health education programs; evaluating effectiveness of health education programs; coordinating provision of health education services; acting as a resource person in health education; and communicating health and health education needs, concerns, and resources (NCHEC, 1996). The responsibilities have been adopted by the major health education organizations and serve as the basis for the accreditation of graduate health education programs and accreditation and program approval of undergraduate health education programs. The framework for the health education credentialing was reinforced at the spring 2005 national Society for Public Health Education (SOPHE) conference. SOPHE recommended that updated

competencies be adopted and be used the basis for updated health education specialist certification exams (SOPHE, 2005).

Summary

This chapter reviewed the literature relating to the study of comparing health education skill acquisition between students taking health education skill courses in the online and traditional environments. Online education is likely to increase, and online programs that incorporate collaborative learning, student-student and instructor-student interaction, real-life application, and reflection activities have been found to produce comparable learning outcomes to their traditional counterparts.

Assessment of courses and programs is required to increase and maintain the quality of all educational programs, including online programs. Constructivism is a fundamental educational theory implemented within the online environment. Students produce meaning from the discovery and application of information, as well as through meaningful discourse with others. Authentic assessment as a measure of authentic achievement is commonly completed with the use of grading rubrics.

The health education profession has adopted core skills and competencies that represent the responsibilities of health educators in the work setting. Grading rubrics based upon the skills and competencies of health educators have been developed and were used to assess the achievement of students engaged in an undergraduate program at Texas Woman's University. Undergraduate health studies majors may complete their educational programs in the online or traditional environments. The remainder of this

document will examine the learning outcomes of students in the two learning environments.

CHAPTER III

METHODOLOGY

This study was conducted utilizing a post-test, quasi-experimental design. The purpose was to examine if differences existed in the acquisition of health education skills between students enrolled in online and traditional undergraduate health education courses. The experimental treatment was defined as participation in the online courses; the control condition was defined as participation in the traditional, face-to-face courses offering the same content as the courses in the experimental condition. Students self-selected into the online and traditional courses, thus randomization was not possible.

The courses selected for this study were four courses within the health education curriculum taught during the Fall 2004 and Spring 2005 semesters for which both online and traditional sections existed. The courses represented four of the seven responsibilities for entry-level health educators: assessing individual and community needs; acting as a resource person; planning effective health education programs; and evaluating the effectiveness of health education programs. The online courses were taught using Blackboard software.

The dependent variables examined were the health education skills identified above, as defined by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996), and demonstrated by students on course projects representative of the health education skills. The skills were evaluated via grading rubrics developed by faculty members in the Department of Health Studies,

Texas Woman's University for HS 1373, HS 3073, HS 3083, and HS 4353. The measures of the variables were the content, composition, and overall scores for skill level attainment on the course projects. All scores were converted to percentages. Because communication of health education needs is a core skill of health educators, writing ability on the course projects was also evaluated by course instructors according to grading rubrics and recorded.

Population and Sample

All students completing HS 1373 in the Fall 2004 semester and all students completing HS 3073, HS 3083, and HS 4353 during the Fall 2004 and Spring 2005 semesters were included in the study. One hundred-seventy two students were enrolled in the undergraduate health studies program during the 2004-2005 academic year.

University statistics show that 49% of students enrolled in the health studies program are White; 32% are Black; 12% are Hispanic; 4% are Asian; 2% are International students; and 0.5% is American Indian. A departmental survey developed and distributed by the Health Studies faculty to all undergraduate students enrolled within the Department of Health Studies had a return rate of 68%. Of the undergraduate health education students who responded, approximately 20% were married and 31% were age 25 or greater. The median age completing the departmental survey was 21 years of age.

The online students completing the survey were similar to the traditional students on the following aspects: race/ethnicity, Pearson χ^2 (4, N=112) = 6.65, $p = .16$; hours spent on responsibilities outside of employment and school, $t(85) = -0.864$, $p = .39$; gender, Pearson χ^2 (1, N= 111) = .740, $p = .39$; and current or past health-related

employment, Pearson χ^2 (1, N= 94) = .000, p = .99. The online students differed from the traditional students on the following aspects: age, $t(109) = -5.29$, $p < .05$, with online students having a higher average age than the traditional students ($M = 33.20$ versus $M = 23.89$); and marital status, Pearson χ^2 (3, N= 109) = 15.34, $p < .05$, with online students being more likely to be married than the traditional students.

Protection of Human Participants

The data utilized for this study was preexisting data. The identities of the students remained unknown to the researcher throughout the study. The researcher submitted a prospectus outlining the research questions and methodology to the Texas Woman's University Institutional Review Board for expedited review. The study was approved in January 2005.

Data Collection Procedures

Sampling

The culminating projects for all students enrolled in the online and traditional sections of HS 1373 during the Fall 2004 semester, and the online and traditional sections of HS 3073, HS 3080, and HS 4353 during the Fall 2004 and Spring 2005 academic year were included within this study. The courses were selected because they represent core entry-level responsibilities of health educators, were offered in both the online and traditional environments during the 2004-2005 academic year, and are required courses for all undergraduate health studies majors.

Instrumentation

The instruments utilized for data collection were grading rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University for HS 1373, HS 3073, HS 3083, and HS 4353. Two professionals with expertise relating to the testing of the roles and responsibilities of health educators as delineated within *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) assessed the instruments' content validity.

Inter-rater reliability was established through the distribution and grading of a minimum of three randomly selected papers from the Fall 2004 semester. Papers were graded according to the rubrics by the course instructors within the department teaching HS 1373, HS 3073, HS 3083. Inter-rater reliability information was not available for HS 4353. Correlation coefficients were computed for the courses. To reduce Type I error, a p value of .01 was required for significance. The correlations between course project scores for HS 1373 and HS 3073 were statistically significant. The correlation between course project scores for HS 3083 was not statistically significant. Table 1 provides a summary of the correlations.

The rubric for the HS 1373 Community Health student project corresponded with the health education core responsibility of assessing individual and community needs for health education. The competencies that fall within this responsibility include the ability to obtain and analyze demographic, social, cultural, and health data to ascertain health education needs for a population, as well as identify risk and protective factors relating to the health status of the identified population (NCHEC, 1996). The criterion noted as

content on the rubric was utilized to assess the core responsibility; the criteria of style and organization were used to assess communication.

The rubric for the HS 3073 Program Planning student project addressed the core responsibility of planning effective health education programs. The competencies that are assumed under this responsibility include the ability to recruit resources, organizations and participants; the ability to develop an appropriate health education plan; the ability to write program objectives that address the identified health need; and the ability to design an educational program that will meet the program's goals and objectives (NCHEC, 1996). The criteria that assess these health education competencies included description of the program needs assessment; identification of mission, goals, and objectives; description of the program components and rationale for providing those components; description of promotion, motivation, and retention strategies; description of program staffing; description of supplies, equipment, and facilities for the program; description of program implementation and operation plan; description of program evaluation plan; and program budget. The criteria utilized to assess communication include flow and organization; grammar and spelling; and APA format.

The rubric for the HS 4353 Seminar student project corresponded with the health education core responsibility of acting as a resource person health education programs. The HS 4353 course is a capstone class that incorporates many of the health education responsibilities incorporated into other health education courses. Acting as a resource person includes the competencies of utilizing health information retrieval skills, a skill necessary for assessing health needs, as well as the development of a program plan and

an evaluation plan; establishing relationships to assist with improving community health, a skills necessary for program planning and qualitative needs assessment; interpreting and responding to health information requests, a skill necessary for program planning and communicating health education; and selecting effective health education materials, a skill integrated within program planning. The HS 4353 student project required the students to synthesize and integrate the responsibilities to best represent the responsibility of acting as a resource person. The criteria on the HS 4353 rubric that correspond with meeting the skills related to the responsibility were content and focus, and analysis and critical thought. The criteria utilized to assess communication skills were structure and organization; style and layout; APA citations; and grammar usage and mechanics.

The rubric for the HS 3083 Program Evaluation student project assessed the health education core responsibility evaluating effectiveness of health education programs. The health education competencies addressed within this responsibility are the ability to develop plans that assess attainment of program goals and objectives; the ability to implement the evaluation plan; the ability to interpret the results of an evaluation; and to identify strengths and weaknesses for future health education practice (NCHEC, 1996). The criteria that addressed the competencies included the evaluation proposal introduction, description, purpose, and evaluation questions; sampling, instruments and data collection; evaluation timeline and budget; evaluation results; and evaluation discussion and conclusions. The criteria for communication included flow and organization; spelling and grammar; and APA format.

The researcher was able access to student project scores from the online and traditional sections of the following classes after the completion of the Fall 2004 and Spring 2005 semesters: HS 1373, HS 3073, HS 3083, and HS 4353. The researcher analyzed the scores on the skills related final projects for the courses. The scores relating to health education skills were separated from the scores related to the assessment of writing/communication quality.

Data Analysis

Student scores on course projects were analyzed as grouped by those who participated in the online courses and those in the traditional courses. The project scores were separated by content, composition, and total score, and then analyzed by course, i.e. students enrolled in HS 1373 online compared to students enrolled in HS 1373 traditional; students enrolled in HS 3073 online and students enrolled in HS 3073 traditional; students enrolled in HS 3083 online and students enrolled in HS 3083 traditional; and students enrolled in HS 4353 online and students enrolled in HS 4353 traditional. Project scores were also analyzed collectively, i.e. all scores earned by students participating in online health education courses compared with those taking the traditional health education courses. Levels of achievement between the two groups, i.e. 70% level of achievement on the projects, 80% level of achievement on the projects, and 90% level of achievement on the projects, were also compared collectively. The Statistical Package for Social Sciences (SPSS) version 11.5 for Windows was used for data analysis.

The following statistical tests were performed with a p value of .05. Independent-samples t tests and χ^2 analyses were performed to examine if the students enrolled in the online sections were from the same population as the students enrolled in the traditional section. Independent-samples t tests were conducted to examine age and hours spent on responsibilities outside of work and school. χ^2 analyses were conducted to examine the demographic variables of race/ethnicity, gender, marital status, and health-related employment history. Independent-samples t tests were conducted to examine if differences existed in content scores between students enrolled in traditional and online health education courses HS 1373, HS 3073, HS 3083, and HS 4253. Independent-samples t tests were conducted to examine if differences in composition scores and overall scores existed for students enrolled in the traditional and online courses across all courses. A multivariate analysis of variance (MANOVA) was used to examine the scores of the two groups collectively across all courses and to examine if differences in variances occurred across courses relating to content, composition and overall scores. Analyses of Variance (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA. χ^2 analyses were performed to examine if the levels of achievement for content and overall scores, i.e. the percentage of A's, B's, C's, D's and E's, differed between the online and traditional students. Table 2 summarizes the statistical tests used by hypothesis.

Summary

In the current study, a post-test, quasi-experimental approach was used to examine if the acquisition of health education skills was comparable for undergraduate

health education students enrolled in traditional and online undergraduate health education courses. The independent variable was the instructional format, traditional or online. The dependent variables were the course project scores, the composition scores, and the content scores, representing core health education skills. Health studies courses, HS 1373, HS 3073, HS 3083, and HS 4353 were selected for the current study because they were offered in the traditional and online formats during the Fall 2004 and Spring 2005 semesters, represented core responsibilities of entry-level health educators, and were required courses within the health studies undergraduate curriculum. All course projects from HS 1373 in the Fall 2004 semester and HS 3073, HS 3083, HS 4353 in the Fall 2004 and Spring 2005 semesters were used in the data analysis.

Data collection was completed using grading rubrics based upon *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996), the document used as the basis for program and individual health education accreditation. Inter-rater reliability was established for HS 1373, HS 3073, and HS 3083 using Pearson correlation statistical testing. Course project data was analyzed using the following statistical testing methods: independent-samples *t* tests, χ^2 analyses, and MANOVA with follow-up ANOVA testing. The Statistical Package for Social Sciences Program (SPSS), version 11.5 for Windows was utilized to process the data. A *p* value of .05 was established for all statistical analysis. The next chapter will review the results of the statistical analyses.

Table 1

Results of Pearson Correlations for HS 1373, HS 3073, and HS 3083

Course and scoring aspect	N	df	Pearson correlation	<i>p</i>
HS 1373	12	10		
Course project content			1.00	.00
Course project composition			.88	.00
Course project total			.78	.00
HS 3073	17	15		
Course project content			.67	.00
Course project composition			1.00	.00
Course project total			.92	.00
HS 3083	3	1		
Course project content			-.99	.08
Course project composition			.92	.26
Course project total			.98	.12

Table 2

Statistical Tests Conducted by Hypothesis

Hypothesis	Statistical Tests
Hypothesis 1	Independent-samples t tests; χ^2 analyses
Hypothesis 2	Independent-samples t tests
Hypothesis 3	Independent-samples t tests
Hypothesis 4	Independent-samples t tests
Hypothesis 5	Independent-samples t tests
Hypothesis 6	Independent-samples t tests
Hypothesis 7	Independent-samples t tests; MANOVA with ANOVA follow-up; χ^2 analyses

CHAPTER IV

RESULTS

The primary purpose of this study was to compare the health education skill attainment of undergraduate health education students participating in the traditional and online health education courses in the Department of Health Studies, Texas Woman's University during the Fall 2004 and Spring 2005 semesters. The independent variable was the instructional format, i.e. course participation in the traditional learning environment or the online learning environment. The dependent variables were scores earned on course projects within four courses designed to develop four core health education skills as defined within *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996). The skills examined were assessing individual and community needs, acting as a resource person, planning health education programs, and evaluating health education programs. The scores were measured according to course specific grading rubrics developed by faculty within the Department of Health Studies at Texas Woman's University in Denton, Texas. Writing skill, as measured by composition scores earned on the course projects, was an additional dependent variable examined. The scores were analyzed by individual course/health education skill and collectively across the four courses. The results are presented in this chapter.

Results Related to Each Hypothesis

Results are based upon the scores for students participating in the traditional and online versions of HS 1373, HS 3073, HS 3083, and HS 4353. Analyses were conducted utilizing the SPSS for Windows software program, version 11.5. Each null hypothesis is restated and the results of the analyses are presented.

Hypothesis One

Hypothesis 1: There will be no statistically significant difference in the demographic characteristics of age, race/ethnicity, gender, family responsibilities, and past/current employment for undergraduate students enrolled in the traditional health education core skills courses and the students enrolled in the online health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

Independent-samples *t* tests were conducted to evaluate the hypothesis that there would be no statistically significant difference in age and responsibilities outside of employment and school for undergraduate students enrolled in the traditional health education seminar course and the students enrolled in the online health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters. Results were not statistically significant for hours spent weekly on responsibilities outside of employment and coursework, $t(85) = -0.864, p = .39$. The hours spent on outside responsibilities was comparable for the traditional students ($M = 15.16, SD = 14.5$) and online students ($M = 20.50, SD = 16.34$). The independent-samples *t* test was found to be statistically significant for age, $t(109) = -5.29, p < .05$. Student in the traditional instructional format ($M = 23.89, SD, 5.05$) were statistically significantly younger than

the students in the online instructional format ($M = 33.20$, $SD = 7.66$). Table 3 summarizes the age and hours spent on outside responsibilities by instructional format.

Table 3

Age and Hours Spent on Outside Responsibilities by Instructional Format

Demographic variable	M	SD	<i>t</i> score	<i>p</i>
Age			-0.53	.00
Traditional	23.89	5.05		
Online	33.20	7.66		
Hours outside responsibilities			-0.864	.390
Traditional	15.16	14.50		
Online	20.50	16.34		

Chi-square (χ^2) analyses were conducted to determine if the race/ethnicity status, gender, marital status, and types of employment differed between students enrolled in the traditional health education undergraduate courses and the online health education undergraduate courses. The race/ethnicity status of students did not differ between students in the traditional and online environments, Pearson χ^2 (4, $N = 112$) = 6.54, $p = .16$. Students' gender was also found to be not related to the instructional format, Pearson χ^2 (1, $N = 111$) = .740, $p = .39$. Marital status was found to be associated with instructional format. Students enrolled in online courses were more likely to be married

than students in the traditional section, Pearson χ^2 (3, N= 109) = 15.34, $p < .05$. The students' current and past employment histories did not statistically significantly differ, Pearson χ^2 (1, N= 94) = .000, $p = .99$. Neither the traditional students nor the online students were more likely to have health-related jobs in their employment histories. Table 4 summarizes the demographic variables analyzed using χ^2 analysis.

Table 4

χ^2 Analysis of Selected Demographic Variables

Variable	N	df	Pearson χ^2	p
Race/ethnicity	112	4	6.54	.16
Gender	111	1	0.740	.26
Marital Status	109	3	15.34	.002
Employment History	94	1	0.000	.99

Hypothesis Two

Hypothesis 2: There will be no statistically significant difference in skill attainment related to assessing individual and community needs for health education for undergraduate students enrolled in the traditional community health education course and the students enrolled in the online community health education course at Texas Woman's University during the Fall 2004 semester.

An independent-samples t test was conducted to evaluate the hypothesis that there would be no statistically significant difference in skill attainment related to assessing individual and community needs for health education for undergraduate students enrolled

in the traditional community health education course and the students enrolled in the online community health education course at Texas Woman's University during the Fall 2004 semester. The criterion noted as content on the HS 1373 rubric was utilized to assess the skill attainment of assessing individual and community needs. The test was not statistically significant for the content score, $t(32) = -0.53, p = .60$. Students in the online condition ($M = 92.73, SD = 8.81$) scored comparably to the students in the traditional condition ($M = 90.96, SD = 9.21$).

Hypothesis Three

Hypothesis 3: There will be no statistically significant difference in skill attainment related to acting as a resource person for health education for undergraduate students enrolled in the traditional health education seminar course and the students enrolled in the online health education seminar course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

An independent-samples t test was conducted to evaluate the hypothesis that there would be no statistically significant difference in skill attainment related to acting as a resource person for health education for undergraduate students enrolled in the traditional health education seminar course and the students enrolled in the online health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters. The criteria noted as content and focus and analysis and critical thought on the HS 4353 rubric were utilized to assess the skill attainment of acting as a resource person. Levene's Test for Equality of Variances was found to be statistically significant $F = 23.01, p < .05$, therefore the following t statistic reported does not assume equal variance. The t test was

found to be statistically significant for the content score, $t(29.038) = -2.402, p < .05$.

Students in the online condition ($M = 88.64, SD = 3.67$) scored statistically significantly higher than the students in the traditional condition ($M = 82.61, SD = 11.09$).

Hypothesis Four

Hypothesis 4: There will be no statistically significant difference in skill attainment related to planning health education programs for undergraduate students enrolled in the traditional program planning health education course and the students enrolled in the online program planning health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

An independent-samples t test was conducted to evaluate the hypothesis that there would no statistically significant difference in skill attainment related to planning health education programs between undergraduate students enrolled in the traditional program planning health education course and the students enrolled in the online program planning health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters. The criteria noted as description of the program needs assessment; identification of mission, goals, and objectives; description of the program components and rationale for providing those components; description of promotion, motivation, and retention strategies; description of program staffing; description of supplies, equipment, and facilities for the program; description of program implementation and operation plan; description of program evaluation plan; and program budget on the HS 3073 rubric were utilized to assess the skill attainment of planning

effective health education programs. The t test was found to be not statistically significant for the content score, $t(37) = 0.374$, $p = 0.76$. Students in the online condition ($M = 91.64$, $SD = 9.54$) scored comparably to the students in the traditional condition ($M = 92.3$, $SD = 3.95$).

Hypothesis Five

Hypothesis 5: There will be no statistically significant difference in skill attainment related to evaluating the effectiveness of health education programs for undergraduate students enrolled in the traditional program evaluation health education course and the students enrolled in the online program evaluation health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

An independent-samples t test was conducted to evaluate the hypothesis that there would be no statistically significant difference in skill attainment related to evaluating the effectiveness of health education programs for undergraduate students enrolled in the traditional program evaluation health education course and the students enrolled in the online program evaluation health education course at Texas Woman's University during the Fall 2004 and Spring 2005 semesters. The criteria noted as the evaluation proposal introduction, description, purpose, and evaluation questions; sampling, instruments and data collection; evaluation timeline and budget; evaluation results; and evaluation discussion and conclusions on the HS 3083 grading rubric were utilized to assess the skill attainment of evaluating the effectiveness of health education programs. Levene's Test for Equality of Variances was found to be statistically significant $F = 11.01$, $p < .05$, therefore the following t statistic reported does not assume equal variance. The t test was

found to be statistically significant for the content score, $t(13.17) = 5.78, p < .05$.

Students in the online condition ($M = 91.67, SD = 1.00$) scored statistically significantly lower than the students in the traditional condition ($M = 98.00, SD = 3.62$).

Table 5

Summary of Statistical Analyses of Health Education Skill by Instructional Format

Course and Health Education Skill	M	SD	<i>t</i> score	<i>p</i>
HS 1373 Community Assessment			-0.53	.60
Traditional	90.96	9.21		
Online	92.73	8.81		
HS 4353 Resource Person			-2.40	.02
Traditional	82.61	11.09		
Online	88.64	3.67		
HS 3073 Program Planning			0.37	.76
Traditional	92.30	3.95		
Online	91.64	9.54		
HS 3083 Program Evaluation			5.78	.00
Traditional	98.00	3.62		
Online	91.67	1.00		

Hypothesis Six

Hypothesis 6: There will be no statistically significant difference in the writing skills as measured by the analytic portions of the health education skills grading rubrics between

students in the traditional undergraduate health education course and students enrolled in the online undergraduate health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters.

An independent-samples t test was conducted to evaluate the hypothesis that there would be no statistically significant difference in the writing skills as measured by the analytic portions of the health education skills grading rubrics between students in the traditional undergraduate health education course and students enrolled in the online undergraduate health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters. The criteria related to composition noted on the HS 1373, HS 3073, HS 3083, and HS 4353 grading rubrics were utilized in the analysis of the writing skills. Levene's Test for Equality of Variances was found to be statistically significant $F = 13.62, p < .05$, therefore the following t statistic reported does not assume equal variance. The t test was found to be statistically significant for the composition scores, $t(122.87) = -5.41, p < .05$. Students in the online condition ($M = 93.60, SD = 9.42$) scored statistically significantly higher than the students in the traditional condition ($M = 82.23, SD = 14.49$).

Hypothesis Seven

Hypothesis 7: There will be no statistically significant difference in the level of attainment of health education skills as described by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured utilizing course rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University between students enrolled in the traditional

undergraduate health education core skills courses and students enrolled in the online undergraduate health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters. This hypothesis was examined utilizing three different statistical tests: independent-samples t test, Multivariate Analysis of Variance, and χ^2 analysis.

An independent-samples t test was conducted to evaluate if the overall averages of content scores earned by students in the online and traditional learning environments differed from each other. Levene's Test for Equality of Variances was found to be statistically significant $F = 6.825, p < .05$, therefore the following t statistic reported does not assume equal variance. The t test was found to be not statistically significant for the content scores of all courses combined, $t(155.91) = -0.592, p > .05$. Students in the online condition ($M = 90.98, SD = 6.72$) scored comparably to the students in the traditional condition ($M = 90.14, SD = 9.29$).

A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of the instructional format, traditional or online, on three dependent variables: content (health education skills) scores, composition scores, and overall scores. Statistically significant differences were found among the two instructional formats on the dependent measures, Hotelling's $T^2 = 31.35, F(3,127) = 10.27, p < .05$. The multivariate η^2 was .20. The means and the standard deviations on the dependent variables for the three groups can be found in table 6.

Analyses of Variance (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was

tested at the .05 level. The ANOVA score for the content (skills) score was not statistically significant, $F(1,130) = .287, p = .59, \eta^2 = .006$, while the ANOVA scores on the composition $F(1,130) = 22.64, p < .05, \eta^2 = .149$, and combined scores $F(1,130) = 6.67, p < .05, \eta^2 = .042$, were statistically significant. A summary of the follow-up analyses can be found in table 7.

Table 6

Mean Scores and Standard Deviations of Scoring Variables by Instructional Format

Scoring Variable	<u>Traditional</u>		<u>Online</u>	
	M	SD	M	SD
Content	90.14	9.29	90.98	6.72
Composition	82.23	14.49	93.60	9.42
Combined	88.47	9.73	92.60	6.28

Table 7

Follow-up Analyses of Variance for Content, Composition, and Combined Scores

Variable	df	<i>F</i>	η^2	<i>p</i>
Content Scores	131	0.287	.006	.59
Composition Scores	131	22.64	.149	.00
Combined scores	131	6.67	.042	.01

A χ^2 analysis was conducted to evaluate if the proportion of individuals in each level of course project grades, i.e. those earning A's, those earning B's, those earning C's, those earning D's, and those earning E's, were the same for the traditional and online populations. The instructional format, traditional or online, and the students' project grades were not found to be statistically significantly related, Pearson χ^2 (4, N= 132) = 5.69, $p = .22$.

A second χ^2 analysis was conducted utilizing only the content scores to evaluate if the proportion of individuals in each level of the course content grades, i.e. those earning A's in the content portion of rubric, those earning B's in the content portion of rubric, those earning C's in the content portion of rubric, those earning D's in the content portion of rubric, and those earning E's in the content portion of rubric, were the same for the traditional and online populations. The instructional format, traditional or online, and the content portions of the students' project grades were not found to be statistically significantly related, Pearson χ^2 (3, N = 131) = 3.98, $p = .26$. There was no statistically significant difference in the levels of achievement between students participating in the traditional and online classes for either the content scores, those that directly measure the core health responsibilities, or the overall course project scores. A summary of the students' levels of achievement can be found in table 8. A summary of the χ^2 analyses for both course project scores and content scores can be found in table 9.

Summary

Statistical analyses were conducted to determine if differences existed between student scores relating to core health education skills and writing skills for undergraduate

students participating in traditional and online courses in the Department of Health Studies, Texas Woman's University during the Fall and Spring semesters of the 2004-2005 academic school year. Demographic differences between students participating in the traditional and online learning environments were also examined. Statistically significant findings are discussed in the next chapter.

Table 8

Course and Content Grades by Format

		<u>Level of Attainment</u>				
Format	N	A	B	C	D	E
Traditional						
Course project grade	87	53	24	6	1	3
Content grade	86	55	21	5	5	NA
Online						
Course project grade	45	33	11	0	1	0
Content grade	45	30	14	0	1	NA

Table 9

 χ^2 Analysis of Course and Content Grades

Variable	N	df	Pearson χ^2	<i>p</i>
Course project grade	132	4	5.69	.22
Content grade	131	3	3.97	.26

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The core roles and responsibilities for professional health educators as outlined in *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) serve as the foundation for programmatic and individual credentialing in the field of health education (Hayden, 2000). Although the responsibilities do not dictate a particular curriculum, they do relate the competencies that each individual program in the higher education setting must address and the core skills that certified health education specialists (CHES) should possess. Web-based instruction has an ever-increasing presence in the realm of higher education. As health education programs venture into the distance learning environment, health education professionals working within the preparation programs have sought methods of programmatic assessment to ensure that program quality is maintained.

Many studies have found the learning outcomes in the distance learning environment to be comparable to those in the traditional environment. Although studies have examined health education and health-related courses in the online environment (Anderson & Mercer, 2004; Buckley, 2003; Christianson, Tiene, & Luft, 2002; Davies & Mendenhall, 1998), a comprehensive examination of health education courses across the curriculum has yet to be completed. The study being presented compared the health education skill acquisition between the traditional and online learning environments across four courses in a health studies curriculum. This chapter will review the study

design and provide a summary of results relating to the hypotheses under investigation. Implications of the findings will be discussed, and recommendations for further study will be presented.

Summary

The purpose of this study was to determine if skill attainment as defined within *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured according to course specific grading rubrics was similar between students enrolled in traditional undergraduate health education courses and students enrolled in online undergraduate health education courses offered within the same department at Texas Woman's University. The study was conducted utilizing a post-test, quasi-experimental design. The independent variable was the instructional format, with the traditional format as the control condition and the online format as the experimental condition. The dependent variables were composition scores, course project scores, and content scores representative of core health education skills. The project scores were obtained from the major course projects within the online and traditional HS 1373 sections offered in Fall 2004; the online and traditional sections of HS 3073 offered in Fall 2004 and Spring 2005; the online and traditional sections of HS 3083 offered in Fall 2004 and Spring 2005; and the online and traditional sections of HS 4353 offered in Fall 2004 and Spring 2005. The grading rubrics used for the course projects were developed by faculty within the Department of Health Studies and based upon the health education skills defined in *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996). A

total of 132 course projects were available for analysis; composition and content scores were available for 131 of the 132 projects. Scores were compared by course and by instructional format. Levels of attainment across the four courses were also examined.

Conclusions

This section will review the research questions. Conclusions based upon statistical analyses will be presented. A summary of the conclusions relating to the research hypotheses can be found in table 10.

Research Question One

Were students enrolled in the traditional undergraduate health education courses from the same population as students enrolled in the online undergraduate health education courses? Independent-samples *t* tests were conducted to determine whether the students enrolled in the online and traditional health education courses differed by age or hours spent on responsibilities outside of school and employment. Statistically significant results indicated that students in the traditional sections were younger than the students enrolled in the online sections. Results indicated that the hours spent on responsibilities outside of school and employment were comparable.

Chi-square (χ^2) analyses were conducted to determine if the race/ethnicity status, gender, marital status, and types of employment differed between students enrolled in the traditional health education undergraduate courses and the online health education undergraduate courses. The results indicated that neither race/ethnicity status nor gender status was statistically different. Results also indicated that neither the traditional students nor the online students were more likely to have health-related jobs in their employment

histories. Marital status was, however, found to be associated with instructional format. Students enrolled in online courses were more likely to be married than students in the traditional section.

The null hypothesis for research question one, there will be no statistically significant difference in the demographic characteristics of age, race/ethnicity, gender, family responsibilities, and past/current employment for undergraduate students enrolled in the traditional health education core skills courses and the students enrolled in the online health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was rejected.

Research Question Two

Was skill attainment related to assessing individual and community needs for health education different for students enrolled in the traditional undergraduate community health education course and students enrolled in the online undergraduate community health education course? An independent-samples *t* test indicated that students enrolled in the online section of HS 1373 scored comparably to those enrolled in the traditional section. The inter-rater reliability analysis for HS 1373 indicated the scoring to be statistically correlated. The null hypothesis for research question two, there will be no statistically significant difference in skill attainment related to assessing individual and community needs for health education for undergraduate students enrolled in the traditional community health education course and the students enrolled in the online community health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was not rejected.

Research Question Three

Was skill attainment related to acting as a resource person for health education and communicating health education needs different for students enrolled in the traditional undergraduate seminar course and students enrolled in the online undergraduate seminar course? An independent-samples *t* test found a statistically significant difference in the scores. Students in the HS 4353 online condition scored higher than the students in the HS 4353 traditional condition. The inter-rater reliability was not established for HS 4353; therefore the results must be examined with caution. The null hypothesis for research question three, there will be no statistically significant difference in skill attainment acting as a resource person for health education and communicating health education needs for undergraduate students enrolled in the traditional health education seminar course and the students enrolled in the online health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was not rejected due to the strong potential for a Type I error relating to a lack of inter-rater reliability.

Research Question Four

Was skill attainment related to planning health education programs different for students enrolled in the traditional undergraduate program planning health education course and students enrolled in the online undergraduate program planning health education course? An independent-samples *t* test indicated that students enrolled in the online section of HS 3073 scored comparably to those enrolled in the traditional section. The inter-rater reliability analysis for HS 3073 indicated the scoring to be statistically

correlated. The null hypothesis for research question four, there will be no statistically significant difference in skill attainment related to planning health education programs for undergraduate students enrolled in the traditional program planning health education course and the students enrolled in the online program planning health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was not rejected.

Research Question Five

Was skill attainment related to evaluating the effectiveness of health education programs different for students enrolled in the traditional undergraduate program evaluation health education course and students enrolled in the online undergraduate program evaluation health education course? An independent-samples *t* test indicated that students enrolled in the traditional section of HS 3083 scored statistically significantly higher when compared to those enrolled in the traditional section. The inter-rater reliability analysis for HS 3083 indicated the scoring to not be statistically correlated; therefore the results must be examined with caution. The null hypothesis for research question five, there will be no statistically significant difference in skill attainment related to evaluating the effectiveness of health education programs for undergraduate students enrolled in the traditional program evaluation health education course and the students enrolled in the online program evaluation health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was not rejected to prevent a Type I error relating to inter-rater reliability.

Research Question Six

Was there a difference in the writing skills between students enrolled in the traditional undergraduate health education core skills courses and students enrolled in the online undergraduate health education core skills courses? An independent-samples *t* test was conducted using the composition scores from all of the courses. The scores were statistically significant. Students in the online condition scored higher than the students in the traditional condition. The null hypothesis for research question six, there will be no statistically significant difference in the writing skills as measured by the analytic portions of the health education skills grading rubrics between students in the traditional undergraduate health education course and students enrolled in the online undergraduate health education course at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was rejected.

Research Question Seven

Was there a difference in the levels of attainment of health education skills as described by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured utilizing course rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University between students enrolled in the traditional undergraduate health education courses and students enrolled in the online undergraduate health education courses? Three statistical tests were utilized to comprehensively answer this question, independent-samples *t* test, MANOVA with follow-up ANOVA testing on the dependent variables, and χ^2 analysis on levels of achievement.

An independent-samples t test was conducted to evaluate if the overall averages of content scores earned by students in all of the online and traditional learning environments differed from each other. The results were not statistically significant. Students in the online condition scored comparably to the students in the traditional condition on content.

A one-way multivariate analysis of variance (MANOVA) and follow-up analyses of variance (ANOVA) on the dependent variables were conducted to determine the effect of the instructional format, traditional or online, on three dependent variables: content (health education skills) scores, composition scores, and overall scores. Statistically significant differences were found among the two instructional formats relating to composition scores and overall project scores.

Two χ^2 analyses were conducted to evaluate if the proportion of individuals in each level of course project grades and the content scores were similar for the traditional and online populations. The instructional format, traditional or online, and neither the students' project grades nor the students' content grades were not found to be statistically significantly related. Results indicated that levels of achievement are similar for the traditional and online populations. The null hypothesis for research question seven, there will be no statistically significant difference in the level of attainment of health education skills as described by *A Competency Based Framework for Professional Development of Certified Health Education Specialists* (NCHEC, 1996) and measured utilizing course rubrics developed by faculty members in the Department of Health Studies, Texas Woman's University between students enrolled in the traditional undergraduate health

education core skills courses and students enrolled in the online undergraduate health education core skills courses at Texas Woman's University for the Fall 2004 and Spring 2005 semesters, was not rejected.

Table 10

Summary of Null Hypotheses and Conclusions

Null Hypothesis	Conclusion
Hypothesis One	Rejected
Hypothesis Two	Not rejected
Hypothesis Three	Not rejected
Hypothesis Four	Not rejected
Hypothesis Five	Not rejected
Hypothesis Six	Rejected
Hypothesis Seven	Not rejected

Discussion and Implications

Debate exists regarding the effectiveness of web-based instruction (Bennett & Green, 2001). The examination of the four courses combined and the level of attainment across the four courses within this study indicated that the scores for undergraduate students enrolled in traditional and online health education courses were comparable. This indicated that the levels of health education skill acquisition between undergraduate students within the two formats of program dissemination were comparable and supports

the no significance phenomenon described by Thomas Russell in his annotated bibliography of the same name (Phipps & Merisotis, 1999; Ramage, 2002).

Information relating to the validity and reliability were included in the study and utilized during data analysis. This aspect of the study decreased the likelihood of a type I error. The inter-rater reliability scores were statistically correlated for the scores from HS 1373 and HS 3073. The learning outcomes between traditional and online students enrolled in HS 1373 and HS 3073 were found to be comparable for the Fall 2004 and Spring 2005 semesters. Concerns relating to inter-rater reliability decrease the confidence of comparability for HS 4353 and HS 3083. The lack of inter-rater reliability for HS 4353 made it difficult to determine the comparability of the course project scores. However, the online students outperformed the traditional students in HS 4353, indicating that it is likely that the courses were at a minimum comparable. Establishing the inter-rater reliability for this course would enhance the ability to examine the results as they relate to the null hypothesis. In HS 3083, the traditional student scores were negatively skewed when compared to the online student scores. This may be due to reviewer differences rather than actual differences in the skill attainment of the students. When the traditional and online reviewers evaluated the same papers, the traditional reviewer awarded statistically significant higher scores to the papers than the online reviewer. It is likely that the difference in the traditional student scores versus the online student scores were not statistically different. Increasing the inter-rater reliability for this course would enhance the ability to examine the results as they relate to the null hypothesis.

This study addressed many weaknesses identified in the literature relating to assessing the effectiveness of online education when compared to traditional education. Most of the previous studies reviewed focused on the comparability of individual courses and did not examine multiple courses across a curriculum of study. Data in this study were analyzed according to course, but the data from four core curriculum courses were analyzed collectively, providing an overall view of program comparability.

Other weaknesses minimized in this study were those relating to the novelty effect in which participants perform at a higher level because of a new method, the Hawthorne effect in which persons perform at a higher level because they know they are being observed, and the John Henry effect in which participants and/or instructors perform at a higher level because they know they are being compared to others. These effects were reduced because students were unaware they were being compared, were at differing points in their academic careers, and had previous experience within the online environment. Additionally, the courses taught by the faculty were part of their regular work assignments; they were also unaware that the courses would be included in the study.

The lack of randomization has been seen as a weakness in many studies relating to online education (Phipps & Merisotis, 1999; Poirer & Feldman, 2004). This could not be addressed within this study. It would be unethical to randomly assign students to programs of study.

Phipps and Merisotis (1999) in their report from *The Institute for Higher Education Policy for the National Education Association and National Federation of*

Teachers related that learner characteristics or pedagogical strategies may be more responsible for success in studies examining online education than the instructional medium itself. This point is not negated. An assumption of this study was that students selected the educational format that best met their learner needs. Additionally, some of the attributes associated with success in the online environment, e.g. being older and married, can be barriers to participation in the traditional instructional format. Students need to select the type of instruction that will support their learning styles. Ross and Schulz (1999) solidified this point in their exploratory study examining learning styles and computer-mediated learning. In their study, learners characterized as kinesthetic, desirous of less structure assignments, and peer-oriented fared less well in the online environment than students with other learning styles. The importance of comparability in the development and acquisition of health education skills between students participating in the online and traditional environments for this study, as well as future studies, is not that students with higher self-management skills elect to take courses within the online environment, but rather that when a student is successful in the online environment, his or her skills are comparable to those who participated in the traditional environment.

The goal of a health education preparation program is to provide the foundation for health education proficiency when students enter the work force regardless of the instructional medium used in the professional preparation program. Effective instructors adapt their instructional strategies based upon the instructional medium. It is difficult, and was unnecessary for the purpose of this study, to separate instructional strategies from the educational media. The salient point from this study was that students enrolled in the

undergraduate health education courses during the Fall 2004 and Spring 2005 semesters acquired comparable levels of health education skills to those students in the traditional health education courses.

Recommendations

This section will review recommendations that address the weaknesses found within the current study. Other recommendations that complement the current study will also be presented.

All scores utilized in the study were from students attending the same institution; therefore, the results may not be generalizable to other institutions of higher learning. A recommendation is to identify other online undergraduate health education programs and compare scores earned in the courses designed to develop the entry-level skills for health educators with scores from their traditional counterparts.

Phipps and Merisotis (1999) identified high drop-out rates as a common aspect overlooked in research involving distance learning. Drop-out rates tend to be higher in distance learning courses than traditional courses. A possible way to examine this phenomenon is to identify if differences exist between students who drop out of the courses and those who remain, and if differences exist between students who drop online courses and traditional courses within the same academic years.

This study examined the courses offered in the online and traditional environments during the Fall 2004, Spring 2005 academic year. Examining the online and traditional courses from other vantage points will increase the confidence of statements relating to comparability. Other aspects of the programs that can be examined

include internship course project scores and grades, health studies course grades for a cohort of students over the four-year undergraduate experience, individual certification rates and scores, and post-graduate surveys of employers. Other post-graduate surveys could include graduates' satisfaction with skill attainment relating to employment, employment rates in the field of health education, rates of continuing education, and examination of rates regarding the decision to remain in the field of health education between those students who graduated completing their undergraduate preparation in the traditional or online health education programs.

The purpose of this study was not to demonstrate that online education is more effective than traditional education. Nor was its purpose to support replacing traditional health education preparation programs with online preparation programs. The purpose was to examine if students enrolled in traditional and online undergraduate health education courses acquired similar levels of health education skills. The study does support this purpose. This study indicated that students choosing to enroll in an online health education program are able to attain the process-oriented skills relating to the core roles and responsibilities of health educators at a comparable level to their traditional counterparts. Increased research establishing the online learning environment in the field of health education as a comparable alternative to traditional health education preparation programs is needed. The current study is only one of the many needed to demonstrate that online and traditional health education preparation programs can be comparable.

REFERENCES

- Allegrante, J. P., Airhihenbuwa, C. O., Auld, M. E., Birch, D. A., Roe, K. M., Smith, B. J., et al. (2004). Toward a unified system of accreditation for professional preparation in health education: Final report of the National Task Force on Accreditation in Health Education. *Health Education & Behavior, 31*, 1-16.
- Allen, I. E., & Seaman, J. (2003). *Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003*. Needham, MA: Sloan-C, The Sloan Consortium.
- Allen, I. E., & Seaman, J. (2004). *Entering the mainstream: The quality and extent of online education in the United States, 2003 and 2004*. Needham, MA: Sloan-C, The Sloan Consortium.
- Allen, M., Mabry, E., Mattrey, M., Bourhis, J., Titsworth, S., & Burrell, N. (2004). Evaluating the effectiveness of distance learning: A comparison using meta-analysis. *Journal of Communication, 54*, 402-419.
- Alley, L.R., & Jansak, K.E. (2001). The ten keys to quality assurance and assessment in online learning. *Journal of Interactive Instruction Development, 13*(3), 3-18.
- Anderson, E. T., & Mercer, Z. B. (2004). Impact of community health content on nurse practitioner practice: A comparison of classroom and web-based teaching. *Nursing Education Perspectives, 25*, 171-175.

- Aragon, S. R., Johnson, S. D., & Shaik, N. (2002). The influence of learning style preferences on student success in online versus face-to-face environments. *The American Journal of Distance Education, 16*(4), 227-244.
- Arbaugh, J. B. (2000). An exploratory study of the effects of gender on student learning and class participation in an Internet-based MBA course. *Management Learning, 31*, 503-519.
- Beard, L. A., & Harper, C. (2002). Student perceptions of online versus campus instruction. *Education, 122*, 658-653. Retrieved April 30, 2005, from InfoTrac OneFile database.
- Benbunan-Fich, R., & Hiltz, S. R. (2003). Mediators of the effectiveness of online courses. *IEEE Transactions on Professional Communication, 46*(4), 298-312.
- Bennett, G., & Green, F. P. (2001). Student learning in the online environment: No significant difference? *Quest, 53*, 1-13.
- Biggs, J. (1996). Enhancing teaching through constructive alignment. *Higher Education, 32*, 347-364.
- Bostock, S. J. (1998). Constructivism in mass higher education: A case study. *British Journal of Educational Technology, 29*, 225-240.
- Brookhart, S. M. (1999). The art and science of classroom assessment: The missing piece of pedagogy. *ASHE-ERIC-Higher Education Report, 27*. Washington, DC: The George Washington University, Graduate School of Education and Human Development.

- Brooks, J. G., & Brooks, M. G. (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Brown, B. W., & Liedholm, C. E. (2002). Can web courses replace the classroom in principles of microeconomics? *American Economic Review*, 92, 444-448.
- Buckley, K. M. (2003). Evaluation of classroom-based, web-enhanced, and web-based distance learning nutrition courses for undergraduate nursing. *Journal of Nursing Education*, 42(8), 367-370.
- Burbules, N. C., & Callister, T. A. (2000). Universities in transition: The promise and the challenge of new technologies. *Teachers College Record*, 102, 271-293.
- Chamberlin, W. S. (2001). Face-to-face vs. cyberspace: Finding the middle ground. *Syllabus*, 15, 11. Retrieved April 30, 2005, from <http://www.campus-technology.com/mag.asp?month=12&year=2001>
- Christianson, L., Tiene, D., & Luft, P (2002). Examining online instruction in undergraduate nursing education. *Distance Education*, 23, 214-229.
- Ciavarelli, A.P. (2003). Assessing the quality of online instruction: Integrating instructional quality and web usability assessments. In J.E. Wall & G.R. Walz (Eds.), *Measuring up: Assessment issues for teachers, counselors and administrators* (pp. 695-717). (ERIC No. ED 480-084). Retrieved March 8, 2005, from the ERIC database.
- Cobb, T. (1999). Applying constructivism: A test for the learner-as-scientist. *Educational Technology Research & Development*, 47(3), 15-31.

- Council for Higher Education Accreditation (CHEA). (2003). *Distance learning in higher education, update 3: The 1999 national survey of information technology in higher education*. Retrieved November 19, 2004, from <http://www.chea.org/Research/distance-learning/distance-learning-3.cfm>
- Cummings, J. J., & Maxwell, G. S. (1999). Contextualising authentic assessment. *Assessment in Education*, 6(2), 177-194.
- Davies, R. S., & Mendenhall, R. (1998). *Evaluation comparison of online and classroom instruction for HEPE129: Fitness and lifestyle management course*. (ERIC No. ED 427-752). Retrieved November 15, 2004, from ERIC database.
- Dennis, J. K. (2003). Problem-based learning in online vs. face-to-face environments. *Education for Health*, 16, 198-209.
- Diaz, D. P., & Cartnal, R. B. (1999). Students' learning styles in two classes. *College Teaching*, 47(4), 130-135. Retrieved April 10, 2005, from Academic Search Premier database.
- Dominguez, P. S., & Ridley, D. R. (2001). Assessing distance education courses and discipline differences in their effectiveness. *Journal of Instructional Psychology*, 28, 15-19.
- Dutton, J., Dutton, M., & Perry, J. (2001). Do online students perform as well as lecture students? *Journal of Engineering Education*, 90, 131-136.
- Dutton, J., Dutton, M., & Perry, J. (2002). How do online students differ from lecture students? *Journal of Asynchronous Learning Networks*, 6(1), 1-20. Retrieved April 20, 2005, from http://www.aln.org/publications/jaln/v6n1/v6n1_dutton.asp

- Edwards, C. H., & Edwards, L. (1999). Let's end the grading game. *Clearing House*, 72(5), 260-263.
- Erwin, T. D., & Rieppi, R. (1999). Comparing multimedia and traditional approaches in undergraduate psychology courses. *Teaching of Psychology*, 26(1), 58-61.
- Flowers, C., Jordan, L., Algozzine, R., Spooner, F., & Fisher, A. (2004). Evaluating distance education: Comparison of student ratings of instruction in distance education and traditional courses. *International Journal of Instructional Technology and Distance Learning*, 1(3). Retrieved April 22, 2005, from http://www.itdl.org/Journal/Mar_04/index.htm
- Gabbard, R. B. (2000). Constructivism, hypermedia, and the World Wide Web. *Cyberpsychology & Psychology & Behavior*, 3, 103-110.
- Gagne, M., & Shepherd, M. (2001). A comparison between a distance and a traditional graduate accounting class. *T. H. E. Journal*, 28(9). Retrieved on April 21, 2005, from <http://www.thejournal.com/magazine/vault/A3433.cfm>
- Gulikers, J. M., Bastiaens, T. J., & Kirschner, P. A. (2004). A five-dimensional framework for authentic assessment. *Educational Technology Research & Development*, 52(3), 67-86.
- Hayden, J. (2000). *The health education specialist: A study guide for professional competence* (4th ed.). Allentown, PA: National Commission for Health Education Credentialing, Inc.
- Hoskins, S. L., Newstead, S. E., & Dennis, I. (1997). Degree performance as a function of age, sex, prior qualifications and discipline studied. *Assessment and Evaluation*

- in Higher Education*, 5, 197-203. Retrieved March 26, 2005, from Academic Search Premier database.
- Hoskins, S. L., & van Hooff, J. C. (2005). Motivation and ability: Which students use online learning and what influence does it have on their achievement? *British Journal of Educational Technology*, 36, 177-192.
- Jackson, L. A., Ervin, K. S., Gardner, P. D., & Schmitt, N. (2001). Gender and the Internet: Women communicating and men searching. *Sex Roles*, 44, 363-379. Retrieved March 26, 2005, from Infotrac Onefile database.
- Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (1999, October). Comparative analysis of online vs. face-to-face instruction. *In WebNet 99 World Conference on the WWW and Internet Proceedings*. Retrieved January 29, 2005, from ERIC database (ED 448-722).
- Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research*, 11(1), 29-49.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. *The American Journal of Distance Education*, 9(2), 7-26.
- Junaidu, S., & Al Ghandi, J. (2004). Comparative analysis of face-to-face and online course offerings: King Fahd University of Petroleum and Minerals experience. *International Journal of Instructional Technology and Distance Learning*, 1(4). Retrieved April 22, 2005, from http://www.itdl.org/Journal/Apr_04/index.htm

- Kekkonen-Moneta, S., & Moneta, G. B. (2001, May). *Online learning in Hong Kong: A preliminary comparison of the lecture and online versions of a computing fundamentals course*. Poster proceeding presented at the 2001 Tenth International World Wide Web conference. Retrieved May 1, 2005, from <http://www10.org/cdrom/posters/p1081/>
- Lewis, L., Snow, K., Farris, E., & Levin, D. (1999). *Distance education at postsecondary education institutions. 1997-1998 (NCES 2000-013)*. Washington, D. C.: United States Department of Education, National Center for Education Statistics. Retrieved November 19, 2004, from <http://nces.ed.gov/surveys/peqis/publications/2000013/>
- Littleton, K., & Whitelock, D. (2004). Guiding the creation of knowledge and understanding in a virtual learning environment. *Cyberpsychology & Behavior*, 7, 173-181.
- Lorenzetti, J. P. (2005, March 15). Lessons learned about student issues in online learning. *Distance Education Report*, 9, 1-4.
- Lucas, S. R. (2001). Assessment of learning outcomes in an online environment. *Academic Exchange*, 5(4), 63-69. Retrieved March 29, 2005, from InfoTrac OneFile database.
- Liu, Y. (2005). Effects of online instruction vs. traditional instruction on students' learning. *International Journal of Instructional Technology and Distance Learning*, 2(3). Retrieved April 10, 2005, from <http://www.itdl.org>

- Maddux, C. D. (2004). Developing online courses: Ten myths. *Rural Special Education Quarterly*, 23(2), 27-32.
- Matthews, D. (1999). The origins of distance education and its use in the United States. *T. H. E. Journal*, 27(2). Retrieved April 23, 2005, from <http://www.thejournal.com/magazine/vault/a2222.cfm?kw=805>
- McDermott, R. J., & Sarvela, P. D. (1999). *Health education evaluation and measurement* (2nd ed.). New York: McGraw-Hill.
- McGuire, E. G. (1996). Knowledge representation and construction in hypermedia environments. *Telematics and Informatics*, 13(4), 251-260.
- McIsaac, M. S., Blocher, J. M., Mahes, V., & Vrasidas, C. (1999). Student and teacher perceptions of interaction in online computer-mediated communication. *Education Media International*, 36(2), 121-131.
- McLoughlin, C. (2002). Learner support in distance and networked learning environments: Ten dimensions for successful design. *Distance Education*, 23(2), 149-162.
- Middle States Commission on Higher Education (MSACHE). (2002). *Distance learning programs: Interregional guidelines for electronically offered degree and certificate programs*. Retrieved November 1, 2004, from <http://www.msache.org>
- Montgomery, K. (2002). Authentic tasks and rubrics: Going beyond traditional assessments in college teaching. *College Teaching*, 50, 34-39.

- Moskal, B. M. (2000). Scoring rubrics: What, when and how? *Practical Assessment, Research & Evaluation*, 7(3). Retrieved October 11, 2004, from <http://PAREonline.net/getvn.asp?v=7&n=3>.
- National Commission for Health Education Credentialing (NCHEC). (1996). *A competency based framework for professional development of Certified Health Education Specialists*. New York: National Commission for Health Education Credentialing, Inc.
- Navarro, P. (2000). Economics in the cyber classroom. *Journal of Economic Perspectives*, 14(2), 119-132. Retrieved April 20, 2005, from Business Source Premier database.
- Nolte, A.E., & Hamburg, M.V. (1993). Development of national certification for health education specialists. *Journal of Health Education*, 24, 263-268.
- North Central Regional Educational Library (NCREL). (n.d.). *Assessment in a constructivist classroom*. Retrieved March 28, 2005, from <http://www.ncrel.org>
- Palloff, R. M., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: Jossey-Bass.
- Perez-Prado, A., & Thirunarayanan, M. (2002). A qualitative comparison of online and classroom-based sections of a course: Exploring student perspectives. *Education Media International*, 39, 195-202.
- Phillips, V. (1998). Virtual classrooms, real education. *Nation's Business*, 86(5), 41-44. Retrieved April 24, 2005, from Academic Search Premier database.

Phillips, V. (2004). *Distance learning, accreditation, and online college degrees*.

Retrieved on November 19, 2004, from

<http://www.geteducated.com/articles/dlfaq.htm>

Phipps, R., & Merisotis, J. (1999). *What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education*.

Washington, D. C.: Institute for Higher Education Policy. Retrieved March 5, 2005, from the ERIC database.

Pollock, M.B., & Carlyon, W. (1996). Seven responsibilities and how they grew: The story of a curriculum framework. *Journal of Health Education*, 27, 81-87.

Poirer, C. R., & Feldman, R. S. (2004). Teaching in cyberspace: Online versus traditional instruction using a waiting-list experimental design. *Teaching of Psychology*, 31, 59-61.

Priest, L. (2000). The story of one learner: A student's perspective on online teaching. In K. W. White and B. H. Weight (Eds.), *The online teaching guide: A handbook of attitudes, strategies, and techniques for the virtual classroom* (pp. 37-44). Boston: Allyn & Bacon.

Ramage, T. R. (2002). *The "No Significant Difference" phenomenon: A literature review*. Retrieved April 24, 2005, from <http://www.usq.edu.au/electpub/e-jist/docs/html2002/ramage.html>

Ridley, D. R., & Husband, J. E. (1998). Online education: A study of academic rigor and integrity. *Journal of Instructional Psychology*, 25, 184-188. Retrieved March 30, 2005, from Academic Search Premier database.

- Riley, K. L., & Stern, B. S. (1998). Using authentic assessment and qualitative methodology to bridge theory and practice. *The Educational Forum*, 62, 178-185.
- Ross, J., & Schulz, R. (1999). Can computer-aided instruction accommodate all learners equally? *British Journal of Educational Technology*, 30, 5-24.
- Schank, R. C. (2000). The virtual university. *Cyberpsychology & Behavior*, 3, 9-16.
- Scheurman, G. (1998). From behaviorist to constructivist teaching. *Social Education*, 62(1), 6-9.
- Sherman, L. W. (2000). Postmodern constructivist pedagogy for teaching and learning cooperatively on the web. *Cyberpsychology & Behavior*, 3, 51-57.
- Snell, J., & Mekies, S. (1999). Online education and academic rigor: A research note. *Journal of Instructional Psychology*, 26, 194-195.
- Society for Public Health Education (SOPHE). (2005, April 22). SOPHE news. *News U Can Use*.
- Stadtlander, L. M. (1998). Virtual instruction: Teaching and online graduate seminar. *Teaching of Psychology*, 25(2), 146-148.
- Suler, J. (2004). In class and online: Using discussion boards in teaching. *Cyberpsychology & Behavior*, 7, 395-401.
- Summers, J. J., Waigandt, A., & Whittaker, T. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face class. *Innovative Higher Education*, 29, 233-250.

- Svinicki, M. D. (2004). Authentic assessment: Testing in reality. *New Directions for Teaching and Learning*, 100, 23-29. Retrieved March 20, 2005, from Wiley Science database.
- Taub, A. (2004, March). *The Competencies Update Project*. Paper presented at the annual meeting of the Pennsylvania Society for Public Health Education, State College, PA.
- Tepper, N. C. (2004). Supportive practices in teacher education: Finding out what preservice teachers know about teaching, learning, and community, through purposeful and creative assessment. *Education*, 125(2), 236-242. Retrieved March 20, 2005, from Academic Search Premier database.
- Thiele, J. E., Allen, C., & Stucky, M. (1999). Effects of web-based instruction on learning behaviors of undergraduate and graduate students. *Nursing and Health Care Perspectives*, 20(4), 199. Retrieved April 30, 2005, from InfoTrac OneFile database.
- Thirunarayanan, M. O., & Perez-Prado, A. (2002). Comparing web-based and classroom-based learning: A quantitative study. *Journal of Research on Technology in Education*, 34, 131-137. Retrieved November 5, 2004, from Onefile database.
- Turner, F., & Crews, J. (2005). Bricks and clicks: A comparative analysis of online and traditional education settings. *International Journal of Instructional Technology and Distance Learning*, 2(4). Retrieved May 4, 2005, from <http://www.itdl.org>
- United States General Accounting Office (USGAO). (2002, September). *Growth in distance education programs and implications for federal education policy*:

Statement of Cornelia M. Ashby, Director, Education, Workforce, and Income Security Issues. Washington, D. C.: United States General Accounting Office. (Publication No. GAO-02-1125T). Retrieved April 23, 2005, from <http://www.gao.gov/new.items/d021125t.pdf>

Vrasidas, C., & McIsaac, M. S. (2000). Principles of pedagogy and evaluation for web-based learning. *Education Media International*, 37(2), 105-111.

Waits, T., & Lewis, L. (2003). *Distance education at degree-granting postsecondary education institutions: 2000-2001 (NCES 2003-017)*. Washington, D. C.: United States Department of Education, National Center for Education Statistics. Retrieved March 10, 2005, from <http://nces.ed.gov/pubs2003/2003017.pdf>

Wiggins, G. (1990). The case for authentic assessment. *Practical Assessment, Research & Evaluation*, 2(2). Retrieved March 20, 2005 from <http://PAREonline.net/getvn.asp?v=2&n=2> .

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. San Francisco: Josey-Bass.

Zhao, Y. (1998). Design for adoption: The development of an integrated web-based education environment. *Journal of Research on Computing in Education*, 30, 307-328. Retrieved March 5, 2005, from Academic Search Premier database.