DISSERTATION

DIFFERENCES BETWEEN ONLINE AND TRADITIONAL INSTRUCTION METHODS: PERFORMANCE AND SATISFACTION IN AN INTERIOR DESIGN COURSE

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY JULIE KAY CHARLSON ENTITLED DIFFERENCES BETWEEN ONLINE AND TRADITIONAL INSTRUCTION METHODS: PERFORMANCE AND SATISFACTION IN AN INTERIOR DESIGN COURSE BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

DIFFERENCES BETWEEN ONLINE AND TRADITIONAL INSTRUCTION METHODS: PERFORMANCE AND SATISFACTION IN AN INTERIOR DESIGN COURSE

With increasing enrollment in distance education courses and limited classroom space on university campuses, departments are exploring where technology can better meet program and student needs. This study researched online education for the major of Interior Design using WebCT. The initial required course for interior design majors, primarily freshman college students, was selected for the experiment. Using a quantitative approach, the research measured differences in student performance and satisfaction between two teaching methods. One class was randomly divided between a traditional classroom group and an online group learning the same content using home or lab computers. The researcher designed and instructed a unit on the principles of design for both methods.

A parallel pretest-posttest instrument was developed for performance. It was compared using both *t*-tests on gain scores and ANCOVA on post-test scores. Students completed a satisfaction survey with evaluation questions, written comments, and learning activity ratings. The Mann-Whitney U test compared group mean satisfaction ratings.

Findings indicated no significant difference in learning gain between online and traditional groups. ANCOVA results were closer to being significant. Descriptive statistics indicated a greater range of test scores and satisfaction ratings within the online

group. Findings showed a significant difference in satisfaction between groups, with online less satisfied.

The process for unit development is discussed with student and instructor reactions. WebCT tools were explored to see how they could uniquely support the needs of art-related courses for illustrative material and hand-on activities. The electronic environment was intended to enable distant communication and team interaction. Student comments and ratings showed the majority of online activities were acceptable, but many did not want or participate in written team discussions or final team project analysis.

It was concluded that the online format used was not conducive to large classes and better suited for courses where Internet or text provide the visual content and for upper level students with greater time management and computer skills. WebCT offered a variety of tools to facilitate visual material and cooperative activities. Examples and results from the online unit can be viewed with recommendations to help online teaching in Interior Design.

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The completion of this dissertation is dedicated to my father, Mr. Robert Charlson, who said "I should …", to my committee adviser, Dr. Don Quick who said "I could …", and in loving memory of my mother, Mrs. Betty Charlson, who said she knew " I would do it".

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CHAPTER 1 - INTRODUCTION

Technology today is affecting both what is being taught and how instructors are teaching. Educators continue to explore the opportunities technology can provide and are developing new ways to incorporate computers into their classroom and curriculum. Interior Design is a major also influenced by technology, where design professionals are switching from manual to computerized methods, and students seeking employment positions will need more technology skills. However, utilizing technology in the educational process of acquiring Interior Design concepts and skills is a challenge for instructors in this field. Instructors can benefit from shared information gathered about the benefits, problems, methods, and results of research incorporating technology into the learning process.

Besides increasing student's resources and skills, technology can benefit a university program by expanding the body of students a school can reach and serve. Online education can reach a student population outside the physical boundaries of the classroom and campus, increasing enrollment numbers without changes for classroom space. Data has been collected and articles written to document the rapid growth of distance education and to determine the reasons it attracts new students (Brown, 2002; Feenberg, 1999; Marsh, 2000; Peterman, 2002; Sullivan, 2001). Park College in Missouri "started with a pilot course for 20 students in 1995 that has now developed to over 50 online courses offered each term to nearly 1,750 students" (Peterman, 2002, p. 28). Professionals enroll for online classes because they can return for additional classes and

remain in their job locations. Students can also be in contact with the school from home and have the flexibility to do online coursework around jobs, personal schedules, and even children. These advantages for learners are supported by literature on web-based training concluding that it appeals to learners who must balance school with work and home responsibilities (Brown, 2000; Sullivan, 2001).

Recent research has also reported both positive and negative reactions to web-based instruction. Studies have been done to determine if students can learn as well online as they do in the traditional classroom. These studies have primarily been conducted by instructors in a variety of curriculum areas who have initiated online instruction of their courses. Biology, statistics, nursing, and education courses are some of the areas found that compared performance of final test scores and final grades between a traditional class section and an online learning group. Findings in these areas showed similar or improved performance with the online group (McCollum, 1997; Ryan, 1999; Tucker, 2000). Methods varied, however, between these studies on the selection process of participants and the delivery for both the traditional and online sections. Results could be considered inconclusive due to varying levels of experimental validity and most researchers recommend further research to support or compare selected methods of instruction.

Though performance score comparisons from online lessons in these subject areas show no difference from classroom scores, student involvement with different types of learning and their evaluation of the learning process did vary between different online instructional models. Discussion, motivation, problem solving, and collaboration are a few of the cognitive environment areas explored for student satisfaction between the two teaching methods (Sullivan, 2001; Matthews, 2001; Wonacott, 2000). Research will and

should continue to determine the most effective design, preparation, and delivery methods for web instruction courses. Even from different disciplines, the sharing of positive results with how these were achieved can assist educators with the application of technology in their own content area.

Interior Design as a profession had been markedly affected by changes due to technology. In the profession, online exchange of communication and drawings is becoming a practice for national and international projects and business partnerships. A goal of education in Interior Design is to prepare students for these practices in professional careers. Implementing technology into Interior Design programs primarily added the instruction of computer-aided design for student drawings. This has typically been done by a single faculty member instructing CAD courses. A few of these instructors have explored combining online instruction along with student computerized drawings (Bender & Vredevoogd, 2002; North, Sterling, & Ellis, 2000). One grant funded study explored combining online communication and exchange of design planning between partnering universities (Matthews & Weigand, 2001).

Outside of experimental studio experiences, few Interior Design educators have researched using technology for online educational purposes. While the lecture-lab format is typical of Interior Design instruction, the exploration of distance learning has primarily been applied to the studio setting rather than for the lecture portion. This may be due in part to limited or specific faculty having needed technology skills. Most of these instructors teach computer aided design in a lab or studio. CAD instruction responsibilities, with changing versions of software and increasing demands to keep up with industry skills, would leave them little time for additional research. Fewer courses are offered online in

interior design than in many other content areas. Some work has been done on distance education models (Ali, 1995; Kays, 2003), but little published on the development of online educational methods as adapted for Interior Design instruction. Design departments as a result, may be missing opportunities from online course development.

Interior Design may be an appropriate area to consider for online coursework, as Wonacott (2000) identified that students who are "... engaged in learning tasks requiring creative thinking and analysis are most successful in using computer-based, online programs." This description fits the majority of Interior Design students. The sequential and separate nature of the lecture-studio format provides another possible reason for little online course development in Interior Design. Bender (2002) in the abstract from her study on attitudes of Interior Design faculty toward distance education stated, "the need for this investigation was promulgated by the lack of research on educational innovations and the minimal attention given to distance education by faculty members teaching in the arts" (p. iii). Findings from Bender (2002) confirmed the initial reluctance or disinterest of many interior design educators to become involved with online educational practices. Prior to the survey, Bender tried to create a more positive perception of distance education by having faculty view a demonstration CD applying this method to studio projects. However, hands-on interaction between the instructor and the student continued as the preferred method for lab projects and lecture follow-up work to develop student understanding and skills. Her summary concluded that compatibility and trialability of new methods would be significant predictors of Interior Design faculty attitudes to adopt distance education. (Bender, 2002).

Studies are needed on utilizing online education for the initial lecture portion of Interior Design instruction as well. There is a gap in literature exploring the use of online education instead of the lecture-slide presentations used to cover design theory. Interior Design instruction has unique needs to explore if online education is to be compatible with the lecture portion of student education. Design education requires a visual and project-oriented approach towards building problem solving skills. Not only do design educators question if distance education will produce satisfactory results, they will want to know what the design of the online learning environment can look like.

Statement of the Problem

As universities acquired the capabilities to develop distance education and interested instructors in various departments became involved with it, research studies evolved around learning differences. Instructors want to know if an online teaching method, a method that does not involve them being in a classroom with students, would be as effective for learning as the in-class teaching style they are comfortable with. The initial primary concern is if there is a difference in the academic achievement (or performance) of students between the previous face-to-face instructional method and the new online version of the course. Student evaluation is a follow-up concern to measure their satisfaction and directions for course improvement.

The literature for the past ten years shows research studies from a broad variety of department majors as they initiated distance education and began to assess student learning and evaluate their online course (Clouse, 2001; Gloeckner, Hermann-Ginsberg, & Ginsberg, 2000; McCollum, 2997; Ryan, Carlton, & Ali, 1999; Ryan, 2000; Tucker, 2000). Each major subject area has developed over time, different methods and

instructional patterns as part of an effective traditional learning environment. Some subject areas can adapt their traditional learning environment more easily to an online format than others. A combination of factors contribute to whether a department and their instructors embrace distance education (Bender, 2003; Whitney and Waxman (1999) . Frequently literature tells the story of how faculty members started and worked to develop online instruction until they felt it was successful (Alley & Repp, 1996; Matuga, 2001; Gunawaredena & Zittle, 1998; Blankenburg & Kariotis, 2002). Their methods created a path as they continued their research providing models other faculty could follow.

There is limited research in online education in the area of interior design or other art-related fields. Little has been published to help clear a path for faculty in art and design considering online educational methods. Journal articles yield a few extremely different and elaborate electronic set-ups to gather experimental information, but these are seldom easy for other schools to adopt or broaden into an online program. New research is needed addressing online education more specifically than the technology and equipment used for distance education. WebCT and Blackboard software has begun to be explored by faculty in many content areas as schools have acquired the software. Little has been published on the application of online software to interior design instruction, though some applications have been individually explored and presented at conferences (Williams, 2004; Girand 1999). Online research is needed for frequently used design content, the problem issues unique to art and design education, and to recommend methods a greater number of faculty at different schools could facilitate.

There are challenges that need to be explored in online lesson development for art and design. These challenges include faculty issues such as preparation time and support (Bender & Vredevoogd, 2003; Whitney & Waxman, 1999; Girand 1999) and student issues dealing with adjustment to new methods, communication in an isolated environment, and project interaction (Clouse, 2001; Weiss, 2000; Kramarae, 2001; Matthews & Weigand, 2003). Equipment capabilities can be a greater cost factor for Interior Design students as well as the department (Case & Matthews, 1999; Matthews & Weigand, 2003). An online lesson preparation challenge is incorporating the tradition of teaching design concepts through the use of illustrations and understanding related copyright restrictions (Harper, 2001; Consortium for Educational Technology for University Systems, 1996).

In the traditional Interior Design lecture course, lecturers enlarge images onto a classroom screen to illustrate the concepts to learn and to analyze their application (Curfman and Mallette, personal communication, Spring 2003). Discussion is built around students sharing questions and answers about what they see and students demonstrate their knowledge by recognizing learned concepts in new compositions. Instructors collect and value their picture and slide assortments for different lessons. The traditional lecture/slide format easily transitioned into PowerPoint, where classroom facilities permitted, and have become the modern version of this visual format.

Theoretically the question is whether highly visual content areas such an Interior Design can effectively be taught with a small computer screen and supplemental text instead of projecting pictures onto a large screen for the professor to explain concepts to students. The question includes whether design analysis and comparison can be done

without face-to-face instructor and the group interaction that takes place in class discussing these visuals. Application projects are sometimes assigned in conjunction with lecture information and discussion and become another challenge to execute and transmit by computer. The question of online potential then expands to include problem solving and the development of visual options. Exploration of online teaching methods for Interior Design needs to go beyond knowledge and understanding to facilitate individual design and group projects for application and synthesis.

Interior Design and other art courses address visual learning in both two-dimensional and three-dimensional applications. The online environment needs to consider the learning experience associated with moving around a space and multiple views of objects. Other physical design experiences creating challenges for online methods include tactile experiences, three-dimensional planning and analysis, and projects from many vantage points. Team collaboration is effective and frequently used for actual architectural and Interior Design projects. Facilitating this kind of communication and interaction becomes yet another challenge if online education is to be accepted for the instruction of Interior Design.

While published Interior Design studies discuss costly audio-visual equipment for online exchange, online course management is becoming standardized on either WebCT or Blackboard. There are few published studies discussing the potential and limitations of online software for courses in Interior Design. Specific issues for design instruction need to be explored in terms of creating, adapting, and transferring design examples with this adopted software. Preparing the visual material typical in the instruction of Interior Design may require special considerations and procedures to integrate into online lessons

and view from a home computer. Interior Design lacks models using online software from which to develop online instruction. The question now encompasses what online lessons and learning activities can the software tools provide Interior Design students. Use of WebCT to develop units of instruction and courses in Interior Design is needed to discover and evaluate the application of this management software to the major of Interior Design.

Research Problem and Purpose

Online instruction offers a variety of advantages for students and faculty to expand and vary educational delivery, but is it as effective for Interior Design departments as teaching methods that have stood the test of time? Interconnecting hardware, software, and various mechanical devices to create lessons is still in its infancy and educators must share methods and results to assure quality education using technology. A computerized course can be ineffective and frustrating if not operated properly or functioning well for the educational situation.

The main purpose of the research is to measure and compare assessment results between two instructional methods; one method is the traditional lecture/slide presentation style, and the other is through online WebCT prepared instruction. This data will build onto the body of knowledge from other curriculum areas that have adopted online delivery earlier. There is a need for a study to fill the gap in student performance differences between traditional classroom versus online instruction due to the unique needs and practices in design education.

The researcher will develop online lesson material to teach essential fundamentals about the five principles of design; balance, rhythm, emphasis, proportion,

scale, and harmony with unity and variety. This will explore how to adapt web based lessons to the characteristic pedagogy of design instruction. Though not a statistical purpose of the research experiment, recommendations for converting or planning online lessons with WebCT can benefit Interior Design educators planning to adopt distance education into their curriculum. Related areas that also incorporate the principles of design in their curriculum expand the audience to include art, architecture, fashion and industrial design.

Another purpose of the study is to assess student satisfaction with both the traditional and online teaching methods and compare the two groups for differences. Students can also submit comments on preferred portions of the online lessons and where there should be improvement. Satisfaction survey questions will combine program evaluation indicators and learning activity preferences. Satisfaction with classroom and online types of learning activities will be based on student perceptions about which contributed the most to their learning.

Student achievement and satisfaction used as research indicators to measure the effectiveness of distance education in other curriculum areas is also needed as a basis for educators in Interior Design. This study will help fill the gap in online research specifically for Interior Design contributing findings on performance and student satisfaction differences between traditional and online instruction. This data will build upon the body of knowledge from other curriculum areas adopting this delivery method earlier and benefit other art and design fields also providing instruction on the principles of design.

Research Questions

The research study will help determine if visual and project based courses such as Interior Design can be taught with effective results using online instruction. By selecting the principles of design as the unit of information to cover, findings apply to the largest numbers of incoming design students and to other related subject areas such as apparel design and art instruction as well.

The study will compare the divided class with one independent variable and two dependent variables. Type of teaching method is the independent variable. The first dependent variable is performance calculated as gain score achievement between pre-test and post-test results. The second dependent variable is student satisfaction resulting from survey scores at the end of the unit. Program evaluation factors were rated as well as learning activities offered based on how they contributed to the student's learning. The survey will include satisfaction ratings for the different types of learning experiences offered in both learning environments for data on how well they felt each type of activity contributed to their learning. Descriptive statistics will be run on scores to determine differences and their distribution. Appropriate selection of statistics will follow for significance and location of relationships. Both differences, and where there may be no significant difference, will contribute to a greater understanding of technology education when used to create distance education for courses in art and design.

The research problem investigates the presumed effect of a new WebCT instructed unit about the principles of design, on the performance and satisfaction of

university students enrolled in the freshman/sophomore level Interior Design course. The following initial research questions will guide the study:

1. Is there a difference between the two types of instructional methods, the traditional or online delivery, in regard to the improvement in achievement scores for the unit?
2. Is there a difference between the traditional and WebCT instructional methods and student satisfaction ratings with the unit of instruction?

Secondary research questions providing supportive descriptive information will include the following:

3. What are the mean performance scores for academic gain and student satisfaction in each teaching method?
4. What are the mean satisfaction ratings between the types of learning activities within each teaching method?

Definition of Terms

Principles of Design. Curriculum content unit for the teaching method experiment in the Introduction to Interior Design course. Kilmer and Kilmer (1992), in the text used for the initial course for Interior Design majors, included this content as a basic theory of design composition for how the elements of design are applied. Categories used to discuss these rules of application for the design components were balance, rhythm, emphasis, proportion, scale, and harmony with unity and variety. Multiple types for each design principle were identified and explained with illustrated room examples. Allen (1977) stated the importance for an individual to know the basic design principles was to be able to discriminate what is good design and how to achieve it.

Traditional Interior Design education. The main format used by instructors in this major to deliver information about the principles of design is lecture accompanied by the projection of illustrations onto a large viewing screen to explain use of these concepts and for students to analyze their application. Illustrations are projected onto a screen at the front of the room using a slide tray or from slides prepared in a PowerPoint presentation. Botti-Salitsky and Kays (2002) in their comparative study described the traditional course as lecture with "lecture" and "studio" methodology being separate entities they were trying to bring together for greater class collaboration. D. Mallette, Consumer and Family Studies instructor at Colorado State University (personal communication, February 13, 2003) described the common classroom method as presenting the material through lecture and/or PowerPoint reinforcing concepts with visuals. For student demonstration of understanding and application of the principles of design, she added that instructors traditionally require students to find their own picture examples and provide an explanation of the concepts their selection represents. Bender (2002) in researching the perceptions of past secondary Interior Design faculty toward distance education concluded that online design needs to consider the traditional instructional methods widely used to help promote innovative online instruction methods.

Distance education. This is an educational method where the student learning environment is physically separated from the instructor and outside the classroom. Switzer (1994) in his study of distance education through a computer-television environment defined the basic concept of distance education as implying the separation of teacher and student. The term distance education grew out of the need for a concept that would encompass changing communication technology providing courses and

programs to students geographically separated from the instructor (Schwitzer, Ancis, & Brown, 2001). Distance learning modes can bring students together at different sites through telecommunication systems for an audio-visual classroom or network people electronically by computer. Besides the two basic premises of separation of teacher and learner and the use of technical media, the effectiveness of distance education also involves appropriate selection of technologies, instructional design and techniques, and the provision of quality student interaction.

Online education. Use of Internet sources for information and illustrations and web pages created about the content. Lessons can be accessed by home computer or in the campus computer labs on the students' choice of time schedule. Web sites selected were business sources using the Interior Design concepts in the educational unit of study. Internet pages include text information, provide illustrations, and some an interactive activity for students to apply design concepts. Van Dusen (1997) described online education as a virtual classroom where learning is made possible by electronic teaching and research environments created by the use of information and instructional technologies. Khan (2005) defined online education on the Internet as e-learning for an open, flexible, and distributed learning environment.

WebCT. Developed at the University of British Columbia, WebCT is a course management system available to instructors at Colorado State University for the development and server connection of online education lessons. WebCT is a VLE, virtual learning environment, defined as one of the "learning management systems that synthesize the functionality of computer-mediated communications and online methods of delivering course materials" (Britain & Liber as cited in WebCT.com). It is described

on the company Web site as a software that helps instructors and students have an integrated teaching and electronic learning experience.

Threaded discussion. Group discussion as it takes place between student team members taking online lesson appears in a connected format. The email within the online software is utilized to communicate with each other about an assignment. Different individual responses to the same concept can be viewed and are sequentially linked. Clouse (2001) defined threaded discussion as an asynchronous or time delayed interaction where students can contribute at different times through distance communication on a topic. A thread is a group of related comments organized with individual comments indented below the previous response.

Panorama. An instructional video where the student using the computer mouse can view and move three dimensionally, up, down, and around a visual space. Colorado State University Instructional Services has the photographic and computer equipment and expertise to create and post a panorama onto WebCT as a visual learning experience comparable to a distance fieldtrip. Digital photos are overlapped and stitched together. After equalizing lighting on different materials, a movie file is created that can be downloaded and viewed on QuickTime player. During viewing, the panorama also has zoom capabilities to view detail closer or back up to capture the effect of a grouping.

Student satisfaction. Attitudes and preferences of students toward their educational experiences is indicated by student evaluation ratings at the conclusion of the experimental unit. Clouse (2001) also used satisfaction as a dependent variable, using a rating instrument and stated findings in terms of student preferences for learning activities or instructional methods. For this study the instrument was similar to the

college end of course evaluation format utilizing questions typical of other distance and online courses.

Student performance. A measurement of academic success based upon student test score results. In this study, test questions were developed by the instructor and selections approved by the department faculty as accurate and a complete measure of the content area. A student group who previously completed the course, also reviewed questions for clarity. Studies comparing student performance in different content areas between the traditional class and online education methods demonstrated performance as learning outcomes through achievement testing to determine the amount of learning that took place (McCollum, 1997; Ryan, 1999; Tucker, 2000).

CAD. Computer-aided design and drafting is commonly abbreviated in this form. CAD software and techniques support the design process as a tool for sketching, drafting and rendering, photo-alteration, and for three-dimensional capabilities (Brandon, 2001). Interior Design courses teaching CAD design generally use personal computers with Autodesk software such as AutoCAD 2001, Architectural Desktop, and 3-D Viz.

SPSS. A computer software package for Windows to enter and analyze statistical data. Version 11.5 was used for experiment findings of this study. SPSS stands for Statistical Products and Service Solutions and was described by Lyall and Leech as a powerful easy to use statistical package which works in a Windows environment and provides many research analysis options to professionals in the social sciences (Morgan, Greigo, & Gloeckner, 2001).

Delimitations

The scope of this educational experiment is limited to Interior Design students taking the initial Interior Design course for majors in the Department of Design and Merchandising at Colorado State University. The options for lesson development in preparation of the online educational unit is limited to the capabilities of the WebCT software program and the technology expertise of the researcher designing the lessons and of those who assisted with this process. Graphic illustrations used in the online lessons were limited to those without copyright restrictions or that received signed approval for educational use. These included campus photographs without showing people's faces, library facilities, the Colorado Governor's Mansion in Denver, and art student projects.

Limitations

A limitation of this study is that findings will be generalizable only to other undergraduate entry-level courses in Interior Design and to art courses where study of the principles of design is a major component. This study also did not attempt to delineate between first-time users of WebCT and students previously exposed to WebCT in other courses. Course enrollment controlled sample size. Class size was fewer than fifty students in the introductory Interior Design course the semester the study was conducted. The teaching experiment by the graduate student needed to coordinate with the regular instructor's syllabus, curriculum, and match well with their pedagogy and methods. A longer time frame for the online unit may have helped them adjust better to the instructional format. This research held the content and instructor constant for this specific entry level interior design course and did not study other students or courses in

the program. Online participants were limited to randomly selected students from an on-campus course. There were no off-campus students included selecting distance delivery for the course, as there were no online classes available to off campus students in Interior Design at the time of the study. As a single unit of instruction within another instructor's educational delivery style, the results may be less reliable than if the researcher were the full time course instructor.

Significance of the Study

The educational focus in Interior Design continues to seek individualized instruction within smaller studio sections. Interior Design programs at many universities have an enrollment selection process, where larger numbers of freshman and sophomore students must qualify for advanced studies through a portfolio review process. The department head of Design and Merchandising at Colorado State University questioned whether distance education was a potential delivery method for the larger initial lecture courses. Student inquiry, along with financial and space limitations, gave rise to department discussion of distance education as a way to also serve more students and offer specialty courses. Student needs and advantages promoting online instruction would also apply to design students and design professionals seeking further education. Research on distance education development in this content area and student measurement of results is needed to advance similar Interior Design program decision making and planning at other universities.

Other related art and design fields expand the audience for findings and methods used in this Interior Design study to other design curriculum areas including fashion, art, architecture, and industrial design. In addition, the subgroup of university Interior Design

faculty promoting K-12 applications would also find online content on the principles of design applicable for their end-use.

Clouse (2001) in the review of literature section for an asynchronous distance education study, referred to a publication by Phipps and Merisotis (1999) that pointed out that there has been considerable research in the past couple years concluding that learning outcomes for distance learning are similar to traditional instruction. They also found the overall quality of the research questionable, findings inconclusive, and few studies done using random sampling. "This shows an opportunity for further research to validate the different technologies used for distance learning" (cited in Clouse, 2001, p.45). Besides comparing results face-to-face and at a distance, educators are learning how distance education affects the teaching and learning process through how it is designed, delivered, and conducted.

The methods used for the online unit will also propose a developmental model that other interior design instructors can build onto and use or compare with in future studies. Sharing online lesson activities with higher levels of student satisfaction will help guide instructors as they initiate distance education. Problems identified can be avoided by others, which can also contribute significantly to the transition process. "Designers must redefine and generate a set of principles to be followed when designing online educational environments, as much as there are principles of 'good design' that are followed in the design of physical places" (Burge, 1997, p. 6).

Researcher's Perspective

When the head of the Design and Merchandising Department, Dr. Antigone Kotsiopulus, first discussed dissertation topics with me when I began my Ph.D. program,

she brought up the topic of distance education for Interior Design. I had shared with her my past experience in the education of Interior Design and my technology focus in returning to graduate school. My reaction to this suggestion, however, was that my previous success with students resulted from the relationships I built with them and that these and the motivation I generated through my enthusiasm would not develop online. I had returned to school to update my own technology skills, especially CAD, as my business experience exposed me to the increasing demand for these skills in the people hired for design work. Also as a teacher promoting technology instruction, I felt like I was contradicting myself by saying that I didn't think distance education would really work for myself or design students. When she said many students had called or left messages with the department inquiring about online offerings, I said I would reconsider applying this technology to this type of education as well. I did believe practicing professionals need and want to keep current with design issues and that online courses would better meet their needs in regards to time and location than leaving their jobs as I did to continue my education. Though I was interested in distance education for nontraditional students, Dr. Kotsiopulus told me that the inquiries came mostly from potential freshman students.

The assistant department head of Interior Design, Craig Birdsong, recommended the educational topic for an online unit and education experiment be the principles of design. He felt these were important concepts instructed at the freshman level that needed to be better understood and applied in later design projects. Student design problem solving should continue to properly use of these concepts and his observation was that upper classmen could not explain the manipulation of space based on the principles of

design. In subsequent research, Schweitzer, Ancis, and Brown (2001) pointed out that the design of distance learning typically occurred at two levels. This suggested research aligned at the department level seeking innovations to curricula and altering a class to create course offerings that would fit into the institutions distance learning format.

Wanting to research an area useful to the department, and realizing that freshman courses repeated more frequently with numbers larger than studio sections, the concept formed to develop an online unit on design principles and measure differences in students test scores, and course evaluations compared to results from traditional students.

As I began education courses as part of my degree, I took three classes that combined online instruction with resident students in the classroom. Two courses added an audio-video component and two used WebCT for note handouts, assignments, discussion, and grade posting. Only one of the instructors liked working with the technology and all three seemed to primarily relay lecture material and follow-up with slightly stilted take-turn discussion. Though I didn't leave these looking forward to teaching online, I still realized the demand for distance education would increase and that the potential to reach more people and combined interested individuals into a course offering was an advantage.

Learning WebCT for the development of distance education was frustrating due to a lack of organized or individual instruction that went beyond explaining the program's potential for students to the development of actual lessons by the instructor. A few online tutorials were available for faculty, but equipment varied in the labs and parts of tutorials then did not apply or needed to be done differently. If you ran into a problem, email messages didn't help much unless you had computer language experience. Making an

appointment for assistance with instructional services was time consuming. You were then quickly told how to do a portion, which later you still had to explore on your own with little written information to go by. Methods used by other instructors frequently did not address the problems in viewing pictures from home computers.

When you put effort into developing lessons this way, you start to believe in the system selected and develop a desire for them to not only work, but be an improvement on how you previously taught due to the time spent and the ideas generated in the process. My position shifted to believe there are unique learning opportunities in online instruction and that student interaction and group projects can still be attainable. The research experiment would show whether I just adapted to the technology, or if results in terms of learning performance and student satisfaction would meet my similar high expectations.

CHAPTER 2 - REVIEW OF LITERATURE

Literature Review Form and Progression

As a quantitative study, the literature review is included as a separate section and details the research and knowledge base around the research questions. Articles were reviewed that similarly compared performance and student satisfaction with different delivery methods. Interior Design research was explored to establish teaching methods desired with traditional and current instruction as well as experimentation with the integration of technology into the educational practices of Interior Design.

The form taken for the search was a progressive combination of integrative, theoretical, and methodological approaches. Creswell (1994) described these approaches used for a literature review as recommended by Cooper in 1984. The following reviewed studies began as an integrative search to summarize past journal articles related to distance education and education research in Interior Design. It developed into a theoretical form that extracted more specific information on the variables involved in the study: teaching method, performance, and student satisfaction. As the researcher began to explore WebCT as a delivery method for the experimental online unit, the literature search took a methodological form. Articles were reviewed to assist lesson design within the capabilities and limitations of the program, the desired pedagogy, and the technology background of the researcher/instructor.

The goal of the review was to understand the literature surrounding the development of online learning in higher education and the research findings available on

effectiveness as well as methods for introducing this technology to the instruction of Interior Design. The review of literature would also establish the significance of the study, help make decisions on online unit development, and provide a basis for comparison of later statistical results. Achievements and recommendations from the literature review of online instruction in other curriculum areas could contribute to online education research for art and design education. The review of Interior Design studies and presentations on the application of technology for education helped place this teaching experiment in context with changes occurring in this curriculum area.

Online Instruction in Higher Education

Background of Online Instruction

Distance education's role was initially viewed as a different educational delivery system with the intent to extend education. Miller defined distance education in 1990 as a system that offers new ways to articulate and realize the mission and goals of education (as cited in Switzer, 1994). Clouse (2001) stated "higher education is in the beginning stages of a new paradigm on how to best utilize new emerging technologies in the learning process" (p. 1). The previous paradigm in higher education was the information transfer paradigm where faculties lecture for students to acquire information and knowledge (Bork as cited in Clouse, 2001).

Technology contributing to the changing educational environment includes both telecommunication and capabilities. Use of videotapes for delivery first enabled what became know as distance learning, or education without physical contact with the instructor. Today Web-based delivery has become referred to as online learning, using the Internet for content and communication. Both distance learning and online learning

are rapidly growing delivery modalities for higher education. Many institutions use both and select the format for courses based on many factors including available resources, student numbers, the type of content, and preference or preparation of instructors. For example, the Montana State University graduate business program for an MBA degree utilizes online learning for foundation courses and video-conferencing for their professional program, combining off-campus with on-campus students (Clouse, 2001).

Distance learning incorporates online delivery, but online learning does not encompass all of distance education. Online courses can be done with personal computers alone without the use of additional technology or equipment included with distance education.

Purpose and Growth of Online Instruction

Expanding education and better meeting student needs were the major reasons why many schools initiated online instruction. With the development of online courses and resulting research, online learning appeared to offer a method that could also improve learning. Enhancing or improving education emerged as a purpose for incorporating or offering online instruction.

A study by Sullivan (2001) conducted in conjunction with the Connecticut Distance Learning Consortium, (CTDLC), confirmed and helped define the need for distance education. The sample population included students in 72 online courses from 15 of the 32 institutions belonging to the Consortium. Six of these schools were four-year colleges and the rest, community colleges. The study included two open-ended questions to which 195 students responded. They dealt with reasons for and reactions to taking

online courses. Comments were qualitatively analyzed and grouped by content and further compared by gender.

Of the written responses, positive comments outnumbered negative ones by two to one for both gender groups (Sullivan, 2001). Responses were divided into content regarding flexibility, face-to-face interaction, benefits for shy and quiet students, and the need for self-discipline and self-motivation as they related to the online experience. Flexibility was the most frequently cited positive comment related to taking courses online by both genders. Both cited jobs and irregular work schedules, but women also connected family and children to their need for flexibility. Both working and stay-at-home moms cited family issues as reasons for online courses. For both single and married women, connectivity issues involved changeable schedules and driving for children's activities, difficulty with baby sitters, sick children or other ill family members, a desire to maintain family priorities, and the chance to choose a quiet or relaxing time to study. The women expressed that online courses helped them to maintain and achieve their educational goals gradually.

According to Clouse (2001), growth in online education resulted from three paradigm shifts. The first shift was the rapid growth in investment, primarily from governmental sources, towards integrating information technology with instruction. The second paradigm was the growth in the number of college students taking distance learning courses, increasing the need for distance education. Lastly, the growth in the number of research studies in online education, with positive results, increased the potential of offering this additional educational opportunity.

Growth in distance education has been documented by several sources. The Department of Education reported that 1.4 million students were enrolled in distance learning programs in 1997-1998, taking nearly 50,000 college-level courses from different institutions (Weiss, 2000). The Institute of Higher Education Policy (as cited in Clouse, 2001) projected a growth rate in online distance learning of nearly 33% each year from 1998 to 2002. In 1999 a Market Data Retrieval report found an increase in one year from 15% to 33% of two and four-year colleges offering degrees by computer (Weiss, 2000). Strayer University Online expanded 50 classes offered during the summer to 144 classes by the next spring and planned to double that the following year.

The National Center for Education Statistics published online a study by Waits and Lewis (2002) that provided national estimates on distance education of two and four year degree institutions from 2000-2001. It included audio/video and computer technologies in both synchronous and asynchronous formats from college, adult education, and continuing education courses. Credit granting distance courses were offered by 55 percent of all two and four year institutions. 48 percent of these were at the undergraduate level and 22 percent at the graduate level. During this twelve month period, there were "2,876,000 enrollments in college-level, credit granting distance education courses with 82 percent of these at the undergraduate level", (Wait & Lewis, 2002, p. 16), from an estimated 118,100 different courses. Degree programs, designed to be completed totally through distance education, were available at 19 percent of institutions primarily offered at public four year schools.

Carlson (2004) and Carnevale (2005) provided the most current statistics from private studies rather than government reports. Academic officers, surveyed and

responding from 1,170 institutions, provided data weighted to make estimates for the country. 1.9 million students enrolled in online courses for fall of 2003, an increase of 19% from the year before (Carlson, 2004). A 2004 report said nearly one million students across the United States enrolled in courses done completely online (Carnevale, 2005). Though the greatest expansion was in the for-profit sector, nonprofit institutions still dominated. The prediction by the end of 2005 was that online students would make up "about 7% of the 17 million students enrolled at degree-granting institutions" (Carnevale, 2005, p. 2).

Seppanen and Stern (1999) described distance-learning-only students as a 'new wave' of college students that will likely increase at a faster rate than other distance learning students that also combine site attended courses. Their statistics showed that females made up 65% of distance-only students and that they were older, between 26 and 27 years of age, as compared to females age 23 who combined distance and classroom courses (Seppanen & Stern, 1999). Online instruction has increased the number of adults going to college for the first time, completing a degree, or starting another degree (Weiss, 2000). Online education speaks to the need of more choices for adult learners.

Positives of Online Instruction

Choices and convenience for adult learners may account for the demand and growth of online courses, but educators are also interested in the quality of instruction and how this teaching method affects the learning process. Class discussion has been an important component to teaching for students to apply information and for instructors to determine if learning is correctly used. In the online environment, discussion is often

handled via a "bulletin board" or an online threaded discussion. A threaded discussion displays written responses from every student and to each other for any posted question. Since the content can be available and viewed while developing answers to a discussion question, a student can reflect and relate the content more thoroughly to questions. Reflection time is a benefit resulting from this asynchronous form of discussion (Clouse, 2001). Threaded discussion also allows time to compare and expand discussions with additional insights from others. The depth of communication is frequently greater as a result in online written discussion versus verbal classroom comments because of this. Clouse (2001) credited the reflective thinking in online discussions to contributing higher performance scores on final essay exams from a distance module than the traditional class module. Forcing students to be writers was viewed as a plus of virtual courses (Weiss, 2000).

The online communication allows the instructor to 'hear' what every student has to say about a curricular topic where the schedule with a traditional class does not permit this (Matuga, 2001). Students in the Clouse study (2001) also mentioned that more people felt comfortable participating in a chat or asynchronous discussion than with face-to-face-discussions. "They enjoyed hearing the opinions from students that do not normally participate in the traditional classroom setting" (Clouse, 2001, p. 110). Qualitative comments from students who participated in online courses revealed more involvement from quiet or shy students than if they were in the classroom (Matuga, 2001). This comfort promoted self-concept for shy students who said they got anxious about talking in class. One such student commented on threaded discussion as a preferred method "because I felt more confident about commenting on the questions and responding to classmates" (Clouse,

2001, p. 85). Students in an undergraduate course on race and ethnicity expressed that hot debatable topics got increased student participation when conducted online. They said students speak out less in class with sensitive issues, but that everyone has an equal voice online (Weiss, 2000).

Besides providing an equal voice to all in the class, Weiss (2000) felt bringing participants together online from many different locations created a kind of global community helping to share multiple perspectives. Use of the Internet easily provides global resources increasing the amount of accessible information available to students. More students are available for special interest courses when they can be brought together from multiple locations and shared with other schools. Online instruction offers advantages to students who need to relocate and to both students and instructors when they travel. Coursework is maintained and students can complete their degree with the help of a laptop or home computer.

Students also felt more assured of grading equality online. One wrote that a good thing about a web-based course was that "they were afforded some degree of anonymity when it came to teacher bias in the evaluation process" (Matuga, 2002, p. 82). Some students perceive the grading online as more equal and fair because appearance and voice quality is not a factor in how information and opinions are received.

Challenges and Negatives of Online Instruction

Keegan (as cited in Switzer, 1994) felt that distance education was a distinct field of educational endeavor that was fraught with problems for administrators, teachers and students, and difficulties related to quality and status. Problems for educators using online instruction dealt with additional time needed and more roles for them to play.

Gunawardena and Zittle (1998) stated, "Distance teaching requires faculty to devote much more time to preparation than they would for a face-to-face classroom" (p. 113). New and expanding roles cited in surveys by distance educators included technology expert, graphic designer, technician, administrator, facilitator, editor, librarian, support staff, and evaluation specialist. Past studies and articles show that negatives for students tend to deal more with satisfaction than with their academic performance (Clouse, 2001; Ryan, 2000; & Weiss, 2000). This will be explored more in depth in a separate section on satisfaction with this method.

Research by Perdue and Valentine on deterrents to participation in web-based education found that adult students were resistant to change in the way education had been delivered to them in the past (as cited in Clouse, 2001). Using online techniques in assigning a variety of unconventional writing exercises and open-ended problems for critical thinking the researchers said could be a painful process for students not accustom to this. Steps associated with psychological trauma were observed by Woods as resistant students dealt with online learning techniques over time (as cited in Clouse, 2001). Students went through several stages as they transitioned from traditional to online instruction. These stages included shock, denial, strong emotion, resistance and withdrawal followed by surrender and acceptance, and struggle with exploration. The changes concluded by a return of student confidence and integration with success.

Differences in online communication from classroom discussion have been viewed be some as having negative aspects (Clouse, 2001; Sullivan, 2001; Ryan, 2000; Matuga, 2001; Kramarae, 2001). The physical interaction and immediate feedback during classroom discussion does not occur the same with online written communication.

Physical class meetings provide visual clues to guide instruction and take advantage of teachable moments, expanding topics and providing immediate feedback. The instructor often participates in online team discussions, but unlike the regular classroom, the electronic environment has a written delay without direct verbal or visual feedback. Ryan (2000) thought a possible reason for lower instructor ratings from his online group resulted from less opportunity for interaction with students than in the classroom. From a student's perspective, noted more frequently by females than males (Sullivan, 2001; Kramarae, 2001), threaded discussion was viewed as less spontaneous and motivating than in-class discussion and lacked the desired feedback and body language to help interpret. Matuga (2001) added that it was more difficult for students without face-to-face interaction to gage how well they are doing compared to other online students being evaluated. An online student commented that she preferred to know and talk with other students during class time about how each did on assignments. A student in the Clouse study (2001) described an uneasy comfort level with online interaction. "No one wants to say anything daring because it is in print and is somehow less retractable" (Clouse, p. 86). Kramarae (2001) stated the third most frequent response from women who had taken online courses was feeling isolated and missing the personal interaction. Also noted was a university instructor who stated that women should not readily accept themselves as candidates for distance education and "the last thing that single moms need is continued distance from the campus" (Kramarae, 2001, p. 52).

Some students may not be suited for the online environment. These would include students who quit when something goes wrong and those who aren't self-motivated, disciplined, or committed to learning (Weiss, 2000). Written comments from students

showed that is took a lot of discipline to regularly log on and complete assignments on time. Online courses out-of-sight can also be out-of-mind and students who got behind later got overwhelmed. Some students wanted the social contact with other students. A comment from one of Weiss' online student indicated that the online class "wasn't as real" (p. 47) as traditional classroom courses because she did not get the same feeling of making new friends. David Noble's 1997 report *Digital Diploma Mills: The Automation of Higher Education* stated that online education has dropped the "relationship between people and that's what education is all about" (as cited in Weiss, 2000, p. 47)

Student Performance between Classroom and Distance Instruction

Several studies have been done researching whether a difference in student performance occurs between the traditional method of classroom instruction and distance instruction utilizing technology for delivery (Clouse, 2001; Gloecker, Hermann-Ginsberg, & Ginsberg, 2000; Lee, 1998; McCollum, 1997). Most of these studies have been conducted in other subject areas outside art and interior design, therefore this portion reviewed performance comparison studies in other postsecondary areas including science, social studies, nursing, business, statistics, and education courses or programs.

Gloeckner, Hermann-Ginsberg, and Ginsberg (2000) presented at the American Education Research Association annual meeting a study comparing different distance learning models with traditional on-campus classroom students in educational Ph.D. programs. Despite the varying operating structure of the distance learning groups, all performed equally well on the preliminary statistics exam following the required research courses. "Thus, no matter the delivery mode, all students performed equally well on the Ph.D. common preliminary exam"(Gloeckner et al., 2000, p. 4).

Research studies have been conducted to measure performance differences between on-line instruction and the previous classroom teaching method in language and other social science areas. An online pilot study for college-level Spanish students reported that pre-and post-program performance-based tests indicated similar improvement in oral and reading skills (Lee, 1998). However, greater enhancement of cultural knowledge was indicated via the online method. In another study, a sociology professor at California State University found that students who took an online version of the course "outperformed their traditional counterparts by an average of 20 percent in their examinations" (McCollum, 1997). The researcher stated he was unable to determine if performance was due to the online format or a result of more time spent collaborating with classmates. With McCollum's findings, one must consider that group discussion did not accompany lecture in the traditional section.

Tucker (2000) in a paper presentation to the American Educational Research Association found no significant difference in posttest or final exam scores between a business communications class online and a similar size class in the traditional classroom. He did however find a significant difference in online performance scores and age group. Older students performed better online than the younger students.

Performance studies increased as the introduction of distance education expanded into different subject areas. In 1999, data reviews from 400 different studies of distance education using instructional telecommunications showed little difference in test scores and grades between distance learners and traditional classroom students. Weiss (2000) referred to the report of these findings by Russell from North Carolina State University on 'The No Significant Difference Phenomenon'. Russell now provides on the Internet the NSD Site,

No Significant Difference Web site, which compiles distance education studies that measured performance with summary quotes of results. In 2002 there continued group comparisons between online and traditional instruction in the science, such as anatomy and biology, business microeconomics, and language areas including English and Spanish. A study by Shachar, using a meta-analytic approach on data from eighty-six studies with similar criteria, demonstrated that in "2/3rds of the cases, students taking courses by distance education outperformed their student counterparts in the traditionally instructed courses (cited in Russell site, significant difference section, 2002, p. 3).

The closest study included on the NSD site to Interior Design was by Ryan for a construction equipment and methods class. Ryan (2000) custom-built a Web site, formatted to use like a text, and compared performance with the traditional lecture course. Many field photographs were prepared and posted with additional instructor text. Copyright information linked to equipment manufacturers for additional illustrations. Final grades between online and lecture groups of construction management students were not significantly different. Being able to print the course Web pages for reference, Ryan observed that the online students had a better hard-copy set of notes to study from than students attending lecture and taking their own notes.

Ryan (2000) used The College of Architecture Non-Studio course Evaluation to gather student ratings. Ratings of the instructor for clarity and helpful availability were similar from the online and the lecture class. Students indicated the greatest weakness of the online course was interaction with students and the instructor and suggested mandatory meeting times in the format. Availability to the online course all the time was considered the greatest strength along with the opportunity to work at one's own pace. Concerned with

quality assurance for performance comparisons, Ryan concluded that "developing effective and reliable assessment methods for online class participants perhaps will demand the greatest effort for innovation and departure from traditional practices" (p. 4).

Some studies have been presented at conferences and published that measured student performance in interior design courses modified for online instruction. Though scoring was more subjective for student projects than test procedures, North, Sterling, and Ellis (March, 2000) reported collaborative distance education in interior design between two universities "indicated improvement in lighting design over past performance at this level" (p. 74). Alternative assessment was also used by Botti-Salitsky and Kays (2002) in a comparative study between a traditional history lecture course and an online history course. Their goal was to bring the collaborative quality of studio to the lecture methodology through online communication.

Traditional Teaching Methods in Interior Design

History of Traditional Interior Design Instruction

Interior Design became a recognized field of instruction taught primarily in the United States at the Parson's School of Design and the Pratt Institute in New York during the late nineteenth century. A rare early 1900's portfolio with signed and dated work from a female student at Pratt Institute showed that interior design performance standards included "37 large sheets of exercises in design principles, of plans and elevations of stately rooms, and of renderings of decorative arts objects, such as a jewel box and a candelabrum. The medium was pencil or ink, in many cases finished in watercolor." (Benson & Friedmann, p. 13).

A 1908-1909 catalog from the Pratt Institute, which was from the same time period as the portfolio work, listed a program description and two year, five days a week course of study for students who wished to concentrate in design, composition, and color. A course entitled Principles of Design and Composition was required the first year. The catalog also listed courses on drawing, art history, and modeling. The Historic Ornament course included lettering and Instrumental Drawing taught the mechanical requirements of practical design for working drawings. "Drawing from life" (Benson & Friedmann, 1981, p.14.) was recommended as preparatory art training and to continue life drawing with advanced problems in applied design after the two year program.

The Applied Design course during the second year provided practical applications for students skills acquired the first year with the following course description:

> The Interior Decoration work is planned to give a conception of design on a larger scale than that hitherto considered and to apply to Interior Decoration, specifically and practically, the general principles of design that have been acquired in other and related subjects. (Benson & Friedmann, 1981, p.15)

Drawing problems included perspective views of one side of a room or entire rooms, drawn and colored, showing wall treatments and furnishings. The portfolio drawing reproductions would still be admired and used today for fireplace facings, living room windows and woodwork, and mosaic tile and border patterns.

Today the instruction of similar content and skills in the area of Interior Design is still used. The combination of artistic creation is applied to practical problems for the creation of interior spaces. Knowledge of design composition and practice with graphic communication skills enables students to show and execute room designs. Drawings and

models are done in studios and students value and maintain their best work in portfolios. Knowledge is acquired from instructors who use examples from other professionals and history to exemplify the concepts. According to Mallette (personal communication, Feb 13, 2003) lectures with pictures continues to be the accepted format for the presentation and discussion of design principles, followed by lab time for applied design. Renderings and working drawings still require equipment, and the skills to use them, whether using manual or electronic tools.

Components of Traditional Teaching Methodology for Interior Design

Jack Curfman, an interior design faculty member at Colorado State University since 1951, has experienced many changes in the Interior Design program as it evolved out of a home economics interior decorating emphasis into a professional interior space planning and design approach. However, introductory content and method of delivery has remained fairly consistent over the years. Lessons began with a list of concepts to learn, such as identification of the design elements or types of materials to be discussed (Curfman, personal interview, June 24, 2003). This information was basic and necessary upon which to build future projects. Delivery was done by the professor in the form of lecture and started by clarifying terms with dictionary definitions. The lecture incorporated pictures as examples of what the professor was explaining. Visuals were done in many formats, but many professors developed an extensive slide collection. Slides were created from personal travels and historic places. Books were used as a source of group illustrations as well as lecture information incorporating multicultural aspects. Periodicals were also a source of illustrations to keep current with changing trends and to show commercial applications as well. These illustrations were projected

onto a large viewing screen for everyone to see and the professor stood at the front by the microphone in order to be heard. This format could accommodate large groups and as enrollments grew, introductory courses were soon scheduled in lecture halls.

Reiser, Karimi, and Weale (1977) similarly described the instructional procedures employed in many 'traditional' university interior design programs. During classes students received instruction "mostly in the form of slide/tape presentations, lectures and handouts" (Reiser et al. 1977, p. 45). Assessment was in the form of multiple-choice tests taken at the end of each unit. Though interior design content has expanded and visual examples are updated, these teaching methods are still in use for classes considered primarily lecture courses. Introductory and first year courses generally have the largest enrollment and may include students from other disciplines. As a result, many of these are treated as lecture classes and similarly use the described methods and media.

The second component in interior design instruction, following the initial lecture/presentation component, are related labs or studio courses. Studio sections are smaller and still for project application and the development of portfolio drawings. Here information could be reviewed with shared discussion prior to project assignments to apply these concepts. Some projects were more practical using a specific family or facility with design needs. Other projects may have a more experimental approach, seeking creativity, such as an environment on Mars (Curfman, personal interview, June 24, 2003). The instructor, providing options and critique, reviewed the project development process individually with students. Students observed and were sometimes involved in the analysis of other students' design and synthesized the design process for

their own. Written and verbal information accompanied design projects for reflective thought on use of design principles and explanation of the design process.

Interior design educators seldom refer to this lecture-studio method as a traditional method of education but it describes how interior design is commonly taught. Curfman (personal interview, June 24, 2003) felt that instructor-directed approach better explains the previous and long-standing method of teaching interior design, sharing knowledge and experiences accompanied by the importance of visuals as examples and analysis. Application is personalized and skills developed one-on-one with the instructor in the studio or lab where individuality is associated with creativity. Brandt (1998) acknowledged the lecture-studio method in opening her discussion about teaching design history with "When students exit our lecture halls and head towards their studios, what lessons do we hope they retain and apply"(p. 17). Due to the use of slides, sorted chronologically, geographically, and by style, the lecture process became very concrete sequential. She recommended an innovative thematic approach for the study and incorporation of historical interiors into projects. The organizational approach would be different for instructing historic interiors, but the media used and lecture-lab method could remain the same.

Interior Design Course Objectives and Standards

In the mid 1970's, Florida State University instructors improved student performance on interior design exams by creating interior design course objectives and matching content and exam questions closer to those objectives. Course objectives evolved later into national standards for Interior Design program accreditation. The Foundation for Interior Design Education and Research (FIDER) publishes standards and department review procedures, updating them every six years. Department syllabi must

cover all standards and student portfolio work must demonstrate these standards at an acceptable level, in order to receive renewal status. The lecture-studio method was enhanced with standards by forming a better connection between content and student assessment for student success. Individual instructor application of different learning theories may vary teaching methods used, which is acceptable as long as standards are still achieved.

Modifications to Teaching Methodology for Interior Design

Each interior design education article referred to the accepted previous methods as traditional and offered an innovative concept or application regardless of the year published. Learning theory has generally become less teacher-centered and moved toward student-centered activities as educational research became more prominent. Like other curriculum areas, interior design instruction has been effected and modified by educational research in varying degrees. Critical thinking, teamwork, self-evaluation, and building communication skills were some of the proposed methods that have been incorporated into the instruction of interior design.

Teaching methods chosen for Interior Design were found to be influenced by room arrangement. Scott-Weber, Marini, and Abraham (2000) looked at faculty and student reactions to the layout of university classrooms and the effect the classroom had on learning communication. Mapping the movement of instructor and students in their general purpose classrooms showed that "faculty did not penetrate into the closely packed seating arrangement" (Scott-Weber et al. 2000, p. 31) and tended to use presentation as the mode of delivery. The teacher's desk was placed as a barrier between the instructor and students with some walking back and forth at the front of the room by instructors

during lecture or to write on the board there. "Students were observed to be seated and writing, a more passive learning behavior" (Scott-Weber et al., 2000, p. 32). Faculty preferences however, alluded to the desire that classrooms be more flexible with furnishings to allow for social interaction. The classroom environment could be providing environmental handicaps restricting changes from traditional teaching methods. Both faculty and students felt classrooms could be better designed in many areas particularly flexible seating for different user needs, to promote a more responsive social setting, for better control of audio and lighting, and to integrate rather than add-on more use of technology.

Ankerson (1996) referred to the traditional interior design method as "information-laden courses" (p. 99), and proposed an alternative that would encourage more active student participation in the learning process. The existing lecture and lab or studio format was felt to carry with this terminology a preconceived notion by students and faculty that divided the course structure. Ankerson (1996) described the predisposition of the lecture component for interior design in the following:

> The implication too many educators of a one-hour lecture, two-hour studio for instance, is that for one hour each week the educator should be standing in front of the class disseminating information with the students taking copious notes. (p. 100)

Having attended a Writing Across the Curriculum (WAC) retreat, Ankerson recommended informal writing as an implementation tool for dialogue and expanding the knowledge base. She used an issue-based rather than the topic-based approach typically used for lecture format classes. Rather than justifying a grade with "red-lining assignments turned in during finals week" (Ankerson, 1996, p. 100), which was felt to be wasted effort, modular

experiences were used to provide 'teachable moments' by using writing assignments in a conceptually similar way as at the drawing board in the design studio.

Business practices of professional interior designers also influenced instructional methods. Kratky's study of 100 interior design firms (cited in Vogel 1999) found that written and verbal communication was the top skill needed by entry-level Interior Designers. Business teamwork practices and cooperative learning theory combined well to initiate more group work and problem solving in both lecture and studio sections. Vogel provided educators at an Interior Design Educators Council (IDEC) conference with a cooperative learning example to expose them to the application of this learning model to interior design. Problem solving and selecting design options are inherent in the design process, but instructors did more planning to incorporate and encourage the process. FIDER, providing program accreditation for interior design, also requires promotion of the team approach to create design solutions. Cooperative learning "encourages critical thinking and communication skills while teaching successful team interaction (Vogel, 1999, p. 72).

Clemons (1999) presented the learning theory of multiple intelligences to interior design educators to assist them in developing a more inclusive environment to teach design and communication skills. Understanding the different types of intelligences that students possess can be used by educators in modifying their pedagogy to appeal to a variety of intelligences students bring to the class. "Although educators cannot be expected to present information that would appeal to all eight intelligences at one time, it is reasonable to believe that a lecture, for example could be prepared with two or three intelligences in mind" (Clemons, 1999, p. 56).

Examples to analyze of professional design work, based on the fundamentals of design, are thought to carry over into self-evaluation of the student's own projects. "Processing of the information revolves around the student's active involvement in the use and analysis of information" (Ankerson, 1996, p. 100). The Interior Design instructor frequently selects the room illustrations for students to recognize, analyze, or integrate with previously presented concepts. Traditionally the instructor critiqued student work submitted and provided the score. This still applies to the majority of design projects, but with standards, instructors are encouraged to consider and show students the scoring method along with the project guidelines. Score and comment sheets for instructors to complete, or rubrics explaining acceptable levels for each score, are two methods incorporated for assessment. If work is done during class or lab, projects receive continual review by the instructor during the process. Individualized instructor assistance is offered, and input or assistance provided by other students working on the same skills.

Student presentations are generally the practice to explain their design process and final project results. Training for this final step is instructor-driven building communication skills to support graphic design concepts and prepare students for client work. A write-up on design process with some self-evaluation is a reflective piece to develop the thought process prior to the presentation (Curfman, personal interview, June 24, 2003). Professionalism and poise is desired in the verbal presentation with supported explanations applying design principles and satisfying project needs.

Technology Research in Interior Design

With the introduction of computer-aided design, Interior Design professionals began investigating the potential of CAD and comparing results from this medium to

traditional methods of drafting. Conferences of the Interior Design Educator's Council (IDEC) have had papers presented on the effect of these techniques on design development and the use of CAD and virtual environments for three-dimensional interior presentations (Lindsey & McLain-Kark, 1998; Brandon & McLain-Kark, 2001).

Brandon and McLain-Kark (2001) divided a studio section into two groups to compare differences between one group remaining in the studio, with manual drafting tables and tools, and the second group executing the project drawings in a computer lab with AutoCAD. They compared performance and creativity based on seven design aspects previously used for project evaluation ratings. As the project counted for a course grade, students were allowed to select which group to participate in. Equal development time was given to both groups, with instructors collecting drawings after each two hour session for three class periods. The appearance of drawings was equalized by converting student projects from both groups to pencil line drawings before given to the judges. Using a priori alpha level of .05, the results indicated no significant difference between the two design techniques on each of the seven design aspects.

Lindsey and McLain-Kark (1998) studied whether clients would view virtual environments in the same way as the real world. The Marshall Space Flight Center in Alabama provided the VR equipment and multiple screens for the comparison of virtual and real environments for the perception of human functions. These included the visibility of rearranged objects, the anticipated reach for needed objects to do certain tasks, and the ability to converse and share activities with others in the same environment. Randomly selected engineers were seated at the same console to view objects in three environments: a virtual reality simulation, the same simulation with

altered components, and the real word environment of their office area. Colored cubes in the office space were scaled to human size and set at average height positions for different tasks. The study findings were that consistent observations where made in each of the three worlds, which suggested that a virtual simulation could be a "viable method for planning, creating, and testing environments before they are constructed" (Lindsey & McLain-Kark, p.38).

Distance and Online Instruction in Interior Design Courses

Development of Distance and Online Instruction in Interior Design

Definitions and applications will be included as faculty increased their exploration of electronic delivery for Interior Design education. Ali and DiCicco (1995) listed three characteristics as commonly associated with the term distance education: separation of learner and instructor by either time or distance, interaction between the instructor and learner through the means of mechanical or electronic equipment, and offered the learner an opportunity to earn a degree. The format they described for distance education was viewing a live lecture or panel of presenters via tele-conference network cable (Ali & DiCicco, 1995). This method offered the advantage of recorded versions being viewed again by many more at a later date.

Ali (1995) identified four components he felt were crucial for successful distance education programs in interior design: needs assessment, delivery technology options, interactivity, and faculty participation. These were diagramed as an interactive cycle (see Figure 1). His presentation format transferred computer-generated images from a variety of multimedia programs to video.

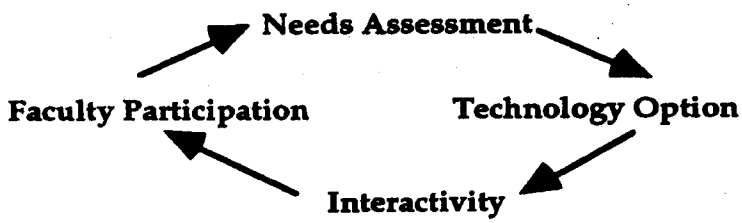


Figure 1. Key Issues of Distance Education for Interior Design

A panel of IDEC educators with different areas of expertise in distance technology defined distance learning "as those teaching methods which allow student and teachers who are separated by distance and/or time to communicate and learn by print, satellite conferencing, computerization or other means" (DeVries, Hart, Pable, Singer, & Mikovec, 1977, p. 26.). The definition provided in a conference abstract (North, Sterling, & Ellis, 2000) stated that the integration of technology in education to develop the delivery of education to students who do not have to be physically present on a university campus where the education originates creates a distance learning experience.

Purpose of Distance and Online Instruction for Interior Design

Ali and DiCicco (1995) did a joint architectural business and educational institution report discussing the appropriateness of distance education for interior design education. The two primary benefits they cited for developing distance education was first to meet the needs and capture the market of nontraditional students, and secondly to enable the transcontinental exchange of ideas. Online courses would bridge the socio-cultural and space-time separation limiting the access of nontraditional students to higher education. Therefore the purpose for online education would be a broader audience for interior design programs and increased quality of shared communication.

At the department level, Ali and DiCicco (1995) reported that online education could serve another purpose as a source of income at a time of decreasing university resources. They suggested that strategic planning for interior design departments include effective development of online courses for conditions of resource decline. Courses could then be identified which reflected market requirements. Partnerships were suggested between business and education and between institutions for the purpose of sharing resources for distance instruction.

The report identified four stages a department would progress through to properly identify courses for distance education and to select the type of technology: 1) a needs assessment, 2) delivery technology options, 3) interactivity, 4) and faculty participation and development (Ali & DiCicco, 1995). The needs assessment was to identify interested participants and determine their academic needs. Ali and DiCicco (1995) proposed the following model in developing an interior design distance education program:

1. Assess the audience by soliciting professional organizations, conferences, institutions, and previous distance students through forums and surveys.
2. Determine target audience program needs through transcript and portfolio reviews, applicant interview, and pre-entrance exams.
3. Review technology options by assessing technology and financial support. Then match content to the delivery technology. (p. 54)

Adapting instructional methods to technology in this article was exemplified as "videotaping a lecture or converting classroom visuals for television" (Ali & DiCicco, p. 54). Studio learning via distance technology they perceived as possible through computer design

technology with "exploration and real-time animation at levels unattainable with traditional drawing"(Ali & DiCicco, p. 55).

Positives of Distance and Online Instruction of Interior Design

Matthews and Weigand (2001) felt introducing students to distance communication in the classroom helped them become familiar and work with technology in preparation for the workforce and enriched the present academic experience. Other interior design instructors after exploring greater use of technology in their course, discovered, and pointed out how features that can be part of online learning could improve interior design education. Some dealt with information and monetary resources, others benefits of partnerships promoting diversity, and the possibility of using technology in studio to create and then exchange and critique design drawings through online capabilities.

Williams (2004) felt the most encouraging aspect of making the philosophical shift to a learner-centered hybrid method was the increase in discussion that occurred online as compared to classroom instruction. She listed four ways in which online written commentary was a less intimidating and a more effective vehicle for discussion;

1) allows student to react to what they find in the lecture material that is relevant to them personally;
2) elicits student contributions (questions and observations) that often go beyond the discussion topic;
3) allows the instructor to become aware of student misconceptions about the material;

4) facilitates student learning through exposure to multiple perspectives (Williams, 2004, p.7)

Internet Resources

History of art and interior design is part of the curriculum where the content continues to grow with time. Student concerns in these courses are remembering dates and mixing up different styles, because the educational approach is usually chronological by region, period, and designer. Online sources offer a way to access, store, and easily retrieve this information when needed. Brandt (1998) recognized and addressed this concern in stating, "More needs to be taught as time passes and rather than overwhelming students with facts hard to retain over time, most will be able to access these quickly with electronic media" (p. 19).

Brandt (1998) recommended a more thematic approach to design history. Students would find connections instead between period pieces and spaces, or similarities between designers of different countries, and then find or create a current adaptation with these features or materials. "This thematic approach enables students to see how they might utilize specific examples ...not just as benchmarks from the past but also as conceptual archetypes for the present" (Brandt, 1998, p. 22). Online searches and computer technology can enable this shift in pedagogy. The electronic connection can start a mental connection with preceding designers through self-discovery and association with lifestyles and feelings they portray. With a thematic approach Brandt (1998) hoped for the following:

> In this way, students may begin to develop a kinship with a host of designers who preceded them, and who have employed the same basic set of tools (the design

elements and principles) and contemplated the same overarching issues (the conceptual, aesthetic, or technical) as they will throughout their careers. (p. 22)

At times of financial shortages and fiscal cutbacks, Internet resources may be more economical for instructors and students than outside books, periodicals, and photographic services. Schrock (1994) noted the Internet as a valuable source of information for educators "free through most school computer networks" (p. 36). Both for teaching and research she recommended this in-office library as efficient leaving more time for student interaction. Museums and art collections, such as the Smithsonian was highlighted as beneficial for Interior Design students. Faculty access to government and other university catalogs and organizations can quickly find resources for project bibliographies, quotes, and visuals through electronic pictures. With some proper search information and procedures, offered by most campus computing services, the "successful network user is a persistent learner who continues to ask questions and view the search for knowledge as an academic version of an exciting treasure hunt" (Schrock, 1994, p. 37). This article recommended the Internet as an information source primarily to assist the instructor with traditional lecture-visual presentations. Online instruction allows the learner to also become part of the search and discovery process.

Williams (2004) recommended a Webquest to add active learning and critical thinking through inquiry-oriented web instruction. This activity used information from resources found on the Internet by the instructor rather than students looking for sites. Students in a design history course were to analyze how oriental design principles were reflected in the cultural tea ceremony. Using Desire 2 Learn courseware and a hybrid format, Williams (2004) integrated traditional face-to-face lectures with online written

activities. Students needed to interact with the Internet sources to establish informational relationships, differentiate, and justify their content by referencing the material.

Online Pictures and Electronic Drawing

Students can extract pictures off the Internet, group, and compare them through insertion into presentation programs like PowerPoint. Designs can be manipulated by image altering programs, such as Adobe Photoshop, to incorporate some original parts, add or change other features, and apply new finishes. Wu and Willis (1977) considered the advantage computers had over manual rendering in constructing multiple perspectives to better represent the total space. In addition to the time-saving feature, predictability of view orientation was an advantage to select the best vantage point from which to continue a rendering. "Outlining perspective printouts under overlay paper provided a framework on which to elaborate color and textures" (Wu & Willis, 1977, p. 44). Some technology programs such as 3-D Viz can start with solid shapes and mold them on the screen into original three-dimensional objects. These 3D CAD drawings, translated into STL format, named after stereo lithography, can download data into paper or plastic rapid prototyping machines to build physical models (Novitski, 2000). The computer as an online tool for the exchange and development of design images offers a broad and growing range of educational possibilities.

Distance and Diversity

Thompson and Gibson (1999) at the IDEC national conference for interior design educators, presented a technology-based distance education model that linked design students and faculty together at different campuses 75 miles apart. Video teleconferencing was used, which offered connections to place bound students and new populations that

previously did not have access to Interior Design education. Their strategy was to reinvent the classroom through a synchronous technology technique. According to the researchers, this non-traditional method of instruction also enhanced the learning environment by bringing the rest of the world to the learner. Besides increasing the awareness of the potential of distance education for interior design, their model demonstrated online application of educational theories such as Bloom's taxonomy of learning and Kearsley and Lynch's recommended five elements for structuring distance education. These methodologies will be discussed further under the heading "Models for Online Education".

Iowa State University also used two-way interactive video conferencing to recruit potential students at fourteen off-campus sites (Mikovec, Beecher, & Cartland, 1999). A videotape presentation with computer generated graphics was followed with the opportunity for students at remote sites to question a panel of presenters. A statewide fiber-optics network offered a solution when time and distance hindered faculty efforts to personalize. They recommended exploring distant education technologies to help facilitate other program and faculty efforts such as contract with alumni, advisory board, and business partners.

Singer discussed cyberinternships using desktop computers and use of the Internet to transfer files between students, design firms, and the supervising instructor (DeVries et al., 1997). Internships are frequently required near the end of the student's interior design program to provide work experience and job potential. Students find design employment in different cities and states away from the school and each other. Online and telecommunication capabilities can provide the instructor joint conversation with students and their employers. Communication between distant interns continued the value of shared

learning through online exchanges and built a supportive network for mentoring and developing job leads.

Online education can bring people together literally from around the world. Research with international related coursework and design projects have helped develop the distance education environment for Interior Design (Matthews & Weigand, 2001; Fowles & Singer, 1999; Kucko, Prestwood, & Beacham, 2005). Exchanging of information, ideas, and viewpoints on different environments can broaden cultural diversity. Matthews and Weigand (2001) in their summary of a collaborative Internet design project pointed out the benefits of online partnerships with other programs and disciplines in the following statement:

> Distance education allows educators to plug gaps by pairing students of differing ethnic, geographical and philosophical backgrounds, and provides for interdisciplinary partnerships where previously none were possible (p. 53.)

Fowles and Singer (1999) linked together students abroad in Rome with their campus counterparts. Seniors students in a studio course were paired as home-base and Rome-based to work together on a retail design project. Each pair selected an Italian manufacturer and in eight weeks designed a store to sell their product line. Students were connected through the Web, e-mail, video taping and conferencing, and the use of digital cameras, slide scanning, and computer imaging. Though there was difficulty with international connections being as reliable as in the United States, project creativity was similar to the previous control year. Student partners felt the experience increased international awareness and enhanced both their learning and relationship.

Six institutions representing Canada, the United States, and Mexico formed the Consortium for Design Education (CODE) to provide both a cultural exchange experience and to facilitate a virtual design project charette. Online technology was used to foster an interactive environment during the charette so that students could generate and develop solutions to design problems. Online communication was used to provide an intensive two-day design experience for students. Charettes group people from different specialties to exchange ideas and work together. Charettes have become a model used by business for an international approach to a design problem. Through Internet connections, a global community is integrated into the Interior Design curriculum (Kucko et al., 2003).

Lazor (2003) concluded in the written description of her conference presentation that "technology will be used to level the playing field to allow schools of any size to provide their students with the opportunity to become citizens of the world" (p. 56). Lazor's presentation was part of a panel discussion sharing cultural projects being done in interior design courses to overcome ethnocentrism. Besides compiling the number and scope of programs addressing global accessibility with a cultural focus, the presentation encouraged the formation of partnerships with interested schools to develop a model program supported by a database and digital communication. Future development would be toward "virtual extreme transformational cultural/global lecture/studios" (Lazar, 2003, p. 55).

Challenges and Negatives of Online Interior Design

Whitney and Waxman (1999) conducted a survey to determine if and how Web technology was being used in the Interior Design classroom. The investigation revealed several obstacles encountered by the 280 Interior Design educators who responded to the survey. "Lack of funding or resources, lack of time, and lack of technical knowledge

were the most common obstacles reported (30%)" (Whitney & Waxman, 1999, p. 22). Finding credible information on the Web was listed by 13%. Ten percent of respondents, mentioned poor attitudes from faculty or students as a hindrance.

Student Computer Requirement

Requiring that students have a home computer is a department and university policy issue to consider when developing online credit courses; especially if needed for the program major. Interior design departments are currently addressing expanding technology needs due to computer aided design being used in the profession. They are making decisions on where and how to integrate CAD training with manual design presentation techniques. Solutions and facilities vary across campuses due to differences in monetary resources, administrative support, available space, and technology-skilled faculty.

At the University of Nebraska, Case and Matthews (1999) reported that interior design students were required to purchase a laptop computer after their portfolio review due to the realities of university economics and politics. Laptops were chosen because they could be used in available studio space and were portable. A laptop and needed software were available for a set price of $3000. From an assessment survey of design graduates, "most students felt insufficiently knowledgeable to make an informed decision about their computer purchase" (Case & Matthews, 1999, p. 53.) Another concern was that comparably equipped desktop workstations sold for half the price. As a result students had mixed feelings that the money they spent on their laptop computer was worthwhile. Case and Matthews noted "that some students spent $8,500 for their computers" (p. 54) with the average amount spent between $4,000 and $5,500.

Though personal purchase of a computer for the Interior Design program at the University of Nebraska was for computer aided design instruction rather than online learning, the principle behind the policy is a still a consideration at land grant institutions. The quality and expense of a home computer for online learning can be much less, but interior design programs doing online learning do not limited themselves to lecture or text-based courses. Most online research in Interior Design has been to support the studio experience, thereby combining the online capabilities with CAD applications. A policy that requires the purchase of a computer for college coursework sets a precedent, which becomes a larger monetary and student equality issue in Interior Design. Because of the monetary issue, the University of Nebraska did make an agreement with the office of student loans "to increase loans by $3,000 for students in need of financial support" (Case & Matthews, 1999, p. 47). Interior Design students in the assessment survey still expressed a need for the university to provide other infrastructure such as color printers, large print plotters, network storage space, and technology support personnel. Few students, Case and Matthews concluded, continued using the laptops following graduation and those working in the field were provided computers by their employers.

Technical Difficulty and Additional Time

Online courses can present both student challenges and teacher challenges in terms of operations. Closely associated with computer learning and course design for computer delivery is the issue of students experiencing technical difficulty. Students enter a program with varying technology skills. Online learning software, such as WebCT, has unique features, and operates slightly differently from other word processing and email systems. Within WebCT, instructors may set up organizational formats differently and

utilize different tools in the software based on their content area or desired pedagogy. How to familiarize students with online operations and skills for specific assignments can be a challenge and a negative aspect for online educators.

Who is responsible for equipment problems, program usage, and information transfer needs clarification. Girand (1999) had a technology team to develop an estimation module centered on a project scenario requiring the calculation and purchase of wallcovering. The logistics of developing items and the coordination for faculty support and division of responsibilities were presented as problematic. An opportunity to observe and practice online procedures is frequently provided students in an orientation. Even so, when problems occur, the instructor will hear about it and needs to deal with student difficulty, particularly as it relates to assignments and grading. If students have taken a previous online course they are apt to think they already know the procedures and expect the organization and operations to be the same. The online instructor has the challenge of trying to prevent problems and create solutions for technical difficulties. If a new online format, the cause for technology difficulty can be harder to distinguish, require more time communicating with students, and delay submission or completion of work. Girand (1999) initially felt technology would be better able to meet students needs for additional practice, options suitable to learning style, and immediate feedback if project done correctly. Instructor and student difficulties with the Web-based module resulted in modifying the pretest-posttest design and evaluation of the unit. The summary questioned if the benefits outweighed the involvement of time for the faculty member.

Case and Matthews (1999) reported a challenge of faculty when integrating computers to their interior design coursework was that "Computer training and

troubleshooting occupied more studio time than expected" (p. 48). Faculty felt they needed more technology training or assistance. Students also felt they needed earlier and better preparation to use computer software in their courses and design projects.

Teaching time and the difference between faculty time involved in conducting a distance course and the same content in a face-to-face format was researched by Bender, Wood, and Vredevoogd (2002). The study used similar computer-aided design courses at two Midwest state universities and students selected which group they wished to be in as their work was also recorded as a grade. Instructors and assistants kept time logs reporting time spent assisting students. Categories of teaching tasks included coordination, student contact, assessment, and instruction time either virtual or face-to-face. Comparative data from daily time logs indicated that "both faculty and teaching assistant time was significantly higher for the asynchronous course" (Bender et al., 2003, p. 9). The amount of email correspondence between student and faculty and difficulties using technology to deliver the course accounted for much of the additional time spent.

Even in a hybrid format, Williams (2004) included as a drawback the amount of time needed by faculty to initially create the course. A concern was expressed that for untenured faculty of Interior Design, online course development could be at the expense of activities needed to achieve tenure. Other drawbacks related to time reported by Williams (2004) included student problems "scheduling their work, managing their time, and understanding the implication of the hybrid course as related to learning" (p. 15).

Self-directed Learning in Classroom of One

Interior design instruction, in both the lecture and studio portions, has been teacher-directed to help students acquire knowledge and demonstrate skills. Though some

student interaction and partner support occurs during open lab and outside work, the instructor is expected to provide the course content and show how-to skills for the execution of design drafting and use of the computer. Facilitating these same expectations can be a challenge or difficult to transfer online. Students that are use to the instructor verbally explaining with visual examples and working with them through steps of a project, may have difficulty working on their own.

The typical classroom social support system is not easily recreated in an online format. Working on a home computer, student interaction and assistance does not develop the same as in a computer lab or studio environment. Many students select interior design because they are social and want to work with people through shared design solutions. Watson (2001) found that diversity in learning styles existed among Interior Design students after assessing 147 undergraduates with the Gregoric Style Delineator. Nearly half, however, scored closely between two different categories and were referred to as bimodal. Relating the Gregoric learning styles to students in Interior students, Watson described hands-on learning as characteristic of Concrete Sequential. Concrete or Abstract Random styles were characterized as people-oriented, experimental and imaginative. Bimodal students were a combination of these characteristics. When the Myers-Briggs Type Indicator (MBTI) was administered to 234 design students, Diehl-Shaffer and Webber (1993) found a larger percentage being NT's, Intuitive Thinking, and NF's, Intuitive Feeling, which are a smaller percentage of the general population. Characteristic of the N personality is speculation on future possibilities recalling connections from theory (Reinhold, 2004, p. 4). T personality thinkers have the ability to analyze and are task oriented and F personality traits include being sensitive to the needs

of people and seeking a consensus. Forty percent of the design student sample were catalyst NF's, and twenty-two percent were visionary temperaments, NT's (Diehl-Shaffer & Webber, 1993, p. 54). There were lower percentages of trouble shooting SP's and traditionalist SJ's among Interior Design students than occur in the general population. Sensing people instead attend to the present with practical solutions liking concrete information. P and J characteristics deal with ones action orientation towards the world. The Perceiving style flexibly takes the world as it is, mixing work and play with few commitments. The Judging style, Reinhold explained, approaches the world instead with a plan in which to organize and make decisions.

A student sitting alone at home in front of a computer invites "feelings of being disconnected from the learning" (Purcell-Robertson & Purcell, 2000, p. 17). This phenomenon has been described as the classroom of one. In the traditional classroom a student can feel a sense of community with others in the room. If many Interior Design students are people-oriented and value the social experience of learning, students in this area may have more difficulty with distant online education. This also means that instructors developing online coursework for interior design need to be concerned with the social interaction provided for students in order to alleviate a negative isolated feeling.

Visual Learning Online

One study explored student learning styles and the visualization skills interior design students need to acquire. Nussbaumer and Guerin (2000) stated that "interior design students must learn to use visualization skills to solve design problems" (p. 2) and that "successes in interior design may depend on interior designer's visualization abilities" (p.7). The visualization part of the design process enables design students to

transfer the visual image in their mind onto paper where it can be presented to clients. During the visualization process, the interior designer visualizes multiple solutions simultaneously and can see things three dimensionally.

Student learning styles influence their need for visual representations and manipulation. Kolb's learning theory explained the difference between left and right–brain learning activity and described the left brain approach as serialistic and less creative. Kolb's theory described the right-brain or holistic approach as gathering new information through a concrete experience that involves experiencing the surroundings through the senses. Though both approaches are needed to solve design problems, Nussbaumer and Guerin (2000) stated that "right-brain activity needs to be encouraged" (p. 2).

Learning style studies with Interior Design students have shown all styles to exist among students, but the majority Nussbaumer and Guerin (2000) considered accommodators and assimilators. Nussbaumer and Guerin defined accommodators as visual and spatial and who liked to apply concepts to real-life experiences. Accomodators are right-brain dominant and require concrete experiences. Assimilators they said were left-brain dominate with great ability to develop and analyze ideas, eliminating the wrong answer as they work through a problem.

Perhaps more important than the learning styles categories are the characteristics within these that interior designers associated with. The characteristics that were selected and described by professors and students as their qualities and ways of gathering information can help in the design of online courses. Creating visual and physical experiences with the building environment can be a challenge with online courses. Computer aided design can offer the viewing of multiple solutions and visualizing three

dimensional forms, but connecting this with online software capabilities, such as WebCT, involves two different technology components. It may also be difficult online to duplicate the sensory experiences that Nussbaumer and Guerin felt are essential to learning for many interior design students.

Complications with Illustrations and Lesson Development

The traditional use of multiple pictures by interior design instructors for teaching is a key methodology to address with online learning. The typical lecture-slide format used teacher-selected illustrations from mixed sources and were verbally explained and analyzed by the instructor. Especially in foundation courses, instructors custom-selected illustrations to depict certain types and applications within the elements and principles of design. Multiple sources became essential to incorporate multicultural influences and show variety between historical use and contemporary adaptations. Since a single text for students was limiting and few were actually available at the university level, the instructor helped students transfer the art concepts to the interior design field via projected illustrations. Trying to transfer this method of instruction to online courses presents a unique challenge for interior design and increases problems in using previous photographic sources.

Copyright restrictions and property rights are two legal issues that cross over the shared use of illustrations and material for online content. Decisions to use each illustration and the format in which to present them must be weighed against four factors involved in determining fair use for education (Consortium for Educational Technology for University Systems, CETUS, 1996). These factors include the effect on business

markets, the amount used, the nature of the work, and the purpose which strictly needs to be nonprofit.

Professional photography is considered to have a significant public market. Copies from published texts strongly involve the factor of effect, because the instructor is using what was created to be purchased for access to the material. Reproducing only a small number of images from texts with many different photographers may be a method to reduce amount and effect, but publishers should be contacted first to see if they sell select slides from the textbook.

Amount as a factor is significant in the selection and use of pictures in interior design. "Quantity must be evaluated relative to the length of the entire original and the amount needed to serve a proper objective...Pictures generate serious controversies, because a user nearly always wants the full image or the full 'amount'"(CETUS, 1996, p. 2). . Photographs of someone else's creation "actually embodies two copyrights: the first is the copyright to the original art; and the second is the copyright to the photograph of the work of art" (CETUS, p. 3).

Photographic services tried in legal cases to have greater restrictions imposed on them than for printed text. The case study of the professor who created slides reproductions from an Italian art book related well to problems with illustrative content for the area of interior design. Even though the entire picture was not copied, if the smaller portion contains the "heart of the work", then the concept of substantiality was ruled to wage against fair use (CETUS, 1996, p. 2).

Harper (2002) explained changes the TEACH Act offered distance educators including the use of still images. To show or display inside the classroom was previously

allowed by law, but not the copying of pictures necessary to transmit them digitally. Passing of the TEACH Act expanded the viewing location outside the classroom, permitted the technology to copy digital works, and equalized the amount that could be seen comparable to face-to-face displays. A non-profit university can store prepared media on the central server, but students must no longer have access after the course is over. Software used should post that material may have copyright restrictions and management settings set to block printing. An example Harper (2002) gave of works now covered online by the TEACH Act was "images of artworks in an art history class" (p. 3). The number of works used from a specific artist would still be subject to fair use guidelines and must be directly related to course content.

A professor combining multimedia excerpts onto a CD for single equipment use in the classroom found it problematic, based on the nature of different works and non-profit issue. Digital format of photography and music was said to undermine the ability of the creator to market or license such work. Any fee or sale of course materials to receive a CD created by an instructor would result in profits competing with sale of the original or profit for a larger organization again. Creation of a CD would require written permission for each illustration used outside the parameters of a public institution (A. Prodhan, Colorado State University Research & Information Technology, personal communication, April, 2002). Campus and government facilities can be considered public institutions as well as public travel facilities. Colorado State University legal and copyright services still advised that it is best to inform administrative and public relations people of your intent and schedule the taking of the photographs to help maintain public safety precautions. People should not appear in your pictures without written permission

to include them. Art sculptures from outside artists are a separate issue still requiring contact and possible payment to include. C.S.U. in order to include a sculpture in a campus brochure was given a large fee from the artist to use the photograph.

File size, downloading rate, and viewing size are additional obstacles to e-learning accessibility of illustrations. The extra time needed to create learning material in an online format may contribute in part too few university art and interior design programs being involved with online education. Instructors should get signed approval before taking photographs to use in their educational material. These pictures then need manipulation to size, enhance, and store before suitable for online delivery. Skills with technology presentation programs and Web page design are helpful to also combine text with pictures for desired results. Finally the process of uploading onto online software such as WebCT and editing needs some training and practice to become efficient.

Student Interaction and Application Projects

The above dealt with preparing illustrated content online as similarly used for interior design lectures. The next related issue is how to instructor-facilitate the analysis and critique by students of these illustrations. Student questions, discussion, and application to design projects are continuing phases of interior design lesson planning with different online challenges. Selecting the type of design projects, ways for students to execute them, and how to submit completed projects involve new resources and procedures when done electronically. Teamwork also takes on new methods and dynamics online. Duplicating the studio experience appears the most difficult to demonstrate drafting, drawing, and computer skills with the instructor separate from the student and students separate from each other.

The instructor will explore online learning options in the process of lesson development. Decisions will be made as whether to try and duplicate previous methodology or begin a new style of instruction to suit and take advantage of unique online potential. Referring to considerations in creating an online environment, Matuga (2001) added that due to time constraints, an instructor designing an electronic course may have very little flexibility altering the course environment after the course has been launched. Bender (2002) in researching the perceptions of post-secondary Interior Design faculty toward distance education found the majority with negative perceptions toward distance education for interior design and did not wish or plan to become involved with it as a teaching method. The study concluded that while online lesson development needs to consider the traditional instructional methods widely used in Interior Design, it would help to also promote innovative online instruction methods for this area.

Matuga (2001) is an Assistant Professor of Psychology in Ohio, and is frequently asked to compare online and traditional course development. From her former experience as an art teacher she provided her perspective on comparing the traditional and online teaching methods. "An artist creating a painting has to create an environment. A teacher within an electronic environment has the same considerations" (Matuga, 2001, p. 83). Her analogy compared traditional instruction to three-dimensional sculpture while she viewed online instruction as two-dimensional like a painting. The traditional classroom instructor deals with environmental considerations much like a sculptor deals with light and space (Matuga, 2001). Regarding pedagogy about the two educational methods, she asked the following:

How does someone compare a sculpture to a painting when each art form is fundamentally different? Is either art form any less capable of evoking an aesthetic experience in the viewer? Each learning environment affords or limits pedagogy in its own way" (Matuga, 2001, p. 84).

The technology challenges are many with multiple aspects of lesson planning to consider for the study of interior design. Opportunities exist in online education for Interior Design, but need to be further explored. Little research on online course development in interior design with easily duplicated methods is available. A few studies have explored use of computer technology for distance learning, but have not continued in the form of ongoing program development. Only recently have studies about WebCT and other online software been conducted for interior design, primarily done by graduate students and individual faculty members pioneering this method for their department. More needs to be developed for different Interior Design courses to determine if WebCT software and delivery will afford or limit the pedagogy of Interior Design faculty. Students also need to determine if online instruction can evoke the same aesthetic experience for them. This study, creating lessons to form a unit on the Principles of Design, explored content design or redesign by facing the challenges and problems discussed, hoping also to uncover new possibilities for design education. On a program level, research information can help departments determine the best placement and courses for online development.

Distance and Online Instruction in Interior Design

Studio Adaptations to Distance Learning

Technology for art and design was initially explored to determine the computer's

ability to enhance the studio learning experience rather than assist the lecture process. The professors in design education were interested in results using the computer to draw, draft, and render. Project performance was based on art critique criteria and comparisons made between manual and computer-aided design results. Later with the development of distance education technology and online software the interior design computer software and online teaching methods were combined. The following different research projects incorporated these computer technologies toward the development of distance and online education for Interior Design studio experiences.

Within the discipline of art, a design course for Interior Designers and Architects was adapted to use distance education technology at Ball State University (Alley & Repp, 1996). Repp's journey evolved through personal experimentation over seventeen years learning computer aided design to instruct three-dimensional design and multiview drawings. He became concerned during portfolio review, that student problem solving and creativity was assessed through one small window of the profession: "the ability to draw" (Alley & Repp, 1996, p. 56). The story started with a computer creation of a red square which later was joined with other forms and one day put into motion across the screen. Repp progressed to use technology in a more lateral teaching approach to visual communication through the construction of wire frame models with digital surfaces and use of textures that mirror natural and artificial lighting.

Incorporating computer aided design programs made it faster for students to create and compare different vantage points. Changes required from instructor critiques were better received by students drawing by computer as it was easier to make drawing revisions.

Permitting more than one way to learn by adding CAD technology, "A student's lack of drawing skills no longer inhibits the expression of ideas" (Alley & Repp, 1996, p.57).

The author did not start out intending to use distance education as part of his instructional process, but the evolution of the red square now embraces online exchange for drawing assistance and critiques as well. After receiving an email from a design student that a drawing is ready for review, Repp can access that student's electronic desktop and view on his computer the drawing changes submitted since the last critique. He can manipulate the students drawing and rotate the design to view it from different angles. He then forwards another email to communicate support of the student's direction. Desktop windows can remain on his screen to view and check work as it is being done (Alley & Repp, 1996). The current online exchange facilitates more timely assistance with the design process and student decision making.

At the national IDEC conference in Santa Fe, spring 2002, Interior Design professor Vredevoogd from the University of Massachusetts, with graduate student Bender had a poster presentation on the creation of an online studio experience with similar access and manipulation of computer drawings. The professor could load the desired program onto the student's computer and both he and the student could view and manipulate the drawing simultaneously through the course website (Bender & Vredevoogd, 2002). The instructor could audibly critique the drawing for instant feedback, which allowed for less written feedback from the instructor and more discussion of the design process. The program Camtasia was used along with Microsoft Message Netmeeting and Naturally Speaking (J.Vredevoodg, personal communication, March 22, 2002). Both above learning environments required special software and technology

expertise that not all interior design instructors will have, so it is important with online design considerations to analyze the capabilities of available resources and cost factors.

A few professors of interior design have done some recent research using more elaborate technology equipment to design online studio sessions. Collaborative problem solving is a basis of studio lab settings where student teams develop different design solutions for an assigned facility. Students at two different universities were paired and joined into groups of four by David Matthews at Ohio University and John Weigand at Miami University. They teamed architecture students with interior design students to renovate an historic train station into corporate offices (Matthews & Weigand, 2001). Their primary objective was to evaluate if collaborative design could occur via distance technology, specifically the Internet. Their study evolved out of the 1996 National Conference of the Association for Computer Aided Design in Architecture, ACADIA, and a roundtable session of interior design visionaries. McCall and Johnson wrote in the Proceedings of the ACADIA Conference that the World Wide Web was creating new opportunities for collaboration where "it will soon be possible for design to be done by huge ad hoc groups whose members are distributed throughout the world" (McCall & Johnson, 1996, p.160). They felt designer's lack of knowledge of the needs and opportunities for collaboration was a fundamental obstacle to integrating these technologies into the design discipline (McCall & Johnson, 1996). Hasell and Scott summarized the trends outlined by sixteen design representatives from education and industry during their roundtable discussion. They identified the single most important trend affecting the discipline as the need for new technical knowledge (cited in Matthews

and Weigand, 2001). Participants agreed that technological advances would also change the process of delivering education.

Both professors, Matthews and Weigand, obtained grant money from their different universities and began several months in advance to set up similar digital design studios with compatible computer hardware and software. Power Macintosh computers were used with FormZ software for 3D modeling and Photoshop for raster graphics. Desktop video conferencing was set up with Apple Video-Phone software and camera attachments to allow students to communicate visually and graphically (Matthews & Weigand, 2001) They could draw simultaneously using the "whiteboard" feature and transmit large graphic files with video-conference "file sharing" feature. The conferencing capabilities for students to view each other and their work cost approximately $250 per workstation, required a technician at each location, and incurred room rental charges ranging from $50 to $100 per hour at each institution (Matthews & Weigand, 2001). Existing student fees provided computer accounts with email and the ability to construct Web pages which allowed for daily communication and the downloading of furnishings and finishes from the Web. Since cameras at each school transmitted only a single image at a time, participants could not see each other simultaneously. The transition time between one speaker and the next resulted in a "more stilted, less spontaneous interchange between reviewer and presenter" (Matthews & Weigand, 2001, p. 52). Detailed site information and photographs were downloaded by setting up a Web site for the studio.

Video-conferencing was underutilized initially because students were not familiar with its capabilities and low available bandwidth during daytime studio hours limited audio and video quality (Matthews & Weigand, 2001). Students used email extensively to

plan their course of action and used fax to exchange early schematic work. Video conferencing for the midproject critique helped bring together all team members and both instructors.

Reconciling major conceptual differences for the project between partnering schools experienced different dynamics online. Students were cordial with each other during video conferences when focused on a specific task function. E-mail, on the other hand, was used to initiate controversial discussions when the receiving party did not agree with a sent solution. "Also, because Internet communication tended to impersonalize the design process, e-mail communication became, at times, confrontational" (Matthews, Weigand, 2001, p.50). The facilitating professors felt the students looked to them to resolve team disagreements more that if they had been in a single location. As several students had difficulty working in a team situation with others they had not met in person, a weekend trip was planned to meet and work with counterparts. The only group unable to reconcile differences did not participate in this session. After major schematic decisions were made, teams worked more efficiently. The authors thought this later cooperation was "probably because specific tasks could now be assigned more easily, and because the impending deadline forced decision making" (Matthews & Weigand, 2001, p. 51).

Project outcomes from the distance studio experiment did demonstrate that a collaborative project could be conducted and completed electronically. The authors concluded that the interuniversity project enriched the student experience by sharing different design philosophies and processes as well as resources. It broadened perspectives by bringing together students from different disciplines, geographic locations, and regional cultures.

Desktop video/audio devices were also used by North, Sterling, and Ellis (2000) to integrate studio learning between two universities. Lighting specialists presented to combined lecture groups with synchronous video transmissions. Desktop units allowed students at both schools to see and communicate with each other. WebCT was used to provide a Web site for study guides and project bulletin board. Faculty worked collaboratively with groups to support project development. Student input on effectiveness indicated greater satisfaction from those who used WebCT with asynchronous communication that those who did not use WebCT.

Kays (2003) conducted an interactive presentation at the annual Interior Design Educator's Council to discuss techniques and benefits of bringing the studio method to the online environment. The focus was to address communications between the teacher and students and how to establish online classroom rapport. The studio method pedagogy the author stated already provided interior design educators a student-centered environment with an interactive community of collaborative thinkers and self-regulated problem solving. Bringing this power of studio learning to the online medium presented challenges to which a conceptual model was offered for online instructional design called "The Four Pillars of Rapport" (Kays, 2003, p. 46). These four pillars included experience, reflection, conceptualization, and action that spiral in group dynamics and support through iteration. Kays claimed using this model, as a framework too build and maintain rapport, could facilitate a dynamic and self-organizing constructivist system for an online studio.

Web Technology Influence on Interior Design

The theme of the 1999 Interior Design Educator's Council national conference was *Designing in the Digital World: process, pedagogy, and practice.* Whitney and Waxman (1999) presented survey results on how web technologies were being utilized in interior design programs. Based on survey responses, 48 members out of 280 who received the survey, "the Web appears to be influencing the pedagogical approach to design instruction" (Whitney & Waxman, p. 22). Data collected showed that 87% of design programs are using the Web for research, and 10% have implemented distance learning via the Web. Web sites have been created by 18% of interior design programs to supplement existing course material. The same percentage, 18%, reported use of the Web to increase teacher-student communication. Creating virtual worlds for three-dimensional visualization was done by six percent, utilizing VRML in design studios. Interior design students were creating electronic portfolios and incorporating multimedia in design presentations. All respondents agreed that Web use within interior design would increase. Whitney and Waxman (1999) felt use of the Web in multiple ways could enrich and make the learning experience of students more effective and transform the ideal of life-long learning into a reality.

Five universities from different regions collaborated to develop a multidisciplinary online course entitled "Issues of the Built Environment" offered to students in Interior Design, Architecture, Construction, Landscape Architecture, and Urban Planning (Bender, 2005). Internet2 technology was used to facilitate instruction by faculty from different departments. Weekly discussions incorporated onsite videoconferencing and online discussions of controversial topics. Benefits which

suggested future collaboration between disciplines included the shared expertise from virtual lecturers, increased awareness of how different design areas interrelate, and integrated philosophies gained from the exchange and critique of multiple perspectives.

Brandon (1999) presented at a conference poster session the use of WebCT to create an online-supplement to a history of furniture class. WebCT was the software package used by the instructor as a means to create the web-based educational environment. The purpose of the supplement was to provide the students with access to the handouts in the course and to supply links to Internet sites related to the content. Undergraduate students assisted by searching the Internet to provide addresses of possible sites to be included as links in the WebCT component. The educator viewed and categorized the sites and inserted selected ones as links in the online supplement. Software tools used in WebCT included Course Syllabus, the Calendar, My Class Notes, Self-tests, Glossary, and internal E-Mail for class members.

WebCT was used by Singer (2001) to facilitate interactive discussion between students and practitioners regarding sustainable design issues. The instructor scheduled chat sessions between her class of fifteen students and sustainable experts selected from various locations of the country. The class organized the question framework for the sessions conducted over a two-month period. The teacher/researcher felt WebCT was helpful with qualitative research by "providing data for the study through the built in functions of tracking and recording participant activities" (Singer, 2001, p. 14). Data collection also utilized the online bulletin boards and email tools of WebCT.

In an IDEC conference abstract, North (1998) described the process and content of an introductory interior design course developed for the World Wide Web. As part of a

group of faculty from different disciplines receiving grants for the summer, they worked together with advisors from the university technology support center to select software for designing course Web pages and to load and manage them on the university server. They previewed each other's course modules and developed contract and policies with the university on concerns including on-line office hours and credit toward faculty teaching load. The course was for a 15-week semester centered around weekly text readings from Kilmer and Kilmer. The text readings were supplemented with Internet sites, discussions, and assignments. Assignments were turned in by email and course grade determined by a combination of participation and assignments.

Student Satisfaction with Online Courses

Definition of Student Satisfaction

Clouse (2001) measured satisfaction outcomes in addition to performance in a study of students using distance education in graduate MBA business courses. He compared reactions of off-campus to on-campus graduate students enrolled for the same course. Though not providing a term definition for satisfaction, findings indicated preferences of students for either the traditional or distance educational methods. Clouse focused on satisfaction ratings between three types of student interaction: 1) with the content, 2) with the instructor, 3) and with other students. He questioned students on which type of teaching method used they felt were the most important for their learning. "Which of these three types of interaction methods are the most important for your learning?" (Clouse, 2001, p.167). Another question asked about learning with online resources. Survey questions included ranking overall satisfaction with the distance learning experience, with the technology used, and in how well they felt they learned the

content. Specifically with content, the survey requested satisfaction rankings with the text, PowerPoint slide shows, and use of technology for discussion with other students. Satisfaction, as measured by Clouse's instrument, was the student's perception of the value in a method for learning the content.

Online Studies With Satisfaction Instruments

Researchers in measuring attitudes of learners toward distance education found they needed to develop their own instruments to adequately measure the environment they tried to create for a specific course. Gloeckner et al. (2000) used a self-designed satisfaction survey for graduate level distance education courses. They compared student satisfaction ratings between four different organizational structures set up for distance education courses. The instrument was field tested in an earlier study and incorporated factor analysis for reliability. Satisfaction was measured in terms of the importance of each item on a four point scale. Items include communication and advising methods, interactions and relationship building with faculty and other students, value of cohort-model groups, discussions, and listserves, and use of selected systems such as WebCT and tools used, independent study, and participation in class projects.

Switzer (1994) looked at satisfaction surveys from nine institutions, used by departments or developed by individual researchers, as guides for reflection on components of the MBA program at Colorado State University. The goal of the survey design was to measure program evaluation as opposed to an instructor evaluation. "Questions were selected and refined to measure student perceptions and attitudes toward five components: instruction, support, interaction, production, and the environment" (Switzer, 1994, p. 27). The instrument was general enough to measure both the

satisfaction of on-campus and off-campus students. The survey was reviewed by colleagues and students and further refined. Overall program perception was measured by questioning off-campus students if they would enroll in another distance education course.

The survey instrument for this study provided a format and content for alternate delivery method courses. The components and questions concerning quality, organization, teaching tools and resources used are applicable to the development of satisfaction surveys for other studies. Open-ended questions at the end of the survey questioned both the strong and weak points of the distance delivery method, in this course being television technologies used for the design of different learning activities. Students compared the technologies used in terms of how each learning activity helped them better understand the material.

Mathews and Weigand (2003) also wanted to expand their distance learning study combining interior design and architecture students to evaluate " the effectiveness of the tool used" (p. 27) in web-based technology selected to assist students with collaborative projects. Communication occurred in several ways through the use of e-mail, instant messaging, FTP document sharing, and shared computer desktops through the use of Timbuktu (Mathews & Weigand, 2003). A self-designed post-assessment survey was developed to evaluate communication and design tools used on a 5-point Likert scale. Assessment of online tools was based on effectiveness and scores ranked by mean response. Open-ended written questions were also included for student assessment of the communication, collaboration, and design process.

Research Findings from Satisfaction Surveys of Online Instruction

Clouse (2001) included a student satisfaction survey administered after the instructor's performance test. These students received both synchronous and asynchronous instructional methods with two different modules within one business course with the same instructor. Pre-learning assessment indicated many students resistant to trying new asynchronous techniques for learning using online and videoconferencing technology. "Most students seemed comfortable with the learning paradigm that they have experience with and were resistant to taking risks to try new techniques for learning" (Clouse, 2001, p. 107).

Findings showed a significant difference in overall satisfaction between the asynchronous online and synchronous classroom modules. "Students strongly prefer learning that includes a synchronous face-to-face lecture with a synchronous face-to-face discussion" (Clouse, 2001, p.102). The conclusion was a student preference for the traditional learning paradigm with lecture and discussion experiences conducted at the same time. Post-learning assessment also found a statistically significant difference between the satisfaction of students with student-to-content, student-to-instructor, and student-to-student interaction. Students placed more value on interaction with the content and the instructor than interactive discussion between the instructor and other students. Students valued instructor feedback and felt they received more during the synchronous lecture and the synchronous chat discussion than through asynchronous methods with online PowerPoint lectures and threaded discussion.

There was a difference in satisfaction levels however between on-campus and off-campus students. Off-campus students were more satisfied with online lecture material, created with PowerPoint, than on-campus students were. Clouse (2001) attributed this to

off-campus students averaging ten years older than on-campus students and the convenience it provided professionals with busy schedules. They could view the PowerPoint material from home or work without driving to the site. Fulberth wrote (as cited in North et al., 2000) that student needs and convenience must to be addressed or students will not have a positive reaction to distance learning. Results from a questionnaire given to students who participated in the distance learning part of an interior design studio course showed student ratings split between the numbers who rated it better or worse than other courses taken. "50% (N=14) of the students who used WebCT rated the course as better than others they had taken (North et al., p. 74)

The model design used for distance or online instruction and the planning of interactive activities can affect satisfaction survey results. Gloeckner et al. (2000) conducted a study of their graduate level education program designed for distance education and integrated with the on-campus classroom. Their study compared different distance learning models with traditional on-campus classroom students in educational Ph.D. programs. Eighty-five students were surveyed from four doctoral formats. Besides traditional on-campus and off-campus distant student groups, there were two other models with occasional face-to-face meetings. The third group participated in interactive video/audio once a week and met monthly on campus. The fourth group, out of state, supplemented web activities with faculty site visits for three weekend deliveries.

In terms of model design: "Overall satisfaction was significantly higher for students in the video/audio group with once a month campus meetings than for on-campus students and out-of-state distance students" (Gloeckner et al., 2000, p. 7). Visual slides on the web were valued more by in-state students in the weekend visits model and

out-of-state weekend students rated chat rooms the highest. A portion of the satisfaction measure of the different doctoral education formats explored student perceptions of the importance of various learning activities and interactions provided. Here they "found great consistency among the responses of the traditional and distance Ph.D. students regarding the importance of various activities and interactions" (Gloeckner et al., p. 5). The student evaluation responses Matuga (2001) received from a new online educational psychology course, however, varied on which type of activity students felt was more effective for learning.

Scott (2001) compared group collaboration of senior year business students, randomly selected for teams of five, in both face-to-face and distance education environments. The seventy-five subjects were divided between the control and treatment groups with the experimental group working on decision-making tasks about a case study in both face-to-face and computer mediated sessions. Besides evaluated as more productive and more equal task-related discussion, significantly more students in the treatment group preferred computer-mediated meetings. "Students indicated that they preferred computer mediated meetings to face-to-face meetings for group collaboration by a ratio of more than two to one" (Scott, 2001, p. iv). A computer meeting consisted of a text-based threaded-discussion created through online software. It was conducted as a synchronous activity for small group communication.

Findings from the satisfaction survey of Mathews and Weigand (March, 2003) assessing the effectiveness of different communication and design technology for design projects indicated a different preference for interior design students. Technologies that most closely approximated face-to-face communication and operated in a synchronous

manner, such as chat, and video or phone conference were preferred for collaborative design. The distance studio experience fostered greater use of digital design software for visual communication of the design process. Written comments indicated that the online technology helped offer an authentic global environment, create virtual collaboration, and collectively benefit communities with design solutions while helping students connect with and understand different cultures.

Difficulties with electronic instruction were reflected in written comments to open-ended questions on satisfaction surveys. Responses included students feeling disconnected from their class members, frustration with a poor flow of communication and technical problems, and confusion from feedback that was not always clear. "They missed having face-to-face contact with their instructor where they could experience verbal as well as nonverbal communication" (Ryan, Carlton, & Ali, 1999, p. 275). Gibbs (1998) reported similar findings from student perceptions of the virtual-classroom experience. Even though students appreciated the online course flexibility and convenience and found it conducive to thoughtful analysis, they reported feeling isolated from peers and the instructor, and felt communication was hindered from the lack of face-to-face interaction.

Clouse (2001) also cited the most common criticisms of online classes as related to face-to-face interaction regardless of gender. Reasons from both men and women for missing this traditional form of interaction included the lack of facial or auditory signals received in a normal conversation and the additional time needed to compose or receive an email response. Some students desired more immediate instructor feedback and felt that online threaded discussions didn't give the same depth and detail of face-to-face back and forth discussions. More women missed the face-to-face interaction than the males.

However, students appeared to find online discussion more welcoming for quiet or shy students than in the traditional classroom. Benefits cited in comments included giving everyone a chance to express their opinion, time to think through responses, improving confidence and writing ability, and feeling less self-conscious or easier to disagree with others online than face-to-face.

Ten percent of the females mentioned self-discipline or self-motivation as negative aspects of online instruction (Clouse, 2001). Some women wrote that they liked and needed the instructor verbal reminders of due dates and felt that lectures were easier than discipline at the beginning of online courses to avoid failure or disappointment. Summarizing these student evaluation comments aids in the possibility of planning a positive online learning environment for students.

A sense of community can occur online through facilitating different distance groups. Opposite results occurred in the Gloeckner et al. (2000) study where "cohorts" from different regions have members that work together through their distance educational program. In this case, on-campus students making up the smallest and youngest group of Ph.D. students in the program, ranked satisfaction with a sense of academic community lower than distance learners did. On-campus students may not have as much discussion time or group effectively together for support and meeting time. The School of Education graduate program does periodically bring all cohort groups together on campus. A social climate with food is provided to get acquainted, share progress, and learn from each group's experiences or projects. This climate and total group interaction play a positive part in building the ongoing sense of community online.

Palloff and Pratt (2003) referred to findings that near one fourth of undergraduates in a national survey were more satisfied with distance courses than the classroom method, but pointed out that one third were less satisfied with distance learning. Rather than over enrolling by one-third, as an instructor they interviewed did for online courses, the authors felt the quality of offerings needed to be improved for retention. Changes for the online environment recommended that the instructor transition from an authoritarian role of providing the information, to facilitating resources and activities where the student takes responsibility for the learning process (Palloff & Pratt, 2003).

Online Instruction Design and Methodology

Transformation Process for Faculty

Articles have been published on the process educators have gone through in switching a traditional course to an online format. In his written account of a year long journey to develop a freshman physics course to utilize distance education technologies, Alley and Repp (1996) reported that two months later Alley decided he must redesign the course to fit and leverage this new learning environment. The traditional course met one night a week for three hours, not requiring a separate lab. Many were nontraditional students who commuted after daytime jobs to campus. One topic was covered each week as a lecture supplemented by student chapter reading from a text. Student evaluation comments of the class length at the end of their day and commuting problems caused the instructor and dean to examine the use of technology to improve the course. The traditional style of sequential lectures meant online learners would listen passively via two-way video to which Alley thought "it seemed obvious that ... it would be difficult to keep their motivation" (Alley & Repp, 1996, p. 51).

He began by listing features desired in the course and areas where he needed expertise in the redesign. One area was "Knowing how to use instructional technologies" (Alley & Repp, 1996, p. 52) and an instructional technology specialist was signed on to partner and help implement the changes. The author wrote that "Preparing for teaching these kinds of courses demands a collaborative approach" (Alley & Repp, 1996, p. 50). Their choice of equipment included a video camera atop his personal computer with a CD-Rom drive, a speakerphone, software for Web page authoring and to allow users at both sites to manipulate shared screen drawing. Incoming and outgoing images appeared as separate windows on the screen. Students connected through a link at the beginning of each class.

The goal for this new distance environment was to make the course more student-centered and to involve more collaborative learning and problem solving. Alley disclosed to students at the beginning that this was a new innovation for him and gave them the option of reverting to the former approach which they declined. He built assessment comments into further mid-semester changes. Schwitzer, Ancis, and Brown (2001) related this goal to student satisfaction with distance instruction. They felt students were more satisfied with instructional content when students were actively engaged through experiential learning that was also meaningful to their life outside the course.

The most systematic change made was the establishment of learning cycle sessions progressing from lower to higher thinking skills on topics (Alley & Repp, 1996). The initial discovery session was to promote curiosity and for students to record observations for later consideration. The second was the closest to lecture where mapped concepts when applied explained the previous observed phenomena. The third was for skill development where

student teams collaborated with network searches and email to analyze and synthesize concepts to an assigned project. The author did not go into detail of how each on these components were set up, but felt the philosophy of students becoming partners in the learning process was an outgrowth of his introduction to distance education that benefited everyone.

Matuga (2001), who developed an online educational psychology course, advised other instructors trying online delivery not to take or make blanket statements about either the traditional or electronic environment. Citing Fuller, Norby, Pearce, and Strand it was stated "also helpful to be aware of your own strengths, weaknesses, and preferences as an instructor when designing an on-line course" (Matuga, 2001, p.78). Recommended considerations were unique factors to the curriculum, personal pedagogical style, and the assumptions and characteristics of student learners.

Much of the literature from institutions operating distance education programs "reflect a move towards a learner-centered, active learning philosophy and away from a teacher–centered approach" (Gunawardena & Zittle, 1998, p.105). The technology and feature capabilities as well as some instructors bringing this orientation to the design and delivery of their distance courses have in part stimulated this shift. There is an interrelationship between the learning tasks, the attributes of the technology software, and the learner's cognitive process. Gunawardena and Zittle (1998) described an approach where the learner is central and in control of the learning process focusing tasks on learner-initiated inquiry and exploration and assignments balancing independent, and interdependent activities. The teachers becomes more of a facilitator than in front of the class with the primary role to guide and support the learning process by linking learners to resources and promoting interactivity with participants.

To avoid negative student feedback with distance instruction, the design of effective online interaction is an important issue. Types of interaction include learner-content interaction, learner-instructor interaction, learner-learner interaction and learner-interface interaction. Gunawardena and Zittle (1998) felt that learner-interface interaction was "often overlooked in faculty and student induction" (p. 108). Learners must first be at ease with the technology and how to manipulate interfaces in order to be able to communicate with one another. These interactive systems need instructor involvement to build virtual communities and to establish a social presence to establish online relationships. Social presence meant the remote instructor was perceived by distance learners as a real person with a genuine interest in student needs, interests, and progress (Gunawarderna & Zittle, 1998). Demonstrating teacher immediacy was advised as contributing to satisfaction with interactive learning. Schwitzer et al. (2001) also stated that student satisfaction was related to the technical adequacy of the distance system used and communication access to the instructor who needed to provide ongoing feedback about student progress.

Student satisfaction was also linked with online collaborative learning. New communication technologies facilitate group interaction for extended time periods. Group work can support group discussion by encouraging reflection and providing multiple perspectives with real-world examples. Gunawardena and Zittle (1998) said the following of distance learning designed for collaborative learning:

> Asynchronous computer-mediated communication is an excellent medium for introducing various forms of group work into distance learning and many distance educators are now adopting this medium, using the resources available through

the Internet and the Web, to design collaborative learning experiences based upon constructivist principles. (p. 109)

The instructor supports the collaborative construction of knowledge by structuring content as a framework on which to connect facts and by building ideas through social negotiation. Online collaborative learning involves the instructor in multiple roles as "moderator, mediator, modeler, and motivator" (Gunawardena & Zittle, p. 109).

Models for Online Education

The contribution that technology can make to the advancement of education stems from the reciprocal relation between instructional theory and instructional technology. Snelbecker (1999) saw instructional theory and models as an integral part of instructional technology. He felt research with instructional technology constituted both an opportunity and obligation to examine and enhance instructional theories. Instructional models can help organize the use of technology and help evaluate the influence on learning. Whether technology will influence learning "will quite likely depend on the kinds of teaching-learning activities we design with the technology" (Snelbecker, 1999, p. 670).

Many studies have been done with different delivery forms of technology; television, computers, the Internet, and multimedia systems to facilitate learning. What educators do with the delivery system, i.e. the way instruction is designed and methods used, is what Snelbecker (1999) really felt influenced learning. Once hardware and software are known, education really needs a better understanding about the ways that technology–supported learning really helps students. Snelbecker (1999) had heard both

technicians and educators use the phrase, 'Curriculum and instruction should drive technology; technology should not drive curriculum and instruction'. (p. 671)

Studies have been published to give higher education working models for online courses with options and procedures to be used in their design and delivery. Thompson and Gibson (1999) planned their distance education model for interior design around five structural elements:"1) content, 2) instructional objectives, 3) characteristics of the students, 4) length of the course, and 5) media and techniques employed" (Thompson & Gibson, 1999, p. 62). In addition, their planning process sought to meet the components of Bloom's taxonomy of learning. Knowledge and comprehension of design theories and methods were incorporated and students were engaged in analyzing and applying their ideas using technology. Opportunities were given to synthesize these ideas into a final design presentation that was evaluated from a distance. Their goal was not to replace face-to-face learning, but to integrate it with the classroom through video teleconferencing to provide education to off campus students or enhance education between different campuses. This article and other authors describe a similar interactive approach and offer suggestions to help make guided study more interactive for online methods (Alley, 1996; Matthews, 2001; Matuga, 2001, and Palloff & Pratt 2003).

Matuga (2001) stated "that the personality, educational philosophy, and pedagogical style of the instructor are critical to the successful design" of any including web-based courses (p. 77). Working with an introductory course, Matuga scheduled one face-to-face orientation with her twenty-three students in a required education course, and the remainder of the course was online. Palloff and Pratt (2003) dedicated a chapter to the importance and design of a good orientation. Students, they said, enter an online course aware of

advantages such as convenience, but are unaware of the demands online learning will put on them. They recommended an orientation that not only explained the use of hardware and software, "but also what the differences in teaching and learning are and how to be an effective student" (Palloff & Pratt, p. 65).

Matuga (2001) stated that a consistent structure to the electronic format was needed and through trial and error set up an online course containing a syllabus, activities and evaluation criteria, and a week-by-week calendar. Linking a second site to the course web site, an environment was built for all course activities. Matuga used a secure commercial site that provided services for on-line courses and grouped areas for student threaded discussions, e-mail within the course, and chat rooms. The only difficulty experienced was using the online chat, where off-campus connections were slower than on-campus connections producing awkward results. Students routinely went to the web site for course information and then to the commercial site to participate in weekly discussion activities and assignments.

Besides trying to take advantage of her teaching strengths within the selected online format, Matuga (2001) also discussed how curriculum goals, instructional strategy, type of assignments and activities, and student evaluation all need consideration for an effective online course. Regarding course curriculum, she was interested in how students viewed the content through the filter of an electronic environment. The example she gave from her educational psychology course related the topic of motivation and self-regulation to how their learning was affected while taking the course online rather than coming to a classroom. To achieve her goals, she wanted a collaborative and safe environment for student discussions. She utilized a wide variety of instructional styles in

the regular classroom and felt her challenge was to create a social-constructivist and student centered learning environment consistent with the course goals.

Matuga (2001) had used lecture and small group work, plus large and small group discussion in her traditional class. To facilitate a collaborative environment online, she decided to form four semester-long teams of four to six students for activities and discussions. The courseware allowed each team to have their own space for discussions, design modifications, and separate team chats. Though she had not utilized semester long teams in her regular class, it was hoped, besides providing different perspectives, that online teams would promote a sense of community. Anonymous midterm evaluations showed the majority of students agreed with positive outcome statements about why the teams were designed. Quotes from written comments at the end of the course described the team relationship as one of the things students would miss about the online course.

Matuga (2001) also utilized the teams for possible solutions to pedagogy problems as they arose. Their first online debate elicited pro and con responses without interactive debate. Solutions student teams gave to make future debate more effective included selection of team captains and online meetings to plan a debate strategy. Other issues arose with the online teams. Some were more interactive than others were and some students requested to change teams. When the instructor responded individually to students, they started responding directly to her rather than to the other team members. For this reason Matuga decided to direct comments and feedback to the entire group. Most students on the online course evaluation rated instructor availability as high, but some commented that they felt they didn't get individual attention. Unlike the regular class where students saw how the instructor's time was divided, "some students still

assumed that I was available to them 24/7 and that they should be receiving more individual attention" (Matuga, 2001, p. 81).

Blankenburg and Kariotis (2000) described the development of an online community college course to train tutors for education. Their two main considerations were to maintain the pedagogical soundness of the course and learning the technology software product. For similar pedagogy, they developed a lesson plan template on the shared drive. Lesson modules were then created from their text files for each of the main content areas. Supplementing the text material were quizzes, discussion forums, and Web-site links. Though accessible through email, the instructor was made available for questions and discussion during a scheduled one-hour time slot each week where students could call or come in if needed. Administrators felt this helped to standardize online course delivery at the college.

Clouse (2001), from his study of interactive communication showed it important for the instructor to provide feedback with both synchronous and asynchronous discussion methods. "The instructor should access the asynchronous threaded discussion area often, provide frequent feedback to students, and utilize thought provoking questions that promote debate to improve effectiveness" (Clouse, 2001 p.109). Student comments in the Clouse study indicated they felt it was easier to participate in threaded discussion when they knew the participants. This lead to a recommendation those instructors provide opportunities for online students to become familiar. This could include "scheduling a face-to-face, chat, or a threaded discussion for that purpose" (Clouse, 2001 p. 110). Also advised was making threaded discussions more social by the instructor interjecting humor, using stimulating questions, and for the students to use the media to ask clarifying

questions. In comparing chats to threaded discussion, however, Clouse stated that the chat discussion was fun for students, but its weakness was the tendency for social exchange rather than focusing on the concepts of the subject matter.

Feenburg (1999) was a faculty innovator in online learning beginning in 1981 in California. His experience has seen advancement in equipment and multiple ways of trying to reproduce the classroom online, but concluded that the online environment is best suited as a space for written interaction. He felt the basic medium in the classroom was speech and multi-media used to supplement verbal communication depending on available equipment. Likewise, Feenburg believed writing to be the basic medium for online expression and that learning experiences and other technologies should be organized around that to build a learning environment. Written communication was not subject to bandwidth problems, nor expensive equipment, to produce what he called poor video copies with inexperienced professors as performers. As most people formulate difficult ideas more easily in written form than speech, "interactive text-based systems actually accomplish legitimate pedagogical objectives faculty can recognize and respect" (Feenburg, 1999, p. 30).

Matuga (2001) in her online educational psychology course posted three types of assignments online. The first type was case-based discussions. A case study was presented each week to illustrate the text reading. A series of questions were posted for group discussion about the study. Besides posting their own thoughts, students were to read and respond to other peers on their team. The case study was posted on the same day each week with a one-week timeframe for responses. The second weekly assignment was a course web-based activity. Joining a discussion board on a web research topic or taking

a learning style inventory was given as examples (Matuga, 2001). The same one-week window was given with grades dependent on whether they finished them on time. The third type was referred to as traditional assignments that included the two debates as well as course papers and projects. The grading matrix and an example were posted for these assignments and they were due at different times during the semester (Matuga, 2001).

How to evaluate student learning on-line was given as another design consideration for an on-line course. Authentic assessment should align with the goals and type of activities (Matuga, 2001). Student expectations and evaluation methods need to be considered together. Scoring options for different online activities can be based on participation within a certain time frame, accuracy of the response, or by scoring against a given rubric.

In a study about women learning online, Kramarae (2001) challenged the assumption that women prefer to work in group or team settings. The majority of over 500 women, from questionnaire and interview responses, indicated they preferred independent study with many stating "that they loathe group work"(Kramarae, 2001, p.18). Many reported they enjoyed group discussion, but not group work. Reasons cited for preferring independent assignments included reliability, tight schedules, pressure from someone controlling decisions, and difficulty in quickly agreeing with methods and allocating tasks. "Teachers are more likely than students to be interested in including group work in their courses" (Kramarae, 2001, p.19).

Copyright Law and Online Lesson Development

The model selected and learning activities planned for the design of an online unit or course needs to consider copyright restrictions when posting illustrations and text

information onto the Web. As illustrations are a major component of interior design lesson development, legal issues regarding copyright protection play a significant role in the instructor's selection of online content and presentation format. Traditional course instruction has frequently in the past, selected pictures from a variety of sources including personal travel photographs as examples of design concepts. Instructors have consulted several different book sources and pulled or combined pages as printed handout material to supplement class visuals and discussion. Some experienced interior design professors even perfected inexpensive ways to produce slide collections of illustrations from different books. These practices are problematic in terms of copyright issues. Scanners today simplify the process for instructors to share and copy resources, manipulate picture size, and store files in less space than slides. These common practices are sometimes rightly and frequently wrongly viewed as fair use of material for educational purposes.

Distant education blurs the distinctions for fair use of copyright material because it can be downloaded and printed outside the classroom. Even restricted access into WebCT can be undermined with printers and attachments to transmit copies at little cost. The following will outline the factors that affect the selection of material transferred electronically by the Web. Many of these guidelines also apply to repeated use of similar materials in a traditional class setting. The purpose, however, is not to analyze practices previously and still currently done in the typical classroom, but rather understanding the legal guidelines at the onset of designing an online course.

There are published guidelines for campus instruction and research that describe and explain the legal limitations of four factors that determine fair use. The Trustees of

California State University published through CETUS a detailed overview, with meanings of each factor and legal case studies to help educators understand the Fair-Use Statue:

> In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include –
>
> 1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
> 2. the nature of the copyrighted work;
> 3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
> 4. the effect of the use upon the potential market for or value of the copyrighted work.
>
> (CETUS, 1996 p. 1)

As purpose is only one of the factors, "educational purpose alone does not make a use fair" (CETUS, 1996, p. 1). The Supreme Court even included multiple copies for classroom use in with the meaning of purpose, so this factor is not the one of concern.

Sample cases were given on the legal result of cases weighing the balance of these four factors in educational situations. Including book chapters as part of course packets printed by a commercial printer such as Kinko's was ruled as excessive use of material whose effect competed with the potential sales of the original books (CETUS, 1996). The court was more lenient when quoted work was from an out of print source to a different audience than the book was intended. Research that may lead to the result of increased profits is not fair use. A court case in 1995 ruled that journal articles a Texaco scientist did for his own research was "systematic copying that may advance the profit goals of the larger organization" (CETUS, 1996. p. 4). Distance education applies for many schools as

an additional means for the institution to bring in funding and can be operated as a separated commercial venture. CETUS wrote that unpermitted photocopying or printing also directly competed with the ability of the Copyright Clearance Center, CCC, to secure permissions and collect fees for licensed publishers.

Some institutions provide electronic reserve systems that allow storage of electronic versions of materials that students may retrieve on a computer screen, and from which they may print a copy for their personal use. The total amount of material on electronic reserve can only be a small proportion of the total assigned reading for a particular course according to guidelines initially established during the Conference on Fair Use, CONFU, in 1996 (Harper, 2002). A required written notice with specific wording is required to appear where users will easily see it with access to the work. Access by students needs to be limited to the registered course and no fee associated in acquiring their copy. Password protected accounts is one acceptable method to limit access. Without written permission from the copyright holder, posted electronic reserve items cannot be used in subsequent academic terms or taught in multiple sections (Harper, 2002). These guidelines limit electronic reserve materials to brief excerpts for a limited amount of time.

Illustrations downloadable from the internet should be assumed as protected by copyright until it is learned that the owner has dedicated it to public domain or the copyright has expired (CETUS, 1996). Though the original work may be in the public domain, the photograph of it may still have copyright protection. Students can create a multimedia production from the Internet more easily than an instructor can, because it is solely an educational project for one time use and not to be reused. It is doubtful if

instructors develop a multimedia production for a class, intending the collection to be temporary, and soon after discard it.

Following the preparation of the experimental online unit for this study, on the elements and principles of design, the Technology, Education, and Copyright Harmonization Act was approved. The TEACH Act amended the 1976 Copyright Act by giving instructors at nonprofit institutions expanded rights to more types of digital works and eliminating the location restriction to the classroom. Prepared instructional materials for password accessed web courses can now remain on the school server for use in subsequent courses. Though the law was updated to allow for digital reception from student computer, wherever they use them, the same limitations applied to upholding the "measures incorporated by the copyright owner to defeat retention and distribution" (Salomon, 2003, p.1). Though instructors may now make multiple copies, these copies need to be retained by the institution. Measures should also be employed to prevent students from retaining or redistributing works they acquire on their computer. This still relates to the student's ability to reprint. When illustrations can be used with proper notation, instructors should also inquire about technology procedures to set up for viewing only.

Wording of the TEACH Act also designated that instructional activities were to be mediated or displayed under the supervision of the instructor (Crews, 2006; Harper, 2002). Crews (2006) pointed out that the legislators envisioned distance education lessons occurring in specified installments, much like lectures, for different designated timeslots during the semester. Harper (2002) said that as a result of this wording, materials were still not covered for students "to study, read, listen to or watch on their own time outside

of class"(p. 3). Intended to protect copying from materials meant to be used by students outside the classroom, such as scanning from a textbook, it also indicates structuring the delivery of information by class dates and cautious use in assignments when instructor is available. Still with limitations and differences in copyright permissions online as compared to the classroom, Crews (2006) concluded that "fair use continues to apply to the scanning, uploading, and transmission of copyrighted materials for distance education, even after enactment of the TEACH Act" (p. 13).

Conclusion

There are several factors that influence the conversion of course content for distance education especially in the area of the arts and Interior Design. This is due to the extensive use of illustrations from multiple sources and the legal issues and technology requirements that become involved for online delivery. Online instruction was found to be combined with computer-aided design technology in distance education for interior design.

The review of literature discussed the use of online education as used in other content areas in higher education to help with additional and possibly different applications methods for Interior Design. Use of WebCT for online instruction has resulted in a pedagogy shift in other subject areas to more student-directed and interactive communication learning activities. This online software can offer Interior Design a practical method for online delivery that would be less expensive for departments and easier for faculty to learn and apply. Online software can still offer the partnership potential and ease of access to students found beneficial in other distance research in Interior Design. Both positive and negative results were shared from online research from

many curriculum areas. This information may help the expectations of Interior Design faculty initiating online courses and help them with considerations for online course design to better ensure initial success.

Academic performance was found in many content areas to be the same or better through online learning, based on final testing or final course grade received. Especially if writing was involved in assessment, the reflective thinking and shared problem solving enhanced essay results. Satisfaction results varied more with different content areas and student characteristics. Students enrolled as distance students, especially older students, had higher performance and satisfaction scores from online instruction. The pre-test post-test instrument selection was typical of many online education research studies as well as self-developed satisfaction surveys.

Written comments from open-ended questions in online evaluations revealed that lifestyle needs supported the purpose for distance education. Women had unique priorities and family responsibilities determining the need for and interest in online education. Female students, however, also had more negative issues and responses to online learning activities. More females than males missed the social interaction, face-to-face instructor interaction, and instructor-motivated direction with assignments of the traditional classroom. As the majority of Interior Design students are female, this may become a factor in performance and satisfaction for online instruction in this area.

Methods selected and used in the online design varied with the technology capabilities of the instructor and the equipment and expertise available. Administrative and financial supports were decision making factors. Primary to student success and satisfaction was the development of online threaded discussion to promote interactivity

and critical thinking through the exchange of written thought. Instructor participation was also needed and expected by students in this process to assure depth and quality. Few faculty thought planning and conducting online courses was a waste of time, but some alluded to the hours and expense involved with the need to learn and adapt lesson design to the capabilities and limitations of the program and equipment used.

CHAPTER 3 - METHOD

This chapter describes the selected research design and explains procedures used in the study to gather data. Decision-making and rationale behind the chosen methods provide for possible duplication. Participants, measures, and instruments are discussed with their associated validity and reliability. Lessons are described as designed and instructed for both the traditional and online methods. An account is given of selected statistical procedures, reasons for their use, and organization of the data for analyses.

Research Approach and Rationale

The quantitative research paradigm was selected for this study with a randomized experimental research approach between groups. The study meets the two criteria for an experimental approach by randomly assigning participants into groups with an active independent variable. The research independent variable was 'teaching method' with two levels; 1) the control group received unit material in the traditional classroom and 2) the treatment group received information on the same content in an online learning environment. The reason for selecting the experimental approach was because "randomized experimental approach is the best suited to determine causes" (Morgan & Gliner, 2000, p. 62). To infer causation the independent variable must precede the dependent variable and be related to it. No additional variable, however, should exist to explain the relationship between the two.

The general design classification, as teaching method was the only independent variable of the study, was as a single factor study with two levels. Since not all participants

were going through the same teaching method conditions, it was a between subjects design. A between subjects design compared the variability between groups as a treatment variance.

The first dependant variable, performance, measured student achievement using the 'gain score' approach. This portion of the study is diagrammed below as a pre-test post-test control group design. Participants were randomly (R) assigned using a random number table into either the intervention group (E), or they remained in the control group (C) with no changes. Participants of both groups were measured twice, the first time prior to the intervention (01), and the second time at the end of the intervention (02).

Online	R	E:	01	X	02	
Grp 1, n = 20 est						Between
Traditional	R	C:	01	~X	02	
Grp 2, n = 20 est.						

The second portion of the study measured the second dependent variable, student satisfaction, once at the end of the educational unit. This design is shown diagrammed below as a post-test only control group design.

Same sample assignment	R	E:	X	0
Grp 1&2 then the same	R	C:	~X	Between 0

Variables

This educational research had one independent variable and two dependent variables. The independent variable of 'teaching method' had two levels. It was an active variable, controlled and administered by the researcher. There were two nominal levels representing different types of instruction for the same content.

The first level, used as a control, was the traditional teaching method. A traditional teaching method was defined as taking place within a classroom where the instructor presented the information through lecture and visuals. Information was presented orally and was primarily accompanied with slides and overheads for visual examples and student note taking. In this situation, i.e. Interior Design, group discussion evolved around the analysis of design examples.

The second level, or experimental teaching method, was delivery of instruction online using WebCT software. The online teaching method was defined as instruction that takes place outside the classroom, on the students' selected time, with information delivered via computer.

The two dependent variables of the study included student performance and student satisfaction. Performance was defined as academic achievement or learning outcomes measured by gain scores determined from pretest and posttest results. Pre-test scores were subtracted from the post-test total to determine the amount of learning gained over time.

Satisfaction, or student perceptions and feelings about the learning experience, was measured with an attitude survey at the end of the instructional unit. Totals of satisfaction ratings for each teaching method, plus rating totals for information categories and individual questions to each group, were used to compare group methods using means and percentages. The two categories of information on the satisfaction survey included program evaluation information on one side of the sheet and learning activities designed for each teaching method on the other side of the survey. Rating totals for different learning activities within each teaching method were also compared to

determine if students felt certain types of learning were more effective in contributing to learning. Ratings between activities were used to determine if some were regarded as more beneficial to learning design concepts or if there was consistency between them for the combination. Literature studies showed other education evaluations looked at student reactions to different learning activities. The researcher involved with planning and selecting new online learning experiences for Interior Design, was interested in ratings and written comments about students' satisfaction with them. Distribution of scores for both dependent variables was continuous and checked for normal distribution prior to selecting the statistics test for further data analyses.

Participants

The participants for the study were students who had declared Interior Design as their major and enrolled in ID 129, Introduction to Interior Design, as the initial required course of their first year. Class size for the experiment, spring semester 2003, was 44 students, made up primarily of freshmen and sophomores. The syllabus for the course contained a unit on the principles of design, with a focus on the application of these principles to the field of Interior Design. Characteristics of the sample included a majority of females within the age group of eighteen to twenty. Though not documented as part of the study, a typical entry-level class for the department had a slight ethnic mix with a majority being in-state students from varied economic backgrounds. The spring 2003 section had two males and two nontraditional age women enrolled for ID 129.

A Colorado State University informed consent form, provided by the Human Research Committee for human subjects, was used to explain to students the purpose, procedures, voluntary nature, and confidentiality of participating in the study. All students

enrolled in ID 129 received this form. The Assistant Professor for the course, a week before the study began, read a script to the class that a graduate student would be conducting a study and become the guest instructor for both teaching method groups. The script and consent forms can be seen as Application forms for HRC in Appendix A. Students needed to submit a signed form in order for their scores and evaluations to be used as participants of the study. Students who chose not to return a signed form remained with the traditional method group. Individuals selected to take the unit online, but who preferred to remain and cover the information in the traditional class setting, were also permitted to remain. Students selected to participate in the online teaching experiment who returned signed consent forms, received an on-campus orientation on the use of WebCT at the beginning of the next class session before continuing work from home. Further directions for the use of WebCT were also posted as 'Tip for the Week' and highlighted "New" on the homepage during the online unit.

The selected sample for the experimental online group was half of the class. Participants for the online sample were selected through a randomized experimental design. Differences between student prior knowledge and abilities should have been randomly distributed between the two groups by use of the sample selection design making the two groups equivalent prior to the intervention of the teaching unit. With a number less than thirty in each group, the sample size has more variability, but the groups are homogeneous from the same class and major. There were no students who did not continue the course once the experiment began, providing a high completion rate for the study.

Sampling Design

The major type of sampling design used for the study was a nonbiased probability sampling technique. The selection of students for the online groups from the accessible population was done by a simple random sampling procedure using a statistical random number table. The current class roster was used to consecutively number those in the class from one to the total. A starting number was blindly selected as the starting point of the reference number table by a person other than the researcher. The two right hand columns were used for the two digits to select half the class. Systematically each of the numbers were looked at down the row and then across to the next column to select no repeating numbers. The last two digits from the table that matched student numbers on the roster were selected for the experimental unit. Numbers outside this range were skipped.

Initially the selected course had an enrollment of 46 students. Two students dropped the course prior to the experiment when the regular course instructor told the class they needed to be Interior Design majors to continue. The class roster of 44 students prior to the experiment was randomly and equally divided into 22 students for each of the two teaching methods. Six students did not return a signed human subjects form, thereby becoming non-participants in the study. Four of the six had been selected for the traditional group and two of them chosen for online. Though the study started with more in the online group, two online students switched from online to traditional making the actual sample size the same, 18, for both methods.

Instrumentation

Pre-test and Post-test

Questions on the performance pre-test and post-test were written to measure the course objectives described on the syllabus. The course description stated that in ID 129 there was an emphasis on the elements and principles of design. Course objectives listed said students were to know the basic principles of design theory used in design compositions and relate terminology to the design types and ways to achieve them. These objectives evolved from standards on design theory from the Foundation for Interior Design Education Research (FIDER) the professional organization that provides accreditation for Interior Design programs. The second national standard is for students to acquire a foundation in the fundamentals of design. Indicators of design fundamentals demonstrate knowledge and use of the design principles (balance, proportion, rhythm, emphasis, and harmony) transforming them from art to Interior Design applications. The final course objective was to incorporate these concepts by exhibiting creative ideas in introductory ways of visual and volumetric thinking.

Previous test questions were acquired from department exam files and requests to Interior Design faculty at Colorado State University who had taught this content, to voluntarily submit questions for use in the instrument. An email request was also sent to other university faculty through the Interior Design Educators Council (IDEC) to return test questions on the Principles of Design if part of their current instruction. Review of assigned reading, lectures, and online source content to be used in the unit was referenced to guide the choice of questions and the wording of possible responses to reflect the material. Two C.S.U. instructors who previously taught ID129, offered recommendations

and reviewed unit content and learning activities prior to the study. Measurement validity was sought by written contact to the national testing organization, National Council for Interior Design Qualification, who license practicing Interior Designers, for use of old questions related to the design principles. The reply of NCIDQ was that their questions were still part of high stakes testing, but referred the researcher to Ballast (1998) who wrote a review manual for the national test. The author provided copyright release through the publisher to use text and questions on the principles of design for the duration of the dissertation study.

Using the above sources for question validity, a multiple-choice format was chosen based on committee recommendation for the purpose of data analyses as opposed to the test format of the current instructor. The room picture provided earlier for testing analysis was used as part of a pilot test and decided that there were too many multiple and ambiguous answers to rate and score consistently. A second bank of questions was developed by the researcher to equally cover each of the five main constructs. These were again reviewed by Interior Design faculty and piloted for student responses.

Enough questions were approved for parallel versions of the pre and post-test. The random number table was used twice with these questions; first to sort questions for either test and secondly to select from these their final order on each test. The pre-test and post-test instruments can be viewed in Appendix B. Student responses to questions were recorded on the university answer sheets and scored by the testing center. Each test was made up of twenty-five questions worth two points each for a total of fifty points. The pre-test score did not become a student grade, but the post-test score was recorded as a unit grade. Online students not satisfied with their test grade, could do a 'Retake test' the

following week. The retake test was the initial pre-test. The study will use all initial post-test scores. The retake test was to adjust course grade if desired without statistical use.

Satisfaction Survey

The student satisfaction survey was a self-report instrument designed to be used at the end of the instructional unit as a posttest only. The questionnaire used a five point Likert scale from "strongly disagree" to "strongly agree". Students were given anonymity with this survey by not including student name or identification number. University answer sheets were used to record choices and for processing by the campus testing center for totals.

The Field-tested Learning Assessment Guide (FLAG) described the form, procedure and purpose of attitude surveys. The satisfaction survey is also known as an affective survey that "can provide information on student perceptions (emotions, feelings, attitudes) of their classroom experience" (Lewis & Seymour, 2003, screen 2). Seymour from the Bureau of Sociological Research at University of Colorado, Boulder, stated the reason for developing an attitude survey was to provide information on student perceptions of their classroom experience including attitudes toward the course, the discipline, and their own learning. The results help instructors identify elements in the course which best support student learning. Though this type of survey may take many forms and address a range of issues depending on the content area or lesson design (Lewis & Seymour, 2003), the instrument typically consists of a series of statements where students express their agreement or disagreement according to a scale.

The satisfaction survey for this study, given after the unit of instruction on the principles of design was developed in two sections. The initial part contained unit

evaluation statements to measure perceived differences in satisfaction between the traditional and online groups. The same questions were to be given to students in both method groups. Content for these statements initiated with the Colorado State University course evaluation form students were familiar with. Comparisons were made with other postsecondary program evaluations. Dissertations such as Switzer (1994) provided a source of self-developed evaluation surveys for studies measuring course effectiveness. Evaluation forms could be found online for other distance education programs. As a classroom assessment technique, these type of questions FLAG described as developed to determine if student needs were being met. They also help determine if a positive learning environment has been provided that meets student expectations. These sources were examined as possible models for this portion, common elements were selected, and some aspects chosen based on similarity with the unit. This list was supplemented for input to help design online learning environments and relate to Interior Design practices.

The second portion of the satisfaction survey focused on the purpose of identifying elements in both teaching methods which best supported student learning. Determining if satisfaction ratings varied between types of learning activities in each method would contribute information towards course design. Similar activities in both teaching methods may be perceived as more satisfactory in one environment than in the other. With the development of new online instruction, educators could learn from each other what works well and match it to their pedagogy. Unique applications and special purposes that online opportunities offered can help advance this teaching method for the arts. It could also provide supportive reasons for why pursuing online instruction was not

an appropriate, effective, or efficient method for the Interior Design area or course content on the principles of design.

The satisfaction survey evolved into a one page document with questions on both sides. The front side covered program evaluation questions with both teaching methods receiving the same questions. The back side listed types of learning activities different for each teaching method. Activities in each group covered the same content, but varied due to the medium and delivery. Online unit content had multiple sources and learning was more student-directed than instructor-prepared presentations and handouts in the traditional classroom. Applied activities involved different skills and end-products. Two open-ended questions were provided below ratings. The first questioned how learning activities the students rated as effective had helped them. The second inquired about ways in which to improve their instructional method for Interior Design courses.

A description of the survey goals and rating scales was written at the top of the form and read to students prior to taking the satisfaction instrument. Students both verbally and in writing were told that responses on the satisfaction survey in no way affected, or were related to, performance grade points for the class. Typical of most satisfaction surveys, the form was administered individually and rarely took less than twenty minutes to complete. Students were accustomed to course evaluation surveys using multiple choice responses, so the experience was familiar and comfortable to them. According to Lewis and Seymour (2003), students are "generally pleased that the instructor is interested" (Screen 4) in their reactions and input toward course development.

Surveys were printed on different color paper: blue for online students, and green for the traditional group. This helped assure accuracy in separating student groups when turned in with the answer sheets. Completed surveys were divided by teaching method and totaled scores used to determine means for the comparison of differences between groups and differences between questions. Copies of both Satisfaction Survey sheets can be seen in Appendix C.

Validity and Reliability

Measurements

Both developed instruments contained face and content validity by using research-based terms and applications previously used by professionals who have also measured similar outcomes in other content areas. Four of the Interior Design faculty at Colorado State University agreed to review the pre-test and post-test to validate the questions. These were former and current instructors and assistant professors who have taught the same level course and covered content on the principles of design. Given final drafts of the testing instruments, resulting from the described research process, faculty were asked to determine if questions measure what was intended, that achievement on all aspects of the topic were represented in equal proportions, and that the constructs of the curriculum were fully measured. Besides clarity in both the instructions and questions, faculty were also asked to check for equality of difficulty between tests. Judging the content in this way further supported content validity and promoted test reliability. Questions from the reference manual for the National Council of Interior Design Qualification, NCIDQ licensure exam, provided a small portion of criterion validity considered as a predictive source of students' future acceptance as a professional. These

provided examples for application and synthesis level questions, but after piloting to students were found unclear and required simplification or the inclusion of more familiar objects and end-use situations for students.

Using different, but similar questions for the post-test improved reliability by reducing the knowledge carry-over effect from the pre-test. Developing parallel forms of the testing instrument was used as a method to contribute measurement reliability. The finalized pre-test post-test versions were administered to a group of Interior Design students during an American Society of Interior Design (ASID) meeting. Revised questions developed with Interior Design committee adviser, were sent and responded to by email to additional interior design students who volunteered to take and comment on questions for final improvements. Ecological validity was gained by the use of a multiple-choice questioning format that students in the department were familiar with and comfortable using for testing. New techniques and features for online learning activities could have affected measurement findings, but it was also important to explore electronic teaching options. The content covered was the same, but the methods and sources varied with the modality.

External and Internal Validity.

External validity of the target population was lower using a convenience sample on campus rather than with groups including other design schools, but the internal validity was high by the random assignment of participants within this class to the experimental teaching groups. There was a higher external validity by selecting the whole class population and the sample represented well the introductory level student population of interest.

Being a required course for design students improved the number of completing participants. Dropouts and the amount of variance between participants was reduced by selecting content in a required course for Interior Design majors and by timing the delivery of the unit near the middle of the course past the drop-date for students. These methods also improved population validity. Data completion for late work and time for student retake testing was controlled with additional class time available after the experiment and student contact possible from the course instructor.

Ecological validity, as part of external validity was contributed by natural settings for the classroom course and by allowing either a home environment or use of the department computer labs for the online lessons. As students could access their own computers or come to a lab when convenient with their time schedule, the conditions related well to real life for ecological validity. The goal in both methods for adequate rapport, even with the online group, should have also contributed to the ecological rating. By having both groups take the pre-test and post-test in the classroom, that was a familiar process, as opposed to the online group experiencing potential anxiety with a new computerized testing system that could affect their grade. Administration of the achievement instrument in this setting maintained ecological validity and contributed reliability to the scores by reducing extraneous variables.

There was the potential for several uncontrollable extraneous variables related primarily to equipment, which could threaten ecological validity. The length of treatment time was also limited by the current instructor's syllabus. The war beginning with Iraq, during the same semester as the study, may have to impacted some student attitudes or outcomes. The best control of extraneous variables between the traditional and online

educational groups was achieved by having the same instructor for both groups. With the instructor as a constant, differences more accurately reflected the lesson design and effect of the learning environment and activities. Findings and comparisons were also more meaningful to the researcher as a result of experiencing both teaching method groups.

Research of Study

Internal validity was most strongly supported by the use of random sampling for equivalence of groups in each teaching method. Demographic data from both groups also showed equivalent characteristics in age group and gender. Data analyses included checking for pre-test equality between the two teaching method groups. There were uncontrolled extraneous variables with the asynchronous modality of the experimental online group. For findings to be generalizible, however, these same variations and occurrences would occur. What threatened internal validity also enhanced external validity and became part of measurable differences. Research reliability through replication of the study would be best achieved with the same instructor due to unique variations among design instructors and practiced pedagogy. If another instructor had access to the WebCT unit and took the time to replicate the methods for their local environment, then research reliability would be possible and consistent for similar results.

Procedure

The procedures for the presentation of information and student work were planned to be as similar as possible for both teaching methods. Both groups had visual examples, written material, and Interior Design analysis problems to apply the principles of design. Directions and assessments were for the same content, with differences in the method of delivery and setting. The research instructor's goal was to maximize the

learning potential with both methods and compare reactions to different possible learning activities within each setting. A satisfaction survey at the end of the unit rated the value of learning activities in both settings and provided a space for additional written comments. The time frame for the unit was dictated by the syllabus, involving seven class sessions during three weeks from 3:35 to 4:50 on Mondays and Wednesdays in April of 2003.

The online tasks assigned to participants in the experimental group were new experiences, different from procedures previously used and understood, and possibly more difficult for some. The viewing format for illustrations and communication was different online than in the traditional classroom. Selecting content from outside linked sources required more student location and filtering of information for needed concepts. Relating concepts, however, and observing their application at different levels in the field was facilitated through outside Web sites.

Prior to Group Instruction

The researcher prepared a script to read to the students explaining the research project. Appendix A contains the script approved by Human Subjects after modified to be read by the regular course instructor. Prior to the new unit, the script was read as an introduction and a consent letter distributed to all enrolled students. The consent form requested use of student test scores and satisfaction ratings from both groups for the purpose of the study. See Appendix A for the approved participation consent form. HRC approved the research methods after further modified to conceal student identity from the researcher and student reporting of their assigned identity number only with work to be graded.

The researcher explained the conversion of scores to data that protected student identity in the study. A contact number was given for any to call if they had further questions. Human Subjects, to approve the study, required that the research instructor not have access to student names in either group. The regular course instructor assigned numbers to students in the course to which they were given scores and communicated with online. Access to WebCT was set up by the committee technology adviser so students could log in within their number series and use 'guest' as the password. Students were asked to complete and return the signed consent form portion of the letter to the previous course instructor if they were willing to be a participant. Assignments were submitted with student numbers instead of names and only numbers, rather than names, were written on testing answer sheets.

The random sample process for students selected for the online group was explained along with the option to remain in the class with the traditional group if they had concerns or did not wish to participate in the online learning method. Selected online students were asked to attend the WebCT orientation in the Education Lab the following class. Forms could also be returned there if they decide then to participate.

Students who do not return a form were not considered participants for data in the study, but still needed to receive the content and grades for the curriculum unit. Students could switch out of the online group at any time, but their data will not be counted with the traditional group. No minors, or students identified as at-risk students were part of the class spring semester to require parent approval.

Explanation of the research experiment, distribution of the consent forms, and options explained for participation were planned for two class dates ahead of when the

content area began. The following class, one session before starting the content, all students took the pretest together in the classroom. With the completion of the test, about half the period, students selected for the online teaching method went to the computer lab for an orientation on the layout and use of WebCT for the unit. Taking one principle of design as an example, the researcher demonstrated the sequence to follow for each week. Students could follow along or watch if these chose to. WebCT log-on, communication procedures, and methods to complete and submit work were discussed. Thirty minute orientation took forty minutes due to some student access and operating difficulty.

Control Group or Traditional Method

A PowerPoint presentation was prepared by the researcher for each of the six principles of design; balance, proportion, scale, rhythm, harmony (unity and variety), and emphasis. Lecture information started in the visual slides and students were encouraged to take additional notes when expanding the content. A text, which had been used in Interior Design for more than one course, was used to assign readings prior to each topic. Interior Design visuals in the slides demonstrated the application of each principle and ways in which to achieve it. Terminology was defined at the beginning of each concept. An unlabeled visual at the end of the show was used for verbal questions to encourage application and demonstrate understanding through responses related to the picture.

Following some review questions and group discussion on the visual examples provided, students were asked to find their own room illustration from magazines, as a good example for each of the principles of design that incorporated the variety of types explained. A written assignment accompanied each room illustration to correctly identify

the principle and types shown, point out the location where used, and discuss how each was achieved with the resulting effect. There were similar individual notebook assignments, provided on a handout with diagrams for the principle, at the end of each class. These were to select and mount illustrations along with typed explanations for the identification and analysis of the different types within each of the design principles. Application room examples were brought to class the following week and notebooks were collected twice during the unit for grading.

At the beginning of the next class a few students were asked to share what they found as good examples to others in the group as a form of introductory review and communication using the terminology. A selected-numbers team activity was done as the final assignment where students created a sample colorboard for a hotel room to synthesize their knowledge and demonstrate all the principles of design used together. Finish selections included floor and wall coverings, fabrics for bed and chairs, paint and trimwork, and an art accessory. Combinations selected, the arrangement and mounting of samples, and written labels explaining choices and their application for each principle needed to be on the group visual. Score sheets were provided ahead of time to each team as a rubric to know project expectations along with directions.

Experimental Group Online Instruction Method

The WebCT lessons covered the same content to meet the same objectives as the traditional method. The online unit also had similar types of learning activities as the traditional method, but where and how information was found, used, and exchanged was different due to electronic capabilities. Both methods shared use of the same text for the course, *Designing Interiors* by Kilmer and Kilmer. The author's chapter on the principles

of design was short, so other ways to present material and illustrative examples were developed. The glossary tool in WebCT was used to provide definitions that could be referenced individually by alphabetical selection or grouped under each design principle they were associated with.

The online modality offered the unique opportunity to link to outside sources for content information. A content module in WebCT was established and organized by design principle. As students clicked on each principle, it opened to list below the concepts to be learned along with links to locate and read about this information. Information through these connections was presented within an applied or professional use framework. See Appendix G to view the format developed within the WebCT Content Module.

This online teaching method corresponded to information received by lecture and handouts in the traditional classroom. Copyright concerns were eliminated by students connecting to outside sources which provided illustration examples, rather than the instructor copying material to present in a different form. Some Web pages were created by the researcher which combined directions with links to help locate and apply specific information.

Different kinds of original Web pages were created by the researcher for ways to deliver information through the content module. The Web pages under "Section Information", supplying links about the concepts to learn, for each principle of design were created as directional sheets for use of the Web sites. Created in Word, clip art could be linked to the desired Web site, and easily converted to an html. file through the save process. Alignment and spacing was an issue with this type of Web page. See

Appendix G for an example of Word Web page for principles of proportion and scale. Diagrams of proportion and types of balance, scanned from The Design Reference Manual by Ballast, were converted to a pdf. file for viewing on WebCT. These images appeared slightly fuzzy on the monitor. Two rather complex Web pages were developed to show application of the principles of design in local residential and commercial design projects. One was of a custom home belonging to a professional interior designer who lived in a private golf course area near the city. The second was a commercial remodel design for the City Chamber of Commerce planned by a local architectural firm in partnership with an office design dealership. These teaching tools required knowledge of photography, Web page design, the choice of a software program to create them in, file organization, and learning the WebCT system to sequence and upload information needed for this content. The department digital camera, which inserted floppy discs, was used to take the pictures. Written permission for copyright approval of pictures used from these Interior Design jobs was acquired for educational purposes. Macromedia Dreamweaver was recommended by campus technology staff and selected as the Web page software due to design adaptability with illustrations. The table format to insert photos and separate text worked well to provide boundaries and backgrounds to the information. Two pages could link back and forth and one photo link to another view or related picture. Examples from these two Dreamweaver Web pages can be seen in Appendix G.

Photographs were also taken from city and educational facilities and used for analysis under team discussion. Written permission to take and use photos of the Harmony Library and of displayed student art on campus was acquired. Attention was

given to reduce the file size of photographs used in WebCT for students to download faster for home viewing and see in entirety if using a smaller monitor.

A picture gallery with descriptive information was set up in WebCT which provided the same kind of information the PowerPoint presentations covered in the classroom. This format provided advantages for download access, the capability to enlarge pictures, organized information, and limited the need for printing. Content information in the photo gallery was easily created within WebCT by adding the Image Database tool and entering information into the template. Campus pictures were used to provide an environmental connection of concepts available to students. This source also worked around copyright issues and provided a familiar theme on which to build learning. Photographs were sized for 1 ½" thumbnail pictures for gallery examples grouped under a database named for each principle of design. When students clicked on "view image" under each thumbnail they were linked to an enlarged view or an alternative view. See Appendix G for an example from the Picture Gallery using the WebCT Image Database tool. Photographs as attached data in the gallery, team discussion, or for web pages were each saved in three formats; 1) the original from the digital camera, 2) a cropped and adjusted version from Adobe Photoshop, and 3) a sized jpeg. file depending on end-use. Uploading into WebCT was best facilitated by putting both the picture files and text or web page file under the same folder.

The team discussion feature for WebCT replaced class discussion online. The actual online student sample was randomly assigned into teams to communicate and share work within WebCT. After students received the concept information through reading the text, linked to sources through the content module, and viewed the

information with campus pictures, they had a discussion assignment about a picture attached to the email system of WebCT. Students were to exchange their analysis of the instructor posted message and picture by internal email and respond back to another member in their team. The instructor could view and respond to the exchange of ideas to help support learning. Submitted examples from online team discussion can be read in Appendix F.

Both an individual and group activity was planned for the online unit to correspond with application projects in the traditional classroom. Students linked to a site, *See My Design*, to create a living room through furniture and room finish materials. Selections could be made and options viewed for flooring, wall and trim paint, different furniture and fabric combinations, and art, area rug, and plant accessories. Students were to send their final rendered picture result to team members. The second part of the site activity was a furniture arrangement layout for a family room that could be manipulated online. The space could be sized, walls and windows outlined, and furnishings and rugs inserted and moved or rotated to desired locations on a square foot grid. Colors could be applied to the selections after placed and saved in the same way as the living room rendering as a jpeg file to their computer. This picture file was to be attached to team WebCT email for sharing individual creativity and discussing results as they related to the principles of design. The assignment tool in WebCT provided directions for an additional written portion explaining the use of the principles of design. Students could insert pictures into Word for the write-up or send separately. Each student submitted their own final products, but could work either individually or with a partner from home

or in the computer lab. The room setting and components for design selections can be viewed in Appendix D.

Uploaded onto WebCT for the online final group project were two panoramas of the remodeled first floor of the Governor's Mansion in Denver Colorado. These panoramas were prepared with the permission of Governor Bill Owen's family and the expertise of Joe Mendoza in Photographic Services, part of C.S.U's central Instructional Services Office. These involved a special stabilized equipment set-up and shooting of interior spaces from centralized locations. Shots on the same plane needed to overlap each other. Lighting and color adjustments were made to equalize window and wall areas using the Adobe Photoshop program. Adobe Photoshop was also used to control density and sharpen images when needed and to size them for inclusion into the final panorama. Sized and aligned photos were connected and animated for electronic viewing using the Realviz Stitcher software program. This program allowed control for both horizontal and vertical viewing. Stitcher lined up vertices and joined the image sections for the total 360-degree by 180-degree panoramic perspective. Stitcher the rendered each composite of images as a .mov file. Students downloaded the moveable files and using the Apple QuickTime Player on their computers were able to view the 360-degree panorama. If not already on their computer, instructions were given to access and download the player for free. QuickTime Player already existed on the campus lab computers where the movie file opened automatically after clicking on the link. Guiding the mouse and using zoom options, the student had a three dimensional interior design experience moving through the space. Students could revisit the Mansion more than once

and move closer to areas to view details. See Appendix G for a copied-views composite from these panoramas.

Following the virtual field trip, students worked together as a team to present and discuss the application of all the principles used in the design. Team email provided a source for private communication in the project planning process. Responsibilities were job-shared with each student contributing a different part, and the final coordinated written Word document was sent to the instructor upon completion. The team was asked to critique and make additional suggestions to further improve or complete the remodel job of either of the two room areas viewed.

A scoring rubric was developed and posted online for both the room designs and group project of the Governor's Mansion. See Appendix E for online project rubrics. The researcher used Rubristar.com as an online resource providing a format for the grading rubrics. The site suggests categories for scoring different types of projects and listed criteria to consider. Wording could be customized to match the content area and project.

The methods, activities, and choice of photographs represented the researcher's instructional pedagogy encouraged by the review of literature. Matuaga (2001) stated the importance of the online method aligning with the instructor's pedagogy. Thompson and Gibson (1999) and Alley (1996) also wanted their technology model to meet the components of Bloom's taxonomy and established a progressive learning cycle on topics from lower to higher thinking skills. Botti-Salitsky and Kays (2002) sought to support brain-based learning theory to attach and build meaning in cognitive learning. These authors and additional ones, (Thompson & Gibson, 1999; Girand, 1999; Matthews & Weigand, 2003; Bender, 2005: Nussbaumer & Guerin, 2000) also supported

collaborative learning, critical thinking, and real-life scenarios considered important to the instruction of Interior Design students.

It was of interest to the researcher how the different online learning activities were rated at the end of the unit on the satisfaction survey. It was also of interest if the activities were rated similarly in terms of contributing to student learning. See Appendix G for the organization of the learning activities on the WebCT homepage and the process developed to advance student learning through each of the design principles. Descriptive statistical data was viewed for reactions to the learning activities of both teaching methods. The research questions determined through statistics if satisfaction was different between the traditional and online methods and if test results, after learning activities were completed, was significantly different between the two groups.

Data Analyses

Scores from the pre-test post-test and satisfaction instrument answer sheets were electronically totaled for each participant at the university testing center. Scores from both instruments were separated between the two teaching methods before running statistics. Post-test scores were given to the regular instructor as a unit grade for students matching the point value in the syllabus. The satisfaction survey indicated only which teaching method the student participated in. The individual student score results were initially used to calculate descriptive statistics for the average and mean scores for academic performance and student satisfaction in each teaching method. Pre-test scores were subtracted from post-test scores to determine performance gain scores for further data analyses of the between groups research design. A between groups design was used for the two levels of teaching method and measured achievement through gain scores.

Gliner and Morgan (2000) recommended gain score analyses for the pre-test post-test design stating it provided the same and clearer information than the mixed ANOVA approach for only two levels. The gain score analyses determined differences in the amount of achievement among the two group conditions (Gliner & Morgan, 2000). It was the type of information the researcher was interested in when implementing this study to determine if learning improved and if the amount gained differed between the two teaching methods used. Performance of the online group was being compared to the control group that received the traditional method of instruction. "The gain score approach provides the gain or effectiveness of each condition over time" (Gliner & Morgan, 2000, p. 286).

The SPSS software program was used for data entry, descriptive results, and inferential statistics analyses. Independent samples *t*-test was initially the choice of statistic to run separately on both the gain scores for achievement and mean scores for student satisfaction. For the selection of an appropriate inferential statistic, Table 13.1 of Gliner and Morgan's book was checked (Gliner & Morgan, 2000, p. 204). If the means for the two dependent variables were normally distributed, the proper parametric statistic for a research design with one independent variable, (i.e. teaching method, with two levels, control and experimental), was independent samples *t*-test or one-way ANOVA. Independent samples *t*-tests are generally used to compare two groups, as in this study with two teaching method groups, while one-way ANOVA is necessary for comparing more than two groups. Morgan, Griego, and Gloeckner (2001) stated that if findings may predict a higher mean for one group, "you may want to use a *t*-test rather than one-way ANOVA when comparing two groups" (p. 112).

Preselection of students to teaching method through use of a random number table, and not including statistics from people who left the online group, the two actual sample sizes ended up equal. Since both test scores and satisfaction totals were continuous, data was expected to have a normal distribution. The SPSS descriptive statistics printout was checked for skewness before continuing. Separate test results were ran for each of the two dependent variables, achievement and satisfaction.

With appropriate descriptive statistics ran in SPSS for data on each dependent variable was the frequency polygon and box and whiskers plot. Descriptive statistics were used on Part 2 of the satisfaction survey, (i.e. mean rating for student satisfaction with different types of learning activities in both teaching methods). See Appendix C for the two separated sheets of the Satisfaction Survey to rate the planned learning activities for both the traditional and online learning environments. Student's ratings indicated the value of different types of content in the unit as it contributed to their learning. Others wishing to replicate this study to further examine differences between these extraneous variables have access to this information.

Descriptive data were pre-screened for violation of normal distribution. If data on either dependent variable ended up skewed and markedly violated the assumptions required for parametric analyses, a non-parametric measure was selected. When the final class sample resulted in one independent variable with two levels for a between groups study, Mann-Whitney was the appropriate non-parametric statistic if data results on a dependent variable was interval or ratio rather than normally distributed. Ranking totals from the satisfaction surveys for teaching method did not end up normally distributed. With a skewed distribution of evaluation ratings, the parametric *t*-test was changed to the

non-parametric Mann-Whitney *U* to test the hypothesis of no significant difference in comparing group satisfaction between teaching methods.

Using the proposed data analyses methods and sequence discussed, the researcher was able to identify if and where there were differences between the two teaching methods related to student achievement and satisfaction. The statistics tests administered with the data had the capability to determine if significant differences existed between traditional and online instruction in achievement results and ratings of student satisfaction. Given the limitations of the study and group size, it was also recommended by the statistics adviser that the Analysis of Covariance approach supplement the data analyses for achievement. SPSS was used to factor out differences in pre-test scores between the two groups before the ANCOVA statistic test, analyzing significant difference only on post-test results, was ran to compare teaching methods. The results of the *t*-test and the ANCOVA test were then compared to see if performance findings supported each other. Interaction testing had to be eliminated without enough older participants, 25 in yrs. or above, to have age as a second independent variable to answer the more complex question with factorial ANOVA. The quantitative methods used to compare online and traditional teaching groups, contributed findings on student performance and satisfaction for Interior Design and related art courses where illustrated content, application projects, and discussion or teamwork are considered important components in lesson planning.

CHAPTER 4: FINDINGS

Statistical Results on Student Performance

The initial research question for the study was, "Is there a difference between the two types of instructional methods, traditional or online delivery, in regard to the improvement in achievement scores for the unit?" The unit of study was on the principles of design for the Introduction to Interior Design course. Student performance was the first dependant variable analyzed as resulting from the independent variable of teaching method. Performance was based on the gain score resulting from a pre-test post-test design. The two tests were not identical, but rather parallel forms of approved questions over the same content. The purpose of the experiment, with random samples, was to determine if there was a difference between the traditional instructed group and the online group in test score results at the end of the instructional unit on the principles of design.

Descriptive Statistics on Performance

A secondary research question providing supportive descriptive information asked what the mean performance scores for academic gain were for each teaching method. Using SPSS statistics software, descriptive information ran on the independent variable, teaching method, with the dependent variable of gain score, the difference between pre-test and post-test points earned indicated that scores were normally distributed for participants. The combined skewness statistic for gain score was greater than -1.0 at -.20. Used was the "rule of thumb that if the skewness is more than +1.0 or less than -1.0, the

distribution is markedly skewed" (Morgan, Griego, & Gloeckner, 2001, p. 28), and no longer normally distributed scale data for parametric statistics tests. The separate skewness statistics for gain score in the traditional group was .465 and -.373 for the online group. The positive skew for the traditional group indicated the curve shape for gain scores was slightly below or left of center. The negative skew for the online group indicated the curve of gain scores peaked slightly above or right of the central point. With verification of approximately normal distributions, the *t*-test was selected as the statistics test to measure difference between teaching methods.

The mean totaled gain score for the traditional method was slightly higher at 10.9, while the mean totaled gain score of the online method was 7.1. The traditional group performance scores varied by a range of 20 points, while the range of performance scores among online students varied within a range of 32 points. The standard deviation for gain score in the traditional group was 6.6 with variance at 44. The standard deviation of gain score in the online group was 8.0 with variance at 65. These data described the variance within groups and are summarized in Table 1.

Table 1

Performance Descriptive Information by Group

Teaching Method	Mean gainscore	Range of points	Std. deviation	Variance
Traditional	10.89	20	6.66	44.34
Online	7.11	32	8.07	65.05

Note. N = 18 in each group

Box and whisker diagrams of gain scores for the two groups visualized a larger spread of points for the online group as compared to the distribution of scores for the

traditional group. The median line for both groups was similarly placed, slightly below midway of the 50% box. The upper and lower 25% of scores extended further away from the 50% for online participants. The bottom 25 % of scores spread further down for the online group than the spread of scores for the upper 25%. This indicated a greater variation and difference between gain scores of online participants than gain scores of the traditional students. It also indicated the range of scores as greater below the median for the online group than the range of scores above the median. The supportive box and whiskers diagrams comparing gain scores between the two teaching methods illustrated the distributions of data in Figure 1.

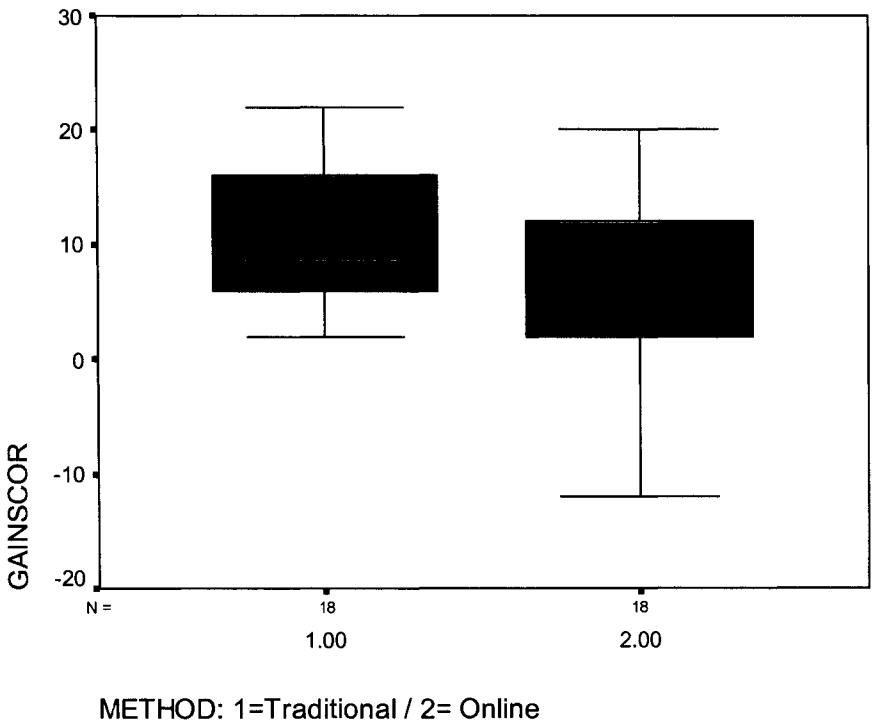


Figure 1. Box and Whiskers descriptive result on performance between teaching methods.

Statistics Test and Results

As a between groups design, comparing traditional and online teaching methods with different student groups, the choice of statistic was the parametric *t*-test since gain

scores were normally distributed in both groups. The two teaching method groups were independent samples as performance results from one group should not affect totals from the other group. According to Gliner and Morgan (2000), the "popular *t*-test can only be used when there are two levels" (p. 202) of the independent variable, which in this case was teaching method.

Though the SPSS descriptive statistics and inspection of visual graphics indicated gain scores were normally distributed in both methods, the *t*-test was still needed to determine if differences between teaching methods were significant. The *t*-test determined if the variance between groups, the difference between means of traditional and online levels, was greater than the variance within these two groups.

The Levene's test for Equality of Variances provided an *F* of .4, with a significance of .5, from which the assumption was not violated and equal variances for gain score between methods could be assumed. Using the equal variance assumed line of figures for the *t* test, the difference between the means of 10.9 for traditional method gain score and 7.1 for online method gain score, was 3.78 points on a 25-point test.

With the *t*-test values at $t(34) = 1.5$, $p = .135$, the difference between group means was not statistically significant with an $\alpha = .05$. N was 36 with 18 final participants in each method. Since *t* was not greater than the critical value of 2.0, or *p* less than .05, it could not be said that there was a difference in student achievement between the two teaching methods. Gliner and Morgan (2000) said, "regardless of what specific statistic you use" (p.174), *p* needs to be small, or less than .05, for the finding to be significant and to reject the null hypothesis. The null hypothesis was accepted as no significant

difference between teaching methods in achievement test results for student performance. The difference in the means of the two groups was by chance.

The *t*-test for Equality of Means indicated that with repeated studies, in 95 samples out of 100, the 95% confidence interval would be between -1.23 and +8.78. According to Morgan et al. (2001) "if zero lies between the upper and lower limits, there could be no difference" (p. 110). This *t*-test finding supports the null hypothesis of no significant difference in mean scores for performance between the traditional and online students.

Due to resistance of some researchers in the social sciences to null hypothesis significance testing, NHST, effect size was calculated and considered as it related to the significance statistic. Dividing the difference in means between the traditional and online groups (-3.78) by the pooled standard deviation (7.37) resulted in an effect size of $d = .5$. Gliner and Morgan (2000) interpreted $d = .5$ as medium effect size citing Cohen (1988). Effect size further defined the extent or strength of the relationship between the independent variable or teaching method and the dependent variable of performance.

Comparative Statistics Test Results

A second statistics test was run to check if results would be the same if post-test scores were adjusted for differences between groups in their pre-test scores as opposed to the use of gain score. The Analysis of Covariance approach, ANCOVA test, was selected to reduce error variance by adjusting post-test scores for differences found in the pre-test scores. "The ANCOVA procedure takes into account the correlation between the pre-test and post-test scores for each group"(Gliner & Morgan, 2000, p. 286). Like the gain score, the mixed design from repeated assessment method is reduced to a single factor design. Once adjustments were made to post-test scores, the analyses was applied only to the

post-test scores. Making these adjustments required satisfying two assumptions. The relationship between covariate pre-test scores and dependent variable post-test scores must be significant and linear and the regression slopes of each be parallel.

The ANCOVA run for this experiment was a single factor ANCOVA. Gliner and Morgan (2000) recommended single factor ANCOVA for analyses of the pre-test post-test data when participants have been randomly assigned to groups prior to the study. The statistical analyses performed by the single factor ANCOVA is similar to the single factor ANOVA less one degree of freedom. Some of the needed assumptions for analyses of covariance were already satisfied. Random sampling was used selecting students for the two teaching methods and according to Leech, Barrett, and Morgan (2005) random sampling was the best way of ensuring the first assumption for ANCOVA ensuring that observations were between independent groups. Descriptive statistics also showed that post-test scores were normally distributed, with a skewness of -.224, and satisfied the second assumption to run an ANCOVA.

A univariate analyses of variance between teaching methods and pre-test scores was run. The tests of between-subject effects showed no interaction between the two different groups of students and their pre-test scores, $F(1, 44) = .1.01, p = .322$. The statistic for significance at .322 maintained that the assumption of homogeneity of regression slopes was met. Descriptive statistics showed the mean score of the traditional group on the performance exam to be four points higher than the online group before the ANCOVA test. The Levene's test of Equality of Error Variances resulted in a significance statistic of .439 indicating that the homogeneity of variances were not

violated. The null hypothesis was confirmed that the error variance of the performance variable tested equally across both groups.

The Analysis of Covariance, ANCOVA test, assessed whether the two teaching method groups had different performance scores after controlling for differences between their pre-test scores. Results indicated that after controlling for pre-test scores, there was not a significant difference between the teaching methods in achievement, $F(1,147) = 3.36$, $p = .076$. The significance statistic of .08 was not significant, however close in approaching significance at the .05 level. The Estimated Marginal Means statistically adjusted the performance means for the traditional and online groups based on pre-test scores. The covariate, pre-test scores, did not have a significant effect on the post-test means. The dependent variable scores remained nearly the same with the traditional mean still four points higher than the online performance mean. The difference between the means of two groups was reduced by only .1 after pre-test scores were controlled.

Results of the ANCOVA supported findings from the *t*-test using gain scores. The ANCOVA adjusted mean difference in achievement scores between the two methods was 4.05. The mean difference in gain score was 3.78. The significance statistic between groups in the ANCOVA test was .08 and the resulting significance from the *t*-test at .14. Though the *F* value was higher and closer to the significance level using the ANCOVA test method, both test results support the null hypothesis of no significant difference in mean scores for performance between the traditional and online students.

In addition to the ANCOVA test for significance of the null hypothesis, SPSS results also provided the 95% confidence interval boundaries and partial eta squared figures for method from which effect size was calculated. The difference between lower

scores and difference between upper scores of the traditional and online methods were each four points higher in the classroom group. The interval range between upper and lower in both methods was the same 6 points at the 95% confidence interval. With 95% confidence the true population mean difference is within this confidence interval. Five out of another 100 sample group means, 5%, would not have the same mean differences. The partial eta squared for method was .092. Calculating the square root, the alternate correlation statistic for effect size, was $r = .30$. This statistic indicated that near 10% of the variance or difference in scores between online and traditional was explained by the teaching method used. Gliner and Morgan (2000), citing Cohen (1988), showed $r = .3$ to be the same as $d = .5$ for a medium effect. Whether calculated as d or r, both the t-test and ANCOVA resulted in a medium size relationship between teaching method and performance in the direction of the traditional method. Effect sizes provided reason to believe, with larger sample groups, that a significant difference may be found between online and traditional instruction and method means for achievement.

Class Observations Related to Performance

Six students missed the post-test and their scores were observed for variations from their main group. Five late post-test scores were in the online method and one was in the traditional method. All but one late test from both methods received 33% lower than their groups highest gain score.

Posted discussion or email dates were observed within the online group to see if participation, scored like attendance, may have played a role in test performance. Previous research (Clouse, 2001& Matuga, 2001) credited team discussion as a method to encourage student interaction online and to foster cooperative learning. For this unit, the

researcher designed team discussion around photos for design analysis to also incorporate a higher level of learning. Though performance means were not significantly different between teaching method, the variation of scores were greater within the online group. The researcher thought that participation in team discussion for the application and exchange of knowledge might help explain the variation.

Only half of the online sample, 8 out of 16, participated in team discussion write-ups. Messages sent within WebCT were separated by discussion assignments and documented by date received. Gain scores were then recorded for online students who did not participate, those who partially completed discussions or were late, and the scores of completers. Means for each type of participant was calculated and comparisons observed. The gain score mean between the pre-test and the post-test for the online sample was previously presented at 7.1. The mean of the eight online students who never sent a discussion message was the same at 7.3. The range of scores for the online students without team discussion ranged from -2 to a gain of 20, containing both the high and low gain scores for the online method. The five students of the sample who did participate and complete the discussions had a slightly higher mean gain score of 8.3 in a point range from 2 to 12. Numbers are too small however for groups within the online sample to perform reliable statistics, but participation in team discussion did not appear to be a separating factor between online students who improved more than others on post-test performance. More will be discussed about online discussion as a learning activity for interior design students under student satisfaction.

Other online discussion behaviors were observed. One was that of those who did participate, the majority did two or more of the discussions on the same date. This would

imply that students either visited lessons less frequently than biweekly class sessions, once a week or less instead, or that when they went into an online learning tool or icon, they chose to do multiple assignments at a sitting. It left the researcher uncertain if student's worked through the other levels of learning with the intended sequence of learning activities prior to the discussion of each principle of design. Half of those who participated in team discussion sent three or more on the same date in one or two writing sessions. This meant that some assignments were late and some were early for the content as shown on the calendar. One student completed both writing sessions back to back on subsequent days, while another completed all late on the last online day scheduled. A student who took a job during class time, while taking the online unit for less than a month, sent an angry email that she needed more notice now before she could be expected to return to class for a guest speaker who changed their presentation date.

Statistical Results for Student Satisfaction

The second research question was, "Is there a difference between the traditional and WebCT instructional methods and student satisfaction ratings with the unit of instruction?" Student satisfaction was a second dependant variable analyzed as resulting from the independent variable of teaching method. Satisfaction was a rated value on a self-designed survey, see Appendix B, to both evaluate the unit and to indicate how well students felt the developed learning activities contributed to their learning. A 5 point Likert scale rated how well students agreed with statements and the value of different types of instructional activities. Letter responses were converted to numbers and summed for all questions to determine a total satisfaction score for each student.

Descriptive Statistics on Satisfaction

Secondary research questions were stated to provide descriptive information supportive of findings on student satisfaction between teaching methods. The first asked what the mean satisfaction score was in each teaching method group. The second was to look for differences in student satisfaction between the types of learning activities within each method.

Descriptive information ran on the independent variable, teaching method, with the dependent variable of satisfaction scores summed for each student, indicated that scores were not normally distributed. The skewness statistic was less than -1., at -1.02, so the Mann-Whitney *U* was the test chosen to measure results. The skewness lied within the distribution of totaled scores for the traditional group with a separate score skewness statistic of -1.384. A negative statistic indicated the high part of the curve was to the right of center or toward the higher ratings. The online group satisfaction totals were not significantly skewed at -.804, but still curved right of center for a greater distribution of higher than lower satisfaction totals.

The mean totaled satisfaction score for the traditional method was higher from the traditional group at 114, while the mean totaled score for satisfaction of the online student group was 100. Out of the potential rating total of 150 points for 30 questions for the traditional group, the mean was 76% of points possible. Average satisfaction rating was 3.8 on a 5-point scale for all traditional students. The online group with 32 questions resulted in a potential rating total of 160 points. Rating technical skill and equipment gave additional points to the online survey. The overall satisfaction mean for the online students was lower at 62% of points possible. Average satisfaction rating was 3.1 on the

5-point scale for all online students. The traditional group score totals varied by a range of 67 points, while point spread of totals among online students differed within a range of 72 points. These results from descriptive statistics ran on submitted satisfaction surveys can be seen in Table 2.

Table 2

Satisfaction Descriptive Information by Group

Teaching Method	Mean Total	% Possible Points	Point Range	Average Rating
Traditional	114	76%	67	3.8
Online	100	62%	72	3.1

Note. N = 16 in each group
Maximum satisfaction total for traditional group was 150
Maximum satisfaction total for online group was 160

The box and whiskers plots indicated the median score for both groups were graphically lined above midway. "For normally distributed date, the median is in the center of the box and whisker plot (Gliner & Morgan, 2000, p. 138). The median total points for the traditional method was 121, seven above the mean, and 80% of points possible. The median satisfaction rating was 4, which from 1 to 5 indicated "Agree". Being skewed, and with one outlier with a mean score of 2.6, it clarifies central tendency to look at the median for the traditional method. The median may be a better measure of central tendency when data is not normally distributed, but rather skewed and ordinal (Gliner & Morgan, 2000).

The box and whiskers plot for the online group also showed the point spread was greater in the lower 25% of students and that the median score was more central, but still lined above midway. The median for the online method was at 104 or 65% of possible

points. The totaled median satisfaction rating for the online method was 3.3, indicating both the mean and median in the middle between "Strongly Agree" at 5 and "Strongly Disagree" with a rating of 1. There were just as many students with a total satisfaction mean above 3.5 as below 3.0 in their averaged ratings of all satisfaction factors. Even the lowest satisfaction total scores included some 4 or agree ratings on individual items. The supportive box and whiskers diagrams comparing satisfaction scores between the two teaching methods is shown in Figure 2. Findings will be more closely examined for indications of preferred online management and learning activities to aid other Interior Design instructors in planning their online units and courses.

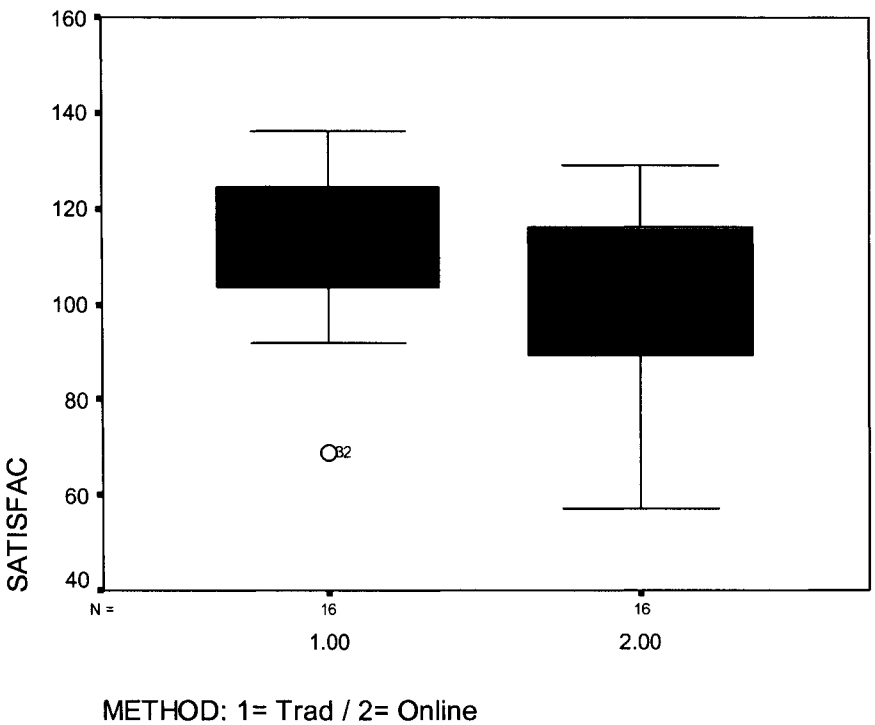


Figure 2. Box and Whiskers descriptive result on satisfaction between teaching methods.

Statistics Test and Satisfaction Results

As a between groups design, comparing traditional and online teaching methods with different student groups, the choice of statistic would be the parametric t-test if summated scores were normally distributed. The two teaching method groups were independent samples as satisfaction score results from one group should not affect totals from the other group. Since the descriptive statistics and inspection of visual graphics indicated satisfaction scores were not normally distributed, the Mann-Whitney *U* was the statistic selected to analyze data on this variable. According to Gliner and Morgan (2000), the appropriate nonparametric statistic, when t-test assumptions are violated, is the Mann-Whitney *U* test with a between groups design and two levels of the independent variable.

The Mann-Whitney *U* test ($U = 73$, $p = .038$) did indicate a statistically significant difference between the two groups. The null hypothesis of no difference in satisfaction between teaching methods was rejected. Satisfaction was a significant factor and difference between traditional and online instruction on Interior Design principles. There was less than a 5% chance that if the same instructional methods were repeated for this content in the same format that satisfaction ratings for online instruction would be the same or better than traditional instruction.

Gliner and Morgan (2000) described most nonparametric tests as converting group data to ranks where they are ordered and summed for each group. "If the sums of the ranking are very different between or among groups, then they are probably significantly different" (Gliner & Morgan, p. 227) and the result found in a similar equations table as t test results. N for satisfaction in both methods was 16. This meant

that two participants in each group did not turn in a satisfaction survey with their posttest. The researcher observed this happen with one student, who when asked about the second part said she didn't want to do the survey. This also occurred with late makeup exams given by the original instructor. The mean rank for the traditional method was 20 and higher than the mean rank of 13 for satisfaction with the online method.

The *z* score of -2.1 resulted in a two-tailed significance of .038 which is less than the significance level at .05. The outcome indicated that less than 5 times in 100 samples would the null hypothesis of no difference be true and was therefore rejected. Summed satisfaction rankings were significantly different between the traditional and online method groups.

The *z* score was used to compute the effect size. The square root of *N* (16), or the sample size, (4) divided into the *z* (-2.1) score gave an effect size of $r = .5$. According to Morgan et al.(2001) the interpretation of the correlation *r* at .5, citing Cohen (1998), was a large effect size. This statistic indicated that near 25% of the variance or difference in satisfaction scores between online and traditional was explained by the teaching method used. Based on effect size, the difference of seven points between the mean satisfaction ranking of the traditional and online groups was considered a large perceptible difference and strongly related to teaching method.

Learning Activities

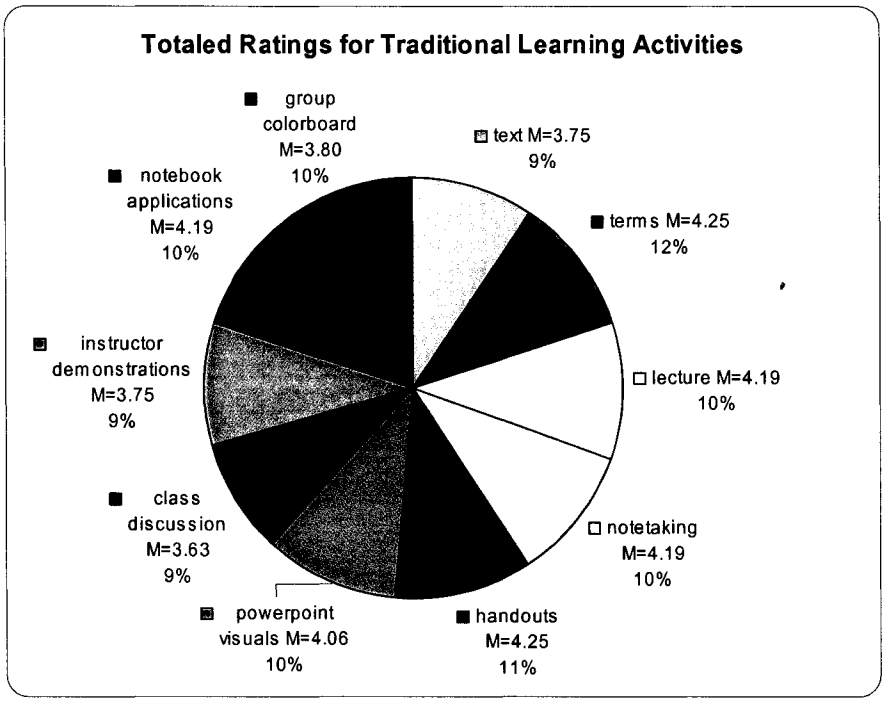
To answer the secondary research question of differences in satisfaction with types of learning activities in the two prepared instructional methods, the ratings from this portion of the survey were separated for analyses. There were ten learning activities planned for the traditional classroom group and nine different types planned for online

lessons. As the researcher designed and developed the online learning activities, it was of interest whether some of the activities were more preferred or satisfactory than others. Some of the online activities paralled the traditional type of activity, while others explored the capabilities of WebCT for an online learning environment complementing Interior Design. Student evaluations Matuga (2001) received from her new online educational psychology course showed responses varied on which type of activity students felt were more effective for learning. Besides learning online method tools and capabilities through developing the instructional unit, the researcher wanted to know how students felt about their experiences.

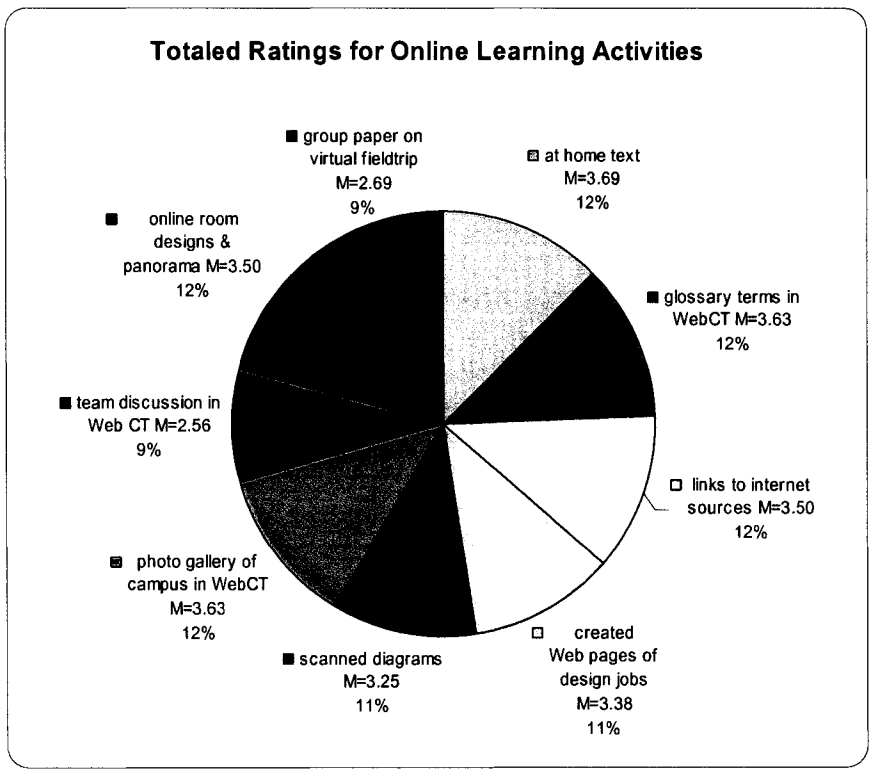
Satisfaction with types of learning activities was similarly rated on a 5 point Likert scale of how much the activity contributed to student learning. The lowest, or of little value, was 1 and the highest value rating was 5. Fig.3. shows the mean rating for each activity in each method and the percentage each activity received of the total. The pie chart visually compares activities in each method to each other with smaller pieces for less satisfactory activities. In both method charts, the sections appear fairly similar in size without extreme differences in types of activities. There was a greater range of difference in means between activities for the online method than in the traditional group. The range between high and lower satisfaction with traditional activities was 0.62 while the range in mean differences with online activities was 1.13.

In online learning activities, means ranged from 2.56, with team discussion in WebCT the least, to 3.69 for use of class text readings rated the highest. Online group project was also rated lower while the majority rated learning value of other activities between 3 and 4. For traditional class activities, means ranged from 3.63 with class discussion the least, to

Satisfaction Ratings for Different Learning Activities in each Method



Means of Agreement Scores on Each Activity
Percentages for Relative Value of Different Activities



Note. N = 16 surveys returned from both groups.
Satisfaction rating indicated level of agreement with how well each activity contributed to student learning from 1 low to 5 as high.

Fig. 3. Comparative learning value for types of activities within each teaching method.

4.25 with terms and handouts ratings the highest overall. Other traditional activities with means of 4.0 or higher for "Agree" by the majority included lecture, notetaking, notebook activities, and PowerPoint visuals as contributing the most to learning.

Discussion was rated lowest in both methods with the satisfaction mean of 2.56 for team discussion in WebCT lower that the mean of class discussion at 3.63. Group projects were also on the lower end of the spectrum in both methods, but less satisfactory online with a mean of 2.69 compared to the traditional group activity with a mean of 3.8.

The traditional group rated six out of ten activities with a score of 4 out of 5 which indicated agreement with satisfaction in learning. None of the activities in the online method averaged a rating of 4, but seven averaged in the middle with a 3. Scores varied much more between participants in the online group than the traditional method.

Table 3 and Table 4 show a more complete summary of satisfaction ratings for learning activities in both teaching methods by totaling the number of similar ratings for each activity. Ratings of 4 or 5, agree and strongly agree, were combined to indicate agree. Scores of 1 or 2, disagree or strongly disagree, were combined for disagree. Separate is the rating of three as neutral or undecided. Activities are listed from top to bottom beginning with the largest number of satisfactory ratings down to the lowest satisfactory ratings.

Learning Projects

Application projects for both traditional and online learning groups included an individual and a team project. These projects were worth the same amount of points for both groups and selected for student synthesis of the content presented on the principles of design. Individual and team projects were also worth the same amount of points in

Table 3.

Summarized Satisfaction Ratings for Traditional Learning Activities

Learning Activity	Agree and Strongly Agree	Neutral	Disagree and Strongly Disagree
Terms	15	1	0
Handouts	14	2	0
Lecture	13	2	1
PowerPoint	13	1	2
Notetaking	12	4	0
Notebook Application	12	3	1
Group Colorboard	12	2	2
Text	11	4	1
Instructor Demonstrations	11	3	2
Class Discussion	9	5	2

Note. N = 16 traditional participants

Table 4.

Summarized Satisfaction Ratings for Online Learning Activities

Learning Activity	Agree and Strongly Agree	Neutral	Disagree and Strongly Disagree
Text	12	3	1
Photo Gallery	10	5	1
Glossary	10	3	3
Online Activities	9	5	2
Internet Sources	9	4	3
Instructor Web pages	8	5	3
Scanned Diagrams	8	4	4
Group Write-up	4	5	7
Team Discussion	4	5	7

Note. N = 16 online participants

both methods. Project grades were each worth less than half the unit exam as the learning from them was intended to contribute to final performance scores. The type of project differed based on the instructional method for the best use of available media.

Traditional classroom instruction utilized the notebook collection of magazine pictures for analysis of the principles of design as the individual project. A colorboard of materials for a resort hotel room, selected for the design library, was the traditional team project. The activity selected for the online individual project was the color and furnishings selections for a living room design and a furniture arrangement of a family room both executed electronically on a Web site. The team project for the online group viewed a panorama of the Colorado Governor's mansion, created with the assistance of the campus photographic services, as the basis for analysis of the principles of design. Online teams, set up previously to identify and discuss by email the design principle shown in campus photographs, were to collectively evaluate this recent remodel of the mansion and recommend ways to complete the design.

The grade distribution for the 18 individual notebook projects of the traditional method included 10 A's, 4 B's, 3 C's, and 1 zero. One notebook was submitted late by a student who claimed to leave early for Easter weekend. One classroom student never came to any of the sessions, nor submitted any work toward notebook points.

In the online method, 12 of the 18 individual project grades was posted in WebCT with a distribution of 4 A's, 4 B's, 1 C, 1 D, and 2 F's. Lower grades were primarily a result of not attaching written explanations to their room designs as required in the online rubric for points. See Appendix E for the online individual project rubric. Of these grades, six of these students submitted their completed project correctly online. The other

six turned in a hard copy near or at the end of the unit where the instructor added points earned individually to the grade tool in WebCT. The remaining 6 instead of getting zero's were allowed by the regular instructor to later submit the traditional notebook assignments, since participating in the online unit was not to affect their grade. The researcher had planned a retake of the exam for online students with a C or less, and not satisfied with their grade, but had not anticipated that some would not do the individual online room design. As the researcher did not know names of the students in the online group, they could only be number identified and contacted by the regular instructor outside WebCT regarding work not submitted. This resulted in some continued learning after the unit exam rather than prior to research performance scores. Examples of student work from the *See My Design* Web site can be seen in Appendix D.

The traditional class selected samples from the design library and constructed colorboards for a resort as their team project. Teams were self-selected during a class session ending up with three students to a team. One traditional student who had been absent that day completed a colorboard individually. These project boards were submitted on time for grading. Distribution of grades was high with 4 of the 5 groups receiving an A and 1 team receiving a B. The individual board from the traditional student also received an A. The two students who switched from online to the traditional group also submitted individual project boards to grade. One of these came in on time and the second was submitted late. The on-time colorboard from the first student to switch from online to traditional received an A-, while the late board from the second online-switch student only earned points for a C.

At the end of the unit, when online students returned to the classroom, both groups got to see each other's design projects. Online students showed printouts the researcher made from their submitted living room designs. These students said they did about six to eight trial versions of the room design before deciding on a final version. This supported the personality findings of Diehl-Shaffer and Webber (1993) that Interior Design students enjoy possibilities and the online environment helped facilitate the viewing and comparison of multiple options.

Of the assigned online teams, two teams of four students completed the Governor's mansion evaluation with design suggestions and submitted their write-up on time. Appendix F shows the better of the two written projects. Two students asked to be together to submit one project as partners. Four students submitted individual assignments saying that other team members did not write back. One of these individual write-ups was submitted late through outside email. Four other online students did not participate in the design critique. Two of these requested to submit a colorboard late to make up for the missed online project. The other two chose to accept their grade without these project points. Of the two online teams who submitted the project, one got an A, the other an A-. The partner project earned points for a B. Of the four individually done design critiques, three earned B's, and the fourth a D. The late project received a B. Appendix E contains the scoring rubric for the online team project.

Written Comments

Two open-ended questions were asked at the end of the satisfaction survey for each method. Under the heading of "Additional Comments" the first asked which learning activity they felt was the most effective and to explain why. The second asked

for recommendations to improve their method as specifically related to Interior Design content and application projects. Satisfaction survey in different colors for the traditional and online groups can be found in Appendix C.

Comments were separated into the categories of positive, negative, and suggestions. Comments about similar content were combined and counted for frequency. There were fewer and more similar comments written from the traditional students. Online comments varied more individually and were more extensive. Written comments were received from 13 of the sixteen returned satisfaction surveys from the traditional group and from 15 of the sixteen participants who returned the survey from the online method.

Traditional Method Comments

The most frequently written response to the most effective learning activity in the traditional method was the notebook assignments on each principle of design. Eight of the students sited this saying that this application assignment "really helped get the overall principal in my head", "helped understand principles", "helped for the test", "had to apply our principles to interiors", and "gave us the opportunity to look for our own examples of the principles of design". One student credited the notebook magazine photos and explanation write-up as more helpful because "it forced me to locate the principle in practice, not just in theory." Several associated this activity as helpful because it was "hands on" and suitable for a "visual learner". One student wrote "I love the hands on-notebook & group activity", but more students had negative comments about the group application project.

Other activities sited as most helpful for the reason of visual learning was the Power Point visuals by two students and related article handouts. A student wrote that "the articles was more helpful to see the principles." A one page handout including colored diagrams was

given after each design principle PowerPoint to take home. Two newspaper articles were also handed out on design for small spaces and the Interior Design of children's rooms in which the author discussed use of principles in design decisions and results. One student listed the review of terminology as visual learning possibly for the examples passed in the room to reinforce it. References to visual or hands-on learning was found seven times in additional comments from the traditional group. This reflected earlier findings of Watson (2001) that hands-on learning was characteristic of Interior Design students.

Negative written comments from the traditional groups focused most use of the technology in the room and the pace of presentation. Three students sited "better technology" and "better power point hookups" as needed to reduce wasting of class time or starting on time. Two said to "slow down slide presentation" for the purpose of notetaking. Two students felt the group project was "kind of a waste" and though the researcher had seen previous examples of colorboards done by the same class, they wanted to be "taught how to make the design boards in a proper way" to assure making better grades.

A final negative comment written by two traditional students and seen again in the online group was more of an environmental factor affecting the research experiment than a comment on learning activities. Portfolio review at Colorado State University was moved to the spring semester of the first year in Interior Design courses. Passing this review process determines in they continue as an interior design major. Two students in the traditional class wrote that it was "difficult to continue...when you know you have not made it through the portfolio review" and that it was "stressful!" to have this near the portfolio review. This would also affect other design courses the second semester of their first year program.

Suggestions recommended by the traditional students to improve that method included comments again on technology set-up and use, preparation, clarity to avoid confusion between types within each principle, and some on content covered. One student wanted more hand-on experiences related to field work and different aspects of Interior Design as well as group project presentation time planned to "to know what other students are thinking". One student wrote "the proportion and scale stuff was confusing @ 1st" while another noted difficulty with the use of other principles in developing harmony. It was recommended to help start on time and be prepared by setting up the computer prior to class although this was not possible for the researcher to schedule. This suggestion was to allow for more "class discussion or we could have learned more than 1 or 2 principles a day". Two noted needing more on stating the subject or objectives than was said or indicated in the PowerPoint at the beginning and one wanted more depth of material written on the slides. Besides more time on board construction techniques one student also felt "projects/activities w/in class time" would insure understanding. Finally, a student liked and wanted more demonstrations, such as the different size lampshades brought in for a bedroom table lamp to better explain proportion. Her reason once again was because "I am a visual learner and those helped me a lot."

Online Method Comments

Written responses from the online group as to which learning activities were the most effective, focused more on the computer generated activities than the satisfaction survey ratings indicated a preference for. Six students had positive comments on the room design selections and furniture arrangements made on the computer screen at an Internet source. Explanations for choosing these online activities included "the room design where we could

use our creativity" and the room layout project because "it helped me to work with creating a space that met all the standards." Some wrote "they enjoyed designing the rooms" which they called and preferred as "I liked the individual project". Credit for the "hands-on feel" was given to this type of online learning and called "helpful tools".

Another positive learning activity written by four online students was the panorama experience of "looking through the mansion" which one student said "allowed me to take the definitions & apply to overall space". "The Governor's mansion activity was good" another student added as "quicktime made you feel like you were really in the room".

Four other students added positive comments that supported higher ratings of some other learning activities by stating "the text reading and glossary" as most effective, scanned reference pages with diagrams "made the most sense", and "looking at pictures & reading examples & info about the picture". One student grouped effective online learning as "pictures was fine" and that she "learned a lot from them".

Though satisfaction ratings indicated team discussion as the least liked online learning activity, three students wrote positive additional comments about participation. Explaining why she thought team discussions were "good", a student said that here "I felt like I knew the material". Another student wrote, "When we had to write about a specific design principle for the different rooms, it made you really look at and think about the room". A reason one student gave for satisfaction with the team discussion activities was that she "was able to post my discussions each time".

Negative comments were frequently about technical difficulty related to online assignments or how the instructor should deal with their computer problems differently. Ratings for the online design activities they wrote as most effective, were likely reduced by

feelings related to negative comments. One student wrote that the instructor should be more "sensitive" to student computer problems, while another wanted the instructor to be available for computer help. Most students were concerned that assignments were received and wanted immediate feedback with grade or message from the instructor.

Students liked the three-dimensional experience and manipulation possible with the panorama to view the entire first floor design of the Governor's mansion, but did not like the accumulative assignment as a group project. "The paper would have worked better as an individual project" or "No group projects! It's hard to get all the members together and work together". These comments echoed those of women interviewed after taken online courses in the study by Kramarae (2001).

CHAPTER 5 – DISCUSSION

Findings for the two guiding research questions concluded with different results for student achievement and student satisfaction between the traditionally taught group and the group receiving online instruction using WebCT. There was not significant difference between the two randomly selected groups in terms of performance test scores at the end of the experimental unit. There was a significant difference reported in student satisfaction ratings in the unit evaluation showing the majority of the online group less satisfied than those remaining in the classroom. Achievement and satisfaction will be summarized separately below with implications for instructional improvement and recommendations of further research.

Performance Results

Summary of Performance Results

Based on mean test scores for achievement, findings from students in Interior Design were similar to other curriculum areas conducting performance research with online learning. The result of the experiment within an Introduction to Interior Design course, comparing half the students taking the principles of design unit online while the rest continued in the classroom, was that there was no significant difference in final test scores between groups. The results support the argument that Internet instruction can be designed to be as effective as traditional face-to-face instruction with previous research of students in other fields of study (McCollum, 1997; Lee, 1998; Ryan, Carlton, & Ali, 1999; Switzer, 1994; Tucker, 2000; Clouse, 2001; Russell, 2005). Russel's No-

Significant-Difference generalization for online performance results in any academic area has been criticized due to nonequivalent group design with convenience class samples used in the majority of studies. Similar findings from this study, using a random sample, contributed greater validity to his theory and added Introduction to Interior Design online instruction to the no-difference phenomenon.

Results with this Interior Design course also expanded performance findings from previous distance education studies done for effectiveness with studio courses (Bender & Vredevoodg, 2002; Mathews & Weigand, 2001; North, Sterling, & Ellis, 2000) to include a typical lecture class. As the instructor, there was still concern that the greater split between high and low scores in the online group, compared to a more even distribution found in the traditional classroom group, may mean that online education was better utilized by a specific type of student than the majority of Interior Design freshmen. It did, however, show online education as a viable educational method for test achievement with Interior Design course content.

The no-significant-difference in achievement could be generalizable to all art and design content areas that instruct and use the principles of design. This result, however, was more apparent with NHST testing and not supported by related effect size. Of the two statistics tests conducted for significance, ANCOVA, more closely approached the level of significance, but both had a larger value for p than .05. The study was underpowered due to small sample sizes and should be larger to better represent the actual population. A medium effect size for both tests indicated that larger sample groups could result in a significant difference in performance. Retesting with larger samples could be acquired in another study combining more sections or continuing the study into

subsequent semesters of the same course. Similar courses could also be combined with other universities, or as recommended by Gliner and Morgan (2000) conduct a meta-analysis of other online performance and satisfaction studies. Meta-analysis would need to use a heterogeneous content area, such as housing, art, and design courses, and include the criteria of standardized achievement measurement from either experimental or quasi-experimental studies. This might be facilitated through use of the Great Plains Interactive Distance Education Alliance (A. Kotsiopolis, personal communication, June 2, 2006). This Alliance provides an online database for Human Science courses available at a distance. Rather than examining the significance statistic of relationships, an effect size would be calculated for each study and averaged for an overall index of strength of the relationships. Journals with meta-analysis articles generally include thirty or more different studies (Gliner & Morgan, 2000).

Instructional Implications of Student Performance Results

Similar performance results between the online and classroom groups after study of the principles of design, contributed data to the no significant difference side with an artistic content area where students consider themselves visual and hands-on learners. With overall achievement results the same with online learning of Interior Design concepts, instructors in this area can be comfortable using WebCT for the dissemination of knowledge. Giving reading assignments, posting handouts, and providing study notes for online viewing are easily done and accessed in the WebCT format. The glossary was an effective WebCT tool for learning definitions which could be accessed by the principle of design or alphabetically either individually or showing all for review. The term is bolded and typing an example after the desired definition is recommended. Links

to Internet sources is facilitated and used more by students in online learning. Instructors may need assistance creating links in WebCT for students, but they are a benefit for additional research and content. Many Interior Design departments have made a collection of good online sites. Looking at the dates for student site visits, it appeared that students tried to focus a block of time for the course and seldom worked more than once a week doing several assignments at the same time. WebCT recorded the time students accessed the unit and observations agree with Matuga (2001) that most students worked online during weekends and later in the evening. Students need to be advised that Sunday evening is a typical time to update sites and that some, such as the Historical site for this unit, was shut down then. Starting late or procrastination was a problem for many and possibly contributed to the variation and spread between achievement scores at end of the unit.

Recommendations for Performance Research

Additions could be made to another online performance study, for a similar interior design course, which would yield further findings. A future study could statistically compare attendance or site visits with concluding test scores to determine if there is a relationship. Though random sampling was preferred, and added both strength and significance for this study, there could be a difference in performance based on whether online learning was a choice or preference. Indicating if their preference was for the online learning method along with the test sheet could better determine a relationship between student perceptions of online education and their performance. Being able to connect student satisfaction evaluations with the test results, rather than remaining unidentifiable, would add another worthwhile research question to the study to test for an

interaction between student performance and student satisfaction between the traditional and online teaching groups.

Performance variations were greater in the online group and further research could be done to test for contributing variables. Using only the online method for larger enrollment, or more than one section of a similar course, factors questioned during this study could become variables to determine if they contribute significantly to higher or lower online grades. These factors would include charted frequency of online discussion, and evaluate written responses in terms of content and depth. An essay test performance measure could supplement the multiple-choice instrument. Similar tracking of online team participation could be correlated with performance. An online team presentation could also be explored as an alternative instrument to measure learning. Documenting hits to the different types of learning activities could support their use and preference. If the software will not accommodate this, students could be given a choice or three out of six and with related assignments indicate their preference and be correlated with grade outcome. Learning style could be added as an independent variable to the dependent variables of learning activity selection and final grade or gain score.

Performance in Interior Design is not limited to exams and comparing project scores could also be measured. Future research could delve more into online activity options and continue to adapt traditional ones to electronic format. Further research could focus on quality comparisons of written and graphic work created online and in the classroom using the same criteria. This would expand the research of Brandon and McLain-Kark (2001) to include CAD generated activities available on the Internet to compare with previous manual or small-scale AutoCAD assignments. Similar online and

classroom written assignments could be compared for accurate identification of the types of design principles used and the depth of analysis submitted. Online and classroom designs or colorboards could be compared with similar rubrics including creativity, space planning, and composition ratings.

Further research could also document portfolio review and program selection results between online students at the end of their first year and on-campus classroom students selected for advancement. This would be similar for Interior Design to recommendations by Gloeckner, Hermann-Ginsberg, and Ginsberg (2000) to further research with online Education students for completion rates and quality of research writing.

The researcher is interested in pursuing further research with the same study, for the same course, partnered with an international design school. This would take advantage of the full potential on Web instruction. Partnered student discussion, similar to a pen-pal, could provide motivation for online communication, international exchange of personal photos, and interesting comparisons of analysis and selections from cultural perspectives. Pairing U.S. students with a foreign student would expand the research of Fowler and Singer (1999) who partnered U.S. students, half at home and half abroad. This research, besides expanding performance and satisfaction results, would yield course and mechanical design features that best enable the exchange of knowledge and application activities done globally with the Internet. There are some foreign locations where the school prefers their students learning introductory material in English. Translation elsewhere would be the largest obstacle, but computer language conversion capabilities may soon exist to enable this type of research with few limitations.

Satisfaction Results

Summary of Satisfaction Results

There was a significant difference in satisfaction ratings between the traditional and online instructional methods. Total satisfaction scores and the total mean satisfaction rating to survey questions were higher from students in the traditional group than from students participating in the online group. These results were similar to Clouse (2001) whose findings showed a significant difference in overall satisfaction between the asynchronous and synchronous methods with business majors where students preferred face-to-face learning. The traditional group of Interior Design students had the higher overall satisfaction score, less of a point spread, and equalized point distribution in the upper and lower 25 percents of participants. "Agree", or the rating of 4, was the most frequent response to satisfaction questions from the majority in the traditional sample.

The online method had a lower overall satisfaction total and mean rating to satisfaction questions. There was a greater variation of scores within this group with the largest point spread in the lower 25% of participants. The middle rating of 3 was the most frequent response to satisfaction questions from the majority in the online sample. Scoring variations between questions helped to indicate greater levels of satisfaction with certain areas and activities as part of the online instruction.

Written Comments and Learning Activity Summary

Written comments dealt with different technology issues between the classroom and online groups. In the traditional class, technology complaints dealt with time needed to set up properly based on how the equipment was left by the previous instructor. Online, the technology complaints were concerned with individual operations and online sending

of illustrated project work. A few students in the traditional class commented that the team colorboard project from the classroom was less worthwhile, but more negative comments came from the online group regarding the team project. Lower ratings and negative comments regarding online team activities was different than the results of Scott (2001) who found that twice as many students preferred computer mediated meetings to face-to-face ones for group collaboration. The researcher thought teamwork may be better facilitated online after experiencing difficulty getting students to meet outside the classroom for projects. Instead, there was more team member complaints and lack of participation with online members than with the traditional class team project which required students to coordinate a meeting time outside the classroom. Many online students reacted to out-of-sight the same as out-of-mind. Weiss (2000) included a similar quote from an online instructor of a second level American Studies course on diversity. "Going to class is in your face, but online classes can be out of sight, out of mind" (p. 46).

Though post-test gain score was the culmination to measure learning through the unit, it was worthwhile to evaluate ratings given the learning activities between the two groups. Value ratings for the variety of learning activities used with the traditional method were more equally distributed than ratings for online learning activities. Students rated the text as more valuable online than in the classroom even though the information on the principles of design in the Kilmer & Kilmer text was minimal. Though considered lecture-based material the learning activities for both classroom and online learners was designed to implement different levels of learning, Bloom's taxonomy, and incorporate analysis with interactive learning. There were problems and concerns from both student and instructor perspectives in terms of developing and submitting desired visuals and design

project work in the online environment. Sources and design activities done by computer were different from the traditional class for the same learning objectives. Online application activities were selected or designed to suit and take advantage of the online environment. See Appendix D for individual room design examples done online. Appendix E contains the rubrics for the individual and group projects in the online method. The best team write-up from the panoramic fieldtrip can be found in Appendix F.

There was a lower preference for team discussion and teamwork online than ratings for the same categories in the classroom. Less satisfaction with online discussion was similar to Clouse (2001) and Ryan (2000) who also identified the source of dissatisfaction relating to discussion differences. Clouse attributed this to students being out of their comfort zone. Appendix F has some examples of online team discussion and project work if instructor pedagogy agrees with Feenburg (1999) that the best value and suitability of online instruction is the writing it enables and the benefits students receive through writing. Findings from this study indicated that online Interior Design students did not attach the same social interaction to online discussion and teamwork and were least satisfied with these activities due to the writing. Those that did participate were more thorough than typical during classroom discussion, but many online students did not participate and considered the written form time-consuming and busy work. The instructor would need to do more to build the sense of community, recommended by Matuga (2001), interject humor to help make it more enjoyable (Clouse, 2001), and communicate the significance and benefits to students beyond earning participation points. Bender (2005) and Matuga (2001) purposely selected controversial topics to more actively engage students in discussions and to share multiple perspectives. Both also

combined chat or videoconferencing with written online discussions. Interior Design courses where debate and personal experiences contribute content may receive higher satisfaction ratings using distant discussion methods. The researcher concluded that written analysis was still important for students to relate and communicate about the design principles, but better if planned as individual work to demonstrate understanding to the instructor and to schedule chats or periodic classroom sessions for oral discussion and building team relationships.

Instructional Implications of Student Satisfaction Results

Comparative satisfaction results for learning activities were worth observing for potential and preferred applications to advance online education in Interior Design. Activity ratings and written comments provided insight into students' perceptions of what was worthwhile and those they felt were less valuable or frustrating. Previous researchers have been interested in discovering how to use the Web effectively for their subject area (Gloeckner et al., 2000; Matuga, 2001) and to evaluate ways in which institutions attempt to deliver distance and online education (Alley ,1996; Snelbecker, 1999) .

Ratings and comments from the traditional classroom group supported the continuation of the long-used notebook project where students select room photos from magazines for the recognition and analysis of the different principles of design applied. Unveiling and arranging actual objects and small furnishings to demonstrate concepts helped refocus attention in the classroom. Though transferring a traditional classroom concept to the online environment, the notebook activity for students to select, analyze, and send the instructor via the Internet may also transfer positive reactions. A familiar assignment using WebCT as new software may help transition students and improve

online satisfaction. This would expand the 'Looking Journal' Williams (2004) assigned in her hybrid course where students scanned images from magazines and used PowerPoint to send and present.

Differences in satisfaction ratings helped identify what to continue and what to discontinue or improve in planning online instruction for Interior Design students. Web pages were not rated higher than other activities to justify the additional instructor time to create them. Students expressed feelings that online discussion was busy work and that projects should be kept individual. If written communication is important to instructor pedagogy, more time needs to be invested here for feedback. Palloff and Pratt (2003) emphasized for satisfaction and retention of online students that feedback be provided in six ways including " post feedback to the discussion at least twice weekly, ...let the group know that they are on track, or summarize key points" (p. 61).

Students may miss the stimulation of immediate instructor and classmate feedback and the satisfaction of being verbally rewarded. Online interior design students thought scheduled chat sessions would a better method for discussion than email. Ryan (2000) said collaboration and interaction would require greater effort by the instructor to motivate participants to communicate using Web capabilities. Almost all of his online students for a construction methods course, being similarly compared to a classroom group learning the same material, felt that interaction with the online instructor and open oral discussion was the greatest limitation of the online method. These students, taking a content area related to Interior Design, also suggested that mandatory times for interaction be included in the class format. Adopting a distance format adding video to

discussion sessions and scheduled campus visits, similar to Gloeckner et al. (2000) for education classes, would increase interaction and possibly student satisfaction.

The type of design projects seems more limited online, but technology keeps expanding design work options. Application activities have been viewed as essential to the learning process and part of Bloom's taxonomy which this study and Thompson and Gibson (1999) agreed was important to incorporate into online instruction. A real-world scenario with a problem to construct, similar to the Internet designed learning environment recommended by Burge (1977) for Interior Design students' learning style (Nussbaumer & Guerin,2000) was searched for. A room planning site was found that allowed students to make room finish and furniture selections online and create a separate furniture arrangement. They could view changes as made in flooring, window, and wall coverings. Electronically the students were able to view more options before decisions were made, but with limited styles and no ability to move objects in the elevation view. Layout manipulation was more difficult and many omitted proper wall and widow creation or did not use grid provided for proper space clearance. Difficulty and frustrated emails occurred with inability to follow directions upon conclusion of the activities to save as jpeg images and upload onto the WebCT assignment page. Gunawardena and Zittle (1998) and Alley (1996) also strived for collaborative learning and problem solving, but problems operating the computer detract from the desired learning process. The researcher concluded like Blankenburg and Kariotis (2000) that it would help to schedule a one-hour time slot each week where students could call or come in if needed. It is also recommended at this beginning level that students save and submit on a disc at a designated drop off place or print out and mail in. Students feel more assured if they use

regular email route to send information and check that it went through. They either want the instructor to respond immediately that illustrations were received or software is preferred that gives them a received message.

Be prepared to use regular student email, outside WebCT, to contact those who you find have not participated online after the first week or second week. Some will claim to not be able to log in, to not understand, or to have forgotten the log in procedure. They may claim you never tried to reach or help them until later, claiming the instructor responsible for their lower grade. Instructor expectations when a student skips class appeared to be different from online participation and more complicated with online students to separate lack of participation with procrastination or student difficulty. Instructor also needs to keep up to date with personal email for work submissions and student problems. It is recommended to load a separate grade file onto WebCT for those who do not submit under assignments properly for posted grades and to enable separating grade easily if requested to send record through their outside email.

Recommendations for Student Satisfaction Research

Again, there are additions or alterations to this study that could yield more information about student satisfaction of interior design students with online learning. A study using an interior design course where students may enroll as an online student could reinforce if selection of the distance learning method yields greater satisfaction. A further study may try to determine if similar descriptive characteristics exist for learners who select online learning.

As the researcher saw an initial negative attitude displayed toward the online learning among students within the sampled class, it is recommended that a study of

Interior Design student perceptions of online learning be done. Perceptions can affect attitude and ultimately satisfaction with the development of further online learning for interior design. Clouse (2001) also noted that students were resistant to trying new techniques for learning. It could be helpful to determine what aspects of online learning these students feel negatively about and if online planning can alleviate these feelings. A qualitative study or portion could take those students who agree with or use a phrase similar to "I don't learn well that way" to further define the reasons or type of learner. Similarly, students who do look forward to online learning could contribute differences in their perceptions.

Besides self-choice of the online method and self-perceptions for preferred learning method, another recommendation toward online satisfaction studies is length of course and experience with technology or previous online instruction. This study developed an online unit for a major component in the Introduction to Interior Design course, but due to the existing instructor's syllabus, was just a portion of the course. As the researcher noted procrastination and difficulty adjusting to new procedures, the question exists if satisfaction would have improved over time or with greater exposure to techniques used. Though some of the class students expressed that they did not like previous online psychology classes and had changed their major to Interior Design, more classes continue to go online and the number of WebCT experiences may affect comfort level and reduce frustrations with technology use. As an introductory class, these students had also not received the CAD training for Interior Design. Upper level students using technology in this capacity may have a different satisfaction level with online courses and learning activities done and sent online.

Maturity or class level may have been a contributing factor to the broader variation of scores and ratings from online students. This would agree with studies done by Tucker (2000), Weiss (2000), Kramarae (2001) and Palloff & Pratt (2003). The researcher noticed a lack of self-motivation or problem solving among many introductory learners. A need was felt to be in contact with the instructor or other students to decide what to do or reinforce their action before proceeding. As Interior Design students transition from lecture through labs that involve more experimenting for results and time planning for projects, this maturity may direct more positive results with online learning at higher level courses. This agrees with Weiss (2000) and Kramarae (2001) quoting online instructors and their students who both said self-motivation, discipline, and being self-paced was necessary to succeed and not become overwhelmed online. Freshmen, who have not adjusted their study skills for the college level, may lack the self-discipline for the online method making it better suited for upper level courses. Palloff & Pratt (2003) said that adult learners differ from traditional undergraduates in the degree of structure they need and those adults online "have an easier time organizing tasks with one another and working toward a successful outcome"(p. 35). Kramarae (2001) reinforced this by stating many respondents in her study said "online courses are more likely to be a good fit for older women who are more focused on goals and less on social interaction"(p. 19).

The desire to maintain social contact also influenced the online group. Though intended that the online Interior Design students would work independently from home, the researcher found out the reason for multiple project files submitted with the wrong extension resulted from a group of students gathering at one of their homes to work on it

together. Similarly, this explained emails close together about a Web site naming others students having the same problem. This student behavior matches the personality findings of Watson (2001) and Reinhold (2004) demonstrating a people-oriented preference of Interior Design students with a desire for consensus in making decisions. More research needs to be done to explore age and other student characteristics as variables and to determine the best Interior Design courses to offer online. The researcher currently agrees with Palloff & Pratt (2003) that required courses, such as this one, be available in both formats, traditional and online.

The researcher wishes the sample had been larger and more mixed in terms of age level and gender. Due to small numbers, these variables had to be eliminated for this study, but recommends further research continue to determine if online learning of interior design varies between men and women and older versus younger students. Combining larger groups of learners, perhaps across campuses, could yield a stronger correlation study to connect online learning with different variables such as age, gender, technology skills, previous WebCT use, and preference of teaching method.

Online Design

Instructor Reactions to WebCT

Much of my personal reaction to WebCT relates to time requirements on the Interior Design instructor to develop online courses as initially researched by Bender and Vredevoogd (2003). I also support Brandon's summary (1999) that the challenges of technology- based instruction continue to be the researching of available tools, which to purchase and use, creating online lesson materials for students, and solving electronic and logistical problems. Part of the time demands resulted from lack of technology assistance

as needed and perceptions of Interior Design faculty regarding the content they wanted to see in online lessons. University IT training at the time the researcher developed the unit was limited to program potential and orientation for student use. Little was available on how to use the software tools other than an outside appointment at their central location. A personal decision to finally learn by trial and error with more specific questions along the way to an adviser in Education with WebCT experience brought the unit together. Both Brandon (1999) and Girand (1999) credited university WebCT training and technology team assistance to create online supplements for their courses.

Picture selections and manipulation multiplied preparation time for the unit. The practice in the Interior Design department to use multiple sources for information and illustrations did not approve a single text source for the postsecondary level with enough content on the principles of design. Other subject areas typically use an accepted text as the source of pictures rather than creating educational visuals. There was also the expectation that most of the online unit would be created by custom Web pages. Macromedia Dreamweaver software was recommended by IT and lab techs for Web pages when needing to incorporate photographs.

As a student again, taking a Dreamweaver course online through a different department, the researcher did not quickly learn to adapt the tutorials to the creation of personal Web pages. The learning curve was compounded with the expectation of high-end design work photos and strict copyright regulations prior to the education amendment. Though satisfied with the level of learning variation achieved in the unit, and a large library of pictures filed, cropped, adjusted, and sized for Internet transmission, the amount of time taken to prepare the unit was disproportionate to the time students spent taking it.

This is in agreement with Girand (1999) that an important aspect to Interior Design instructors first using the online method is the logistics of developing items, along with the technical support available, and the division and coordination of responsibilities. The researcher felt suggestion of paid technology assistance for faculty, preferably with leave time and media team assistance, would encourage instructors to pursue online lesson development.

This is also in agreement with administrators in the study by Kramarae (2001) who supported faculty by releasing a full term without other teaching to develop an online course, instruction of just one other course the first term they taught online, and an additional thousand dollars per web-course taught. One said that without adequately supporting online faculty "nobody will want to teach these courses, because there are just too labor intensive"(p. 30). An option for online Interior Design instruction is to accept a format more limited to courses that primarily use a text with sufficient illustrated content. Supplemented PowerPoints would consist more of text and public domain illustrations presized for Internet use. Recognizing the need for copyright released illustrations, more is available now through collective sites from professional organizations such as IDEC.

The researcher agreed with Brandon (1999) that WebCT offered good organizational tools with templates for customizing a Calendar, Glossary for terms, easy to use Photo Gallery, and internal email for private team discussions. It takes more advance planning time, however, to have everything ready and posted at the beginning than to do partial planning before scheduled class times. It was also difficult to write clear and concise directions related to online learning activities. To add or reword later, when a problem was observed, would not catch the attention of students who print out

everything when they begin. Having also worked in the campus computer lab, the researcher wanted students just to view color illustrations on their screen, rather than print them, to save supplies and expense. Students, however, had not transitioned yet to viewing and sending written material or pictures without printing. Though information remained on the course site, most wanted to print a hard copy as study notes. Online instructors need to set up their WebCT course sites to prints multiple slides or illustrations to a page and size or block the printing of some pictures or pages to help conserve. Otherwise more paper and resources end up being used, rather than less, due to computerized instruction.

The Department Head had suggested this research to see if online courses would help with the large numbers who enrolled for the Introduction to Interior Design course. By the conclusion of the experiment, I would not recommend online education as easier management of large numbers, nor recommend the method for new freshman and sophomore students. Student procrastination, lack of responsibility to team members, the amount of cyber-excuses for unsubmitted work, and the student expectation of immediate feedback from instructor and reply to personal problems would potentially make online education for large underclassmen courses more difficult. Adding additional outside students to already large classes as online students would also increase the instructor workload. Palloff and Pratt (2003) and Kramarae (2001) expressed similar points of view regarding class and group sizes. Administrators in Kramarae's study, with successful online programs in terms of retention and satisfaction ratings, indicated that "Web-based courses need to be much smaller than many of the large lecture courses now offered in

traditional programs" (p. 30). The attributed this to the observed need in this research to monitor the interaction in small groups and guide or support discussions.

The researcher spent a great deal of time responding back to student written responses to aid correct learning or depth of analysis. Frequently their answers were more opinion than applied concepts and the online instructor, to clarify or expand answers, will spend more time responding individually online than building onto responses during classroom discussion. Gunawardena and Zittle (1998) supported reactions that distance education requires more preparation time than the classroom and that there were additional roles involved. My experience matched feelings of other surveyed distance educators that roles expanded in terms of technology expertise, graphic design, librarian for electronic resources, editing, and evaluation. Benefits of the online method, however, ensure that snowy weather will not shut down classes or that students will miss learning due to an ill instructor. The researcher, like Matuga (2001) felt that designing and teaching the online unit was an excellent learning opportunity and unique experience, and that I would teach another web-based course, but similar to her introductory psychology course, not select this particular introductory Interior Design course to further develop for the electronic environment.

The researcher experienced limitations in using WebCT software that may change with new versions. These reactions were journaled as they occurred during course planning and execution. Email messages to students within WebCT would only insert one name at a time rather than the ability to send to multiple students. Could copy/paste additional names, but still needed separate headings and took additional time. If the instructor made an error when composing a discussion message, corrections could not be

made, and had to be redone. WebCT can freeze during a design session and links to sites unavailable to students during unknown times for maintenance. If the instructor tries to allow late submissions, or permit multiple submissions for students who make a change or are unsure they sent work correctly, assignments cannot be viewed and grades posted for those already submitted because message said "unavailable". The Tip Tool was helpful to add forgotten information or provide for multiple students. This message format was bold and the first thing students saw when logged in, so it is recommended to keep brief, positive, and refer to other homepage sections or this may be the only thing students read. The instructor after planning or changing a section should go into the Student View to check. There can easily be unexpected differences than intended. It is helpful to know Web Page design for best use and control in the Content Module. Students had difficulty submitting work in the Assignment Tool despite differently worded directions posted in two locations. They did not know or understand instructions on how to save picture file extensions and insert into Word to continue written explanations. Some students would attach a file under WebCT discussions, but fail to "post" before sending and then needed to rewrite. Confusion occurred when students used Word Perfect at home instead of the full version used in conjunction with WebCT. File extension, wps., was different and did not open for students to know was received and needed to be converted by the instructor to open and score.

Recommendations for Online Course Design Research

More research is needed to document satisfaction with the format used to design online courses for interior design. Comparison of different methods for the same course could help instructors know which sequence and combination of learning activities

produce the best online learning environment for Interior Design. If as an instructor or teaching assistant the researcher was to teach this course again, the goal would be to use written comments and behavior observations to alter and expand to additional online units for the course with greater student satisfaction. Experiences as a first-time online instructor contributed evaluation toward the prevention of online course problems. Schwitzer, Ancis, and Brown (2001) identified that in terms of designing distance learning units, this research was in the entrepreneurial and collectivity stage and agreed that planning decisions are based on research information about existing successes and evaluation findings.

The researcher now questions whether a different orientation or initial survey, used at some institutions to qualify students for online learning, would have improved student online operations and satisfaction. In a source after the experiment, Palloff and Pratt (2003) recommended a comprehensive orientation that contained a list of elements. These elements included time requirements and time management, different roles of the instructor and student in online courses, expectations for evaluation and communication with other students, rules for interaction, and how to get help when needed. Further research could determine if a relationship existed between student performance and satisfaction to the use of a self-assessment instrument and comprehensive or sequenced orientation prior to online learning with similar factors rated again at the end.

Offering an on-campus help session once a week or having a face-to-face group planning session prior to team work would be ways to utilize student comments to improve online learning for this experimental course. This matches the decision of Mathews and Weigand (2001) to organize a face-to face meeting of design groups in

order to facilitate greater online collaboration. Though the orientation had a demonstration screen and hands-on computer use to locate directions and understand the learning sequence for each concept, it may have been beneficial to save and submit a sample online assignment. Format comparisons could include a hybrid approach between class or lab time and online work. Perhaps hardcopy or disc drop-off with project work would eliminate uncertainty about receiving it and instructor emails for immediate response.

Other ways to simulate and support a more social environment, such as a student picture exchange, may help satisfaction and rebuild interest in teamwork and online discussion. Further study similar to Singer (2001), evaluating online communication methods and assessing perceptions of participant's interaction, is needed to improve entry level Interior Design student communication and collaboration in an online environment.

The instructor must decide based on pedagogy and quality assurance how to approach the online course design. See Appendix G for the instructional design format developed for the research unit. Instructors initiating or expanding Web instruction, such as Mathews and Weigand (2003) will continue to want to evaluate the effectiveness of the tool and learning activities designed for their educational goals; especially if the tool or developed activity provides a unique opportunity through technology that is not typically available for classroom use. The goals for Interior Design put additional demands on distance education to include collaboration, hands-on experiences, and spatial manipulation with 3-D visualization skills. Further research opportunities and challenges exist to advance technology teaching in new ways and overcome the difficulties in duplicating design lab experiences online.

One format for all online delivery is not likely to meet the needs of different curriculum areas, nor the needs of each course within a specific major. More research toward improving online design for Interior Design courses could contribute possibilities and document procedures that work well, from which instructors could incorporate with greater assurance. Presented and published discussion and results from further and varied online instruction could help establish best-practices for online courses in Interior Design and the arts. Palloff and Pratt (2003) published sample WebCT pages they designed. The researcher would incorporate their "Discussion Questions" guideline page, (Palloff & Pratt, p. 73) with the expectation for separate day submissions and explanation of quality related to cited use of Internet sources and demonstrated levels of critical thinking.

Pursuing and comparing a constructivist designed online course rather than the more typical behaviorist approach with lecture note conversion to online delivery, is a recommended direction for further online research. Brown (2002) advised faculty developing content for online delivery not to merely convert PowerPoint slides to HTML and call it Web-based education:

> This method is both common and produces large quantities of content, but has highly questionable learning value, especially among adult learners. More creative thinking and programming is required to create highly interactive learning environments and simulations that closely replicate the workplace environment. (p. 15)

Brain-based learning theory has indicated that adding novelty and problem solving challenges helps to promote learning. As technology capabilities continues to grow and

be combined, researchers like Switzer (1994) and Snelbecker (1999) will continue to be interested in reactions to online format selection and the design of different learning activities. Some may enhance learning or be preferred over others or better suit different type of learners. Research comparing learning style with varied online learning activities is also recommended to better serve individual student needs.

The Colorado Community College System is setting up a standard format for all online courses and preparing them for storage and delivery from a centralized location known as CCCOnline. Crews (2006) felt a consequence of the TEACH Act, due to greater institutional responsibilities and liability with complexities that still exist with copyrighted materials and storage, that the "pursuit and regulation of distance-education programs will become increasingly centralized" (p. 4). During the summer CACTE Conference, Colorado Association of Career and Technical Education, Netzer (2005) presented information on the migration and platform recommendations for future online courses saying that decisions had not been finalized. Research can contribute to online course instructional design decisions. He explained that a common platform would provide students consistency between courses and help with online quality assurance. Application of the TEACH Act supports a format that would set up the Content Module by class date or week in order to use materials defined by Cook (2006) and Harper (2002) for mediated instructional activities. A couple of the online Interior Design students verbally expressed at the end of the experimental unit that though they like the varied activities, they wished they could all be listed under one place. Use of the different tools in WebCT did not appear to set up this way, but students to check previous information

while responding to a discussion question or to review for the test preferred everything for each principle be listed in the content module for faster access.

Faculty teams for the state community college system, CCCOnline, are to design courses for different content areas and be taught from a pool of hired instructors (Netzer, 2005). Further research can inquire if instructor selection or course platform make a difference with students and if either is more important. Data received through a central location can help increase sample numbers for further research of online educational concerns. Some women in the study by Kramarae (2001) thought that as they became familiar with computer-based communication and had more online course experience that they would be more positive about this method. Follow-up research on students continuing with courses through CCCOnline, or another online degree program, could help to verify.

An additional area for further qualitative research with course design would be with instructors who have already done online instruction. Research would gather information from experienced instructors on old and new methods used and changes they made after their initial online course.

Conclusion

This study showed that there appears to be no difference in learning performance with students who are taught interior design principles in the traditional fashion and those taught using the developed experimental online method. It is apparent that enough data and written suggestions were provided to modify the online unit for further research with the same introductory material to see if student satisfaction with online instruction improved. Though random selection of student sample is preferred for equivalency

between participants, satisfaction and participation in online activities may be greater with students who choose to take an online unit or course. Greater numbers of students participating online would enable further study for statistical comparison of types of learning activities that can be developed in WebCT.

Score comparisons on other learning activities in addition to the final exam could enrich study findings. Instructors spend a great deal of time with online content preparation and may feel it beneficial to better know which WebCT components are most used, appreciated, and contribute to learning from a student point of view. This would help direct staff development in WebCT as well, especially for the area of Interior Design. Being aware of options within WebCT allows instructors to also select the type of activity design that best matches their educational pedagogy.

It would be interesting to see if students were given the choice, with other units developed for this course, whether to come to class or do the lessons online, if the number choosing the online method would grow as the semester progressed. Use of online instruction for upper grade levels as opposed to freshman or sophomore classes appeared beneficial for greater maturity in self-discipline to participate without procrastination and excuses. This should also be verified by further research with data on grade level and access frequency related to performance and satisfaction. Measurement of design problem analysis, in essay format with qualitatively methods, may further research findings documenting growth of cognitive synthesis and writing skills. Though this study used subject matter almost universal to the design area, content of further research focusing on higher level courses and higher level learning could yield findings identifying where to best expand the application of online instruction. Student perceptions of how they best learn and where to

apply online instruction would be a good starting point for further studies now that it has been observed that Interior Design students have strong attitudes about the type of learning they need and that their initial attitude seems to affect their participation and satisfaction with online instruction.

A hybrid format is recommended to provide sequenced orientations and technology help sessions as well as help build a social context for team support. To support success and improve satisfaction, instructors should expect to spend time explaining the differences and expectations of online learning to students, contact non-participants, expand team discussions, and develop electronic guidelines for teamwork. The electronic environment provides opportunities outside the classroom to virtually visit design locations multiple times and quickly view options for room selections. As students become more familiar with electronic learning and creative design scenarios expand on the Internet, online education is a viable teaching method applied to Interior Design courses. Courses selected for online learning should benefit from multiple perspectives discussing more debatable issues and cover content where Internet sites provide a wealth of professional information.

Kramarae (2001) highlighted the need for further research in this area with a written comment from a vice-president of education in a company that provided online learning support and tutoring, that there are few studies that look at the process of learning online and the perspectives of those involved. More needs to be documented and improved if, with the continued growth of online courses, it becomes true that online instruction has moved in the mind of consumers from experimental to mainstream and driving the growth of higher education (Carnevale, 2005). The researcher agreed with Thompson and Gibson (1999) that when distance technologies are properly integrated and managed, in this study

asynchronous education through the use of WebCT, the learning experience can be enhanced and the opportunity brought online to new populations to learn more about Interior Design.

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APPENDIX A – APPLICATION FORMS FOR HRC

COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

TITLE OF PROJECT:
Differences Between Online and Traditional Teaching Methods About the Principles of Design

NAME OF PRINCIPAL INVESTIGATOR: Professor Teresa Yohon

NAME OF CO-INVESTIGATOR Ph.D. Graduate Student Julie Charlson

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:
Julie Charlson (970)223-7484

PURPOSE OF THE RESEARCH:
This study involves research in the development and use of online instruction for Interior Design. The purpose is to determine if web-based lessons can be as effective as traditional teaching methods used in a classroom. Learning gains and satisfaction ratings on both teaching methods will be collected.

PROCEDURES/METHODS TO BE USED:
ID 129 has been selected as the course to compare teaching methods for a Principles of Design unit. The Principles of Design unit is an important unit in Interior Design. Your class will be divided into two groups using a random number table. One group will continue to learn using the traditional teaching method, combining lecture with visuals inside the classroom. If you are part of this group, learning will take place in the assigned classroom at the same location and time as your previous classes. The second group will study the same unit content online using WebCT. If you are in the online group, you will have a WebCT orientation session in the Education Lab. Online students will then spend the remaining time on the unit via WebCT. A home computer or a computer in CSU computer's lab can be used to access WebCT.

Discussion questions, individual assignments, and a group activity will be part of learning in both groups. The traditional group will have oral discussions. The online group will communicate with classmates and the instructor using WebCT email and discussion boards. For the online group activity, the discussion board will be used.

Everyone will take a pretest before the unit begins. A posttest will be completed when the unit is done. Both groups will take this test in written form in the regular scheduled classroom. Time needed to complete these tests will be about an hour. The posttest score will be recorded as a grade for the course. The difference between the pretest and posttest scores will be used to compare learning gains between the two teaching methods.

Everyone will also fill out an anonymous satisfaction survey. Both groups will complete the survey in class after the unit. The satisfaction survey will take about thirty minutes. Satisfaction scores will be averaged from the evaluation forms for each group. They will be used to compare student's feelings during both methods of instruction. Pretest nor the satisfaction survey scores will not be posted or affect your grade.

RISKS INHERENT IN THE PROCEDURES:
No risks are expected for participants in either teaching method that are greater than risks in your everyday student life. Time spent on computers will be spread out over the unit time. The amount of time in class and for assignments will meet normal college guidelines for three credit hours. Learning potential and the availability of assistance is the same for both traditional and online teaching groups.

BENEFITS:
Both groups will benefit from in-depth learning on the principles of design. You will help educators discover if online learning can be used effectively for visual subject matter. Participating in the online unit may also benefit your personal computer skill. You may find that computerized learning works well for you, which later in life can give you more options in taking additional online courses.

CONFIDENTIALITY:

Only your posttest score will be entered in the grade book as a unit grade. This is the same as for other tests in the course. Pretest scores and your improvement between the pre- and posttest do not affect your grade in any way and will not be available to the regular instructor. Research data are entered using participant numbers, (1-50), with no names, and are not in alphabetical order. Both scrambling the order and reassigning a participant number assures confidentiality of individual student scores. Data findings use group averages rather than single scores. No student names will appear in the written report. Data records used for the research will be locked and stored by the lead researcher for five years and then discarded. They are saved for this period of time only to verify information if questioned by other experts about the findings.

LIABILITY:

The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury. Questions about participants' rights may be directed to Celia S. Walker at (970) 491-1563.

PARTICIPATION:

Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty and still continue in the classroom with course material. There is not the option of changing from the traditional group to the online group. The signed form must be returned for your results to be included with either group. Signing this consent form indicates you are willing to be a participant during this class. By not returning the form you indicate that you will not be a participant in the study, but will continue as a student for the course by attending the regular class. Not returning a form does not affect your grade in any way. As a participant, if you are dissatisfied with your test results, you may request materials from the other section, and retake the unit posttest anytime before the final for the course.

Your signature means that you have read the information stated and willingly signed this consent form. Returning the signed form gives your permission to be counted as a participant in the traditional or online sample groups. Signing also indicates that you have received, on the signed date, a copy of this form containing _2_ pages.

_____
Participant name (printed)

_____ _____
Participant signature Date

_____ _____
Witness to signature (project staff) Date

Differences Between Online and Traditional Teaching
Methods about the Principles of Design
PI: Teresa Yohon

Julie Charlson: ID 129
Human Subjects Attachment 1. : Recruitment Script

Total class presentation script presented by the regular course instructor prior to the research unit instructed by the graduate student.

Introduction: Full time instructor, Carolyn Deardorf will point out to the class that they are starting a new unit on the Principles of Design.

Script:

We have a graduate student with us that I have given permission to do a research study as part this unit in the course. She is a Ph.D. student working on her dissertation and her research interest is in design education. The department approved use of your class for a research study which will be only during your unit on the Principles of Design. I would like to introduce you to her and then describe the study. (Instructor has Co-PI stand and says this is Julie Charlson)
The study is comparing two teaching methods on the same content. The class will be randomly divided into two groups. One group will learn the material online outside of the classroom. The other group will remain in class and continue with the same type of visual presentation and lecture information that has been used throughout the semester.

I will try now to explain how the experiment will work, and how you may have been selected as a participant for the online group or classroom group. For a valid statistics study, participants should be chosen by a random number method. I assigned each student a number to replace your name in the study. Using a random number table, chosen numbers were matched to student numbers for each group, thereby selecting participants and making the two groups equal in size. Julie as the researcher will not know the names of students agreeing to participate in the study or who has been selected for each group. In order for your scores to be included in the study, students in both groups who agree to be a participant will sign a consent form and return it to me. I will just let Julie know which numbers have signed forms for both groups.

The online group of students that agree to be part of the study by returning a consent form will attend a half hour orientation session during regular class time to preview the organization of the website and to understand the learning process and how to submit work. Since this unit may look different from another WebCT unit you have taken on campus, the orientation is important for your success.

Julie has designed the online lessons which will have the same types and amount of learning activities as in the regular classroom. How learning is done and the sources of information will be different. During the orientation, Julie will walk you through the online procedure with one of the principles, so that you will understand how WebCT works with this unit. After the orientation, the online students will do

the lessons from home or in the Education lab on your own time. You will have a special numbered login for WebCT as well, rather than your name, and will use this in communicating with Julie and other students online. The online group must be back in the classroom on the date in the syllabus for the posttest to receive a grade for the unit.

Students in the traditional teaching method group do not require an orientation and will remain during the orientation time in class with me. The graduate student, who is getting her degree to be a university instructor in interior design, will be the guest instructor for unit on design principles. She has created the lessons that will use PowerPoint and handouts in the classroom. The posttest for the traditional group will be given on the same date as the posttest for the online group and also counts as a unit grade. To participate in the study, students in this group will also complete a consent form.

This study measures differences between the two teaching methods based on performance and satisfaction scores. Everyone will take the same pretest and a posttest over the content. The final posttest score will count for your unit grade while the pretest helps the research document your improvement. A satisfaction survey will take place at the end of the unit and will rate the learning activities on how they contribute to your learning. The survey does not count for a grade, but also helps other educators who hear or read about the research better know what you think works and how to plan.

If during the online unit you wish to return to the regular classroom, you may do so by separate email or phone call to me. Julie as the guest instructor for both the traditional and online groups during the Principles of Design unit gives greater consistency between groups. She will also score work related to her instruction in both groups

I will pass out the consent form now. Please read the form and sign it if you are willing to participate in the study. If you do not return a signed form to participate in the study, you will still be expected to attend your class at its regular time, but your pretest and posttest scores will not be used in the study. All in-class students will receive the same information and assignments as students in the in-class study and will be expected to complete assignments and projects as part of the normal class. If you chose not to be a participant for the study, it will not affect your grade in any way."

Conclusion: Ask for questions. Collect forms. Thank class.

APPENDIX B – PERFORMANCE PRETEST AND POSTTEST

Principles of Design Pre-test

Thank you for participating in the pre-test* The purpose is to help the researcher and yourself discover how much you will learn during the upcoming unit.

Introduction: Use only the **Answer Sheets** to fill in your **responses**. Do not write answers on this questionnaire. Use pencil and fill in the bubble for the correct letter answer. On the computer answer sheet use the section number written on the board for the ID course. Fill in spaces for your assigned two-digit student number for this unit and omit your name. When completed, turn in both the stapled question sheets and the answer sheet in separate piles at the front of the room.

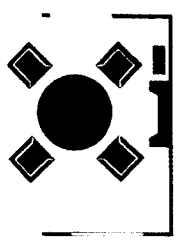
Multiple Choice: Each of the 25 questions count as 2 points for a total 50 points possible. On the answer sheet, fill in the bubble with the letter of the best answer to each question. Choose only one letter selection for each question. Be sure your response number on the answer sheet matches the question number on the test.

1. If the legs of a chair look slender, and the top appears too heavy, which principle is being violated in the design?
   A. Balance
   B. Proportion
   C. Scale
   D. Harmony
   E. Emphasis

2. Which of these examples can accomplish informal or asymmetrical balance on an entry table.
   A. Place a larger light object across from a small dark one
   B. Push large object back and pull smaller grouped objects forward
   C. Arrange objects in a circular pattern
   D. Pair 2 vertical objects across from a large horizontal object
   E. A., B., or D.

3. The principles of design differ from the elements of design in that the principles -
   A. Suggest an order for creating a composition.
   B. Provide a time line for constructing the design.
   C. Outline questions to the client about their design needs.
   D. Are guidelines for how to apply, organize, and arrange the elements of design.
   E. Are the basic components to create the design with.

4. The furniture arrangement diagram below best represents which type of balance?



   A. Symmetrical balance
   B. Asymmetrical balance
   C. Radial balance
   D. Formal balance
   E. Both A. and D.

5. Accessories and plants that support the focal point in an interior space is which type of emphasis?
   A. Emphatic
   B. Dominant
   C. Subdominant
   D. Subordinate
   E. Secondary

6. To take advantage of a beautiful view or a dramatic architectural feature as a focal point is which type of emphasis?
   A. Emphatic
   B. Dominant
   C. Subdominant
   D. Subordinate
   E. Secondary

7. Which of the following would be the best way to incorporate radial balance into a traditionally designed room?
   A. A wagon wheel coffee table with glass top.
   B. Above a round table, hang a circular candelabra light fixture with flametip bulbs.
   C. An area rug with in a bright pinwheel pattern.
   D. Add a bouquet of daisies to the dining room table.
   E. Hang a framed poster of a black and white spiral design.

8. Placing a row of pillows on a sofa in fabric that matches the drapes creates which type of rhythm?
   A. Alternation
   B. Gradation
   C. Physical or kinetic motion
   D. Repetition
   E. Transition

9. Designing the top piece of a hutch to be twice as high as the base drawers (for an overall size ratio of 2:3) is an example of which Greek concept?
   A. Golden Mean
   B. Golden Rule
   C. Golden Rectangle
   D. Golden Section
   E. None of the above

10. Which of the following would make a good secondary focal point to harmonize with a large natural rock fireplace on the main wall of the room?
    A. Built-in pine bookcases
    B. A wrought iron sculpture
    C. Swag antique satin draperies
    D. A hand carved wood door with black metal latches
    E. Any except C.

11. What term below is defined as the size of one object in relation or comparison to other objects in the composition.
    A. Balance
    B. Harmony
    C. Proportion
    D. Scale
    E. Emphasis

12. Which variation of rhythm does the following diagram show?

    A. Alternation
    B. Gradation
    C. Physical or kinetic motion
    D. Repetition
    E. Transition

13. How do you harmonize the exterior of a building with the interior design?
    A. Duplicate architectural elements such as curved or diagonal lines for a similar style.
    B. Repeat materials or textures, such as the same brick for the fireplace as on the exterior.
    C. Plan the door style to transition and reflect the interior look.
    D. Have the same plants indoors as outside near the front entrance.
    E. All except D.

14. The purpose of allowing negative space in an overall composition is to -
    A. Combine shape and form to serve a function.
    B. Provide beauty and aesthetics to overall unity.
    C. Put open space around something you wish to emphasize.
    D. Balance and contrast forms or a mass considered as positive space.
    E. Both C. and D.

15. As you enter a master bedroom, against the first wall you see is an antique armoire. It has a handpainted scene on the doors and stands out more than the other furnishings. Which principle did the designer create in this room?
    A. Balance
    B. Emphasis
    C. Harmony
    D. Scale
    E. Rhythm

16. If a painting looks too small to go on the tall stairway wall, it may need to be -
    A. Hung going horizontal rather than vertical
    B. Replaced by a different painting larger in scale
    C. Framed and matted to closely blend with the wall color
    D. Placed in a larger contrasting frame with a wider colored mat
    E. Either B.or D.

17. Combining several patterns in more than one color scheme in a room -
    A. Creates interest and harmony
    B. Develops a flare and style
    C. Can look busy and chaotic
    D. Develops structural weakness
    E. Contributes well to a contemporary design concept

18. Which of the following would be harmonious with an Asian or oriental design style?
    A. Bamboo wall sconce light fixture
    B. Diagonal paneling
    C. High metal ceiling
    D. Paneled-screen style sliding door opening to patio dining
    E. Both A. & D.

19. From a center point of a fireplace mantel, where would you place a large object in relation to a small object to achieve balance? Select the best solution below:

    A. ___□___ . ___□___ both sizes same distance from center

    B. _□_____ . _□_____ smaller object closer to center

    C. _____□_ . _____□_ larger object closer to center

    D. _□_____ . _____□_ both objects further out

    E. Can't balance a large object with a small one

20. A row of workstations uses fabric panels. The fabric of each workstation is a lighter color than the one in front of it. This example of planning is which kind of rhythm?
    A. Gradation
    B. Physical or kinetic motion
    C. Radiation
    D. Repetition
    E. Transition

21. Which variation of rhythm does the following diagram below show?

    A. Alternation
    B. Gradation
    C. Organic Transition
    D. Opposition
    E. Radiation

22. In adjusting the scale and height of shelving and seating in a preschool for young children which concept are you applying?
    A. The Greek guidelines of proportion
    B. The study of ergonomics
    C. The study of anthropometrics
    D. Individual custom dimensioning
    E. Different levels of emphasis

23. Which of the following best contributes unity to the harmonious design of a restaurant interior?
    A. A mix of different interesting table lamps
    B. A fountain in the waiting area
    C. Use of a red and green complementary color scheme in the furnishings and floorcovering.
    D. Grill chefs all wear hats in different styles.
    E. Leather folders for food bill and napkins match.

24. Rhythm is a term referring to:
    A. The ability of a composition to create meaningful unity.
    B. A focal point sub-dominantly located in a composition.
    C. A pleasing alternative that effectively combines two types of balance.
    D. The repetition of spaced intervals for a sense of continuity and visual movement through a room.
    E. The music played and how it reflects the design concept.

25. Asymmetrical balance is considered as -
    A. Informal and interesting
    B. Formal and static
    C. Equalized and constant
    D. Repetitive and rhythmic
    E. Not balanced

Post-test on Principles of Design

This is the end of the unit exam that will measure what you know and count as a course grade. The following 25 questions count as 2 points each for a total 50 points possible. Relax, take your time, and read carefully. A brief satisfaction survey will follow the exam.

Introduction: On the computer answer sheet use the section number written on the board for the ID course. Instead of your name, fill in spaces for your assigned two-digit student number for this unit. It needs to be the same number used for the pretest. If you switched from the online method back to the traditional class, please write "switched" next to your number.
Use the **Answer Sheet** to fill in your **responses**. Do not write answers on the questionnaire. Use pencil and fill in the bubble for the correct letter answer. When completed, turn in both the stapled question sheets and the answer sheet in separate piles at the front of the room. Pick up and complete your satisfaction survey form when you turn in the unit test.
Thank you and enjoy the remainder of your course.

Multiple Choice: On the answer sheet, fill in the bubble with the letter of the best answer to each question. Choose only one letter selection for each question. Be sure your response number on the answer sheet matches the question number on the test.*

1. The difference in effect of an asymmetrical arrangement of accessories to a symmetrical arrangement is described as:
   A. Ordered and restful
   B. Formal and dignified
   C. Informal and active
   D. Expanding interest outward
   E. Chaotic and busy

2. When a person walks through an interior space, what happens to balance?
   A. It should exhibit the same type of balance throughout.
   B. The type of balance can vary with different three-dimensional views.
   C. Balance becomes less noticeable and necessary as you look at different areas.
   D. Wall areas across from each other should be balanced, as both are visible at the same time.
   E. Both B. and D.

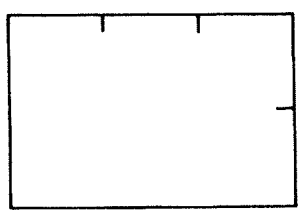
3. Making selections for a room design based on a design concept or decorating theme primarily contributes which principle of design?
   A. Balance
   B. Emphasis
   C. Harmony
   D. Rhythm
   E. Scale

4. The purpose(s) of the principles of design is which of the following?
   A. They are recommended guidelines for how to apply the elements of design.
   B. They are used to evaluate good and poor design composition.
   C. They may be used as reasons to the client for selections and arrangement decisions.
   D. They provide the basic components to create the design with.
   E. A. B., and C.

5. Which level of emphasis was used in placing the sofa toward the nice view of the mountains?
   A. Emphatic
   B. Dominant
   C. Subdominant
   D. Subordinate
   E. Secondary

6. A swag window treatment, made by draping continuous U-shaped curves of fabric along a rod, creates which type of rhythm?
   A. Transition
   B. Repetition
   C. Gradation
   D. Alternation
   E. Kinetic (physical) motion

7. The diagram below represents which of the Greek guidelines for good proportions when dimensioning space?



   A. The Golden Section
   B. The Golden Secret
   C. The Golden Mean
   D. The Golden Rectangle
   E. The Parthenon Progression

8. Creating a center of attention, in the absence of an existing dramatic feature, is which type of emphasis?
   A. Emphatic
   B. Dominant
   C. Subdominant
   D. Subordinate
   E. Secondary

9. Gradation or progression is a type of interior rhythm illustrated with which application below?

   A. Buying nesting tables, set of three different sizes that fit under each other, for one side of the sofa.
   B. Running chairrail around each wall of the dining room.
   C. Vertical paneling along joining walls of a family room
   D. Purchasing a circular tieback netting for above the bed.
   E. None of the above

10. The furniture arrangement diagram below best represents which type of balance?

   A. Symmetrical balance
   B. Asymmetrical balance
   C. Radial balance
   D. Formal balance
   E. Both A. and D.

11. What is a recommended way to combine fabric patterns to look like they go together?
   A. Get them from the same manufacturer
   B. Have them all be a similar texture
   C. Have them contain colors from the scheme planned for the room
   D. Combine one large pattern, with a small overall pattern, and a stripe or plaid
   E. Both C. and D.

12. What principle is being applied when selecting and comparing different sized lampshades for an antique floor lamp?
   A. Balance
   B. Emphasis
   C. Proportion
   D. Scale
   E. Rhythm

13. If applying recommended proportions to room size, what would be a good width for a room if the length were 25ft.
   A. 10ft.
   B. 15ft.
   C. 18ft.
   D. 20ft.
   E. 25ft.

14. How can you add visual weight to a smaller piece of furniture to help balance it with a larger one?
    A. Paint it a bold color
    B. Add a slipcover to hide the open legs
    C. Select a course texture fabric
    D. Upholster with a large patterned fabric
    E. Any of the above

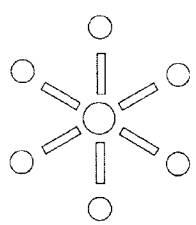
15. How many levels of emphasis can occur in one area for the design composition to look good?
    A. There should be only one center of attention or focal point in a room.
    B. There should be one major emphasis and one minor emphasis in the space.
    C. There are three focal points that rank first, second, and third in importance.
    D. There are four different levels of emphasis that work together to support primary and secondary centers of attention.
    E. There are five levels, one for each wall, and one focal point in the floorplan

16. How can a sculpture become the focal point in an interior space?
    A. Large in size
    B. Form is exaggerated or unusual
    C. Placed in a central location
    D. Brightly colored or highlighted
    E. All the above

17. Which of the following creates harmony in interior design?
    A. Repeating similar structural lines
    B. Repeating similar shapes
    C. Combining different lines and shapes for an creative look
    D. Applying bold color and modern fabric to traditional furniture
    E. Both A. and B.

18. Which design principle is exemplified by placing crown molding around the ceiling of a dining room?
    A. Balance
    B. Emphasis
    C. Proportion
    D. Rhythm
    E. Scale

19. Which variation of rhythm does the following diagram best illustrate?



    A. Transition
    B. Repetition
    C. Radiation
    D. Opposition
    E. Gradation

20. The best definition of rhythm, as a design principle for interior spaces, is –
    A. The sense of movement created by people moving within or passing through the space.
    B. The repetition of elements in a regular pattern as a form of movement to connect parts and lead the eye through the room.
    C. Decorating around a musical theme
    D. Integrating a sound system with concealed speakers
    E. Vibrant colors and mixed styles to entertain the eye.

21. What term means the same as the placement of objects in a room for the appearance of equal visual weights?
    A. Balance
    B. Emphasis
    C. Harmony
    D. Rhythm
    E. Scale

22. The size of a sofa looked fine in the furniture showroom, but was too large when delivered and placed in your living room. The difference resulted from the violation of which design principle?
    A. Emphasis
    B. Harmony
    C. Proportion
    D. Scale
    E. Balance

23. What term means the same as combining unity and variety so that design components interestingly look like they belong together ?
    A. Balance
    B. Emphasis
    C. Harmony
    D. Proportion
    E. Rhythm

24. In a Starbucks coffee shop, the chairs have rounded backs and the tables are round. The color of the tabletops and the chair fabric repeat wall colors. Which type of design principle was used here?
    A. Contrast
    B. Gradation
    C. Unity
    D. Variety
    E. Subordination

25. If applying the Golden Mean, where would you place tieback cords on a vertical drape?
    A. Half way up the length of the fabric
    B. One fourth the way down from the top of the fabric
    C. Three fourths the way down the fabric
    D. Between 1/3rd and ½ the way up the fabric
    E. Half way down the length of the wall

APPENDIX C – SATISFACTION SURVEYS

Principles of Design
Satisfaction Survey

Research Data: (please fill in for statistics) **Age:** _____ **Gender:** _____

The following responses are anonymous and will in **no way be associated with** a student's existing points or **grade** for the unit and course* Thank you for your participation and input.

The purpose of this survey is to provide the researcher with information on student perceptions about the unit and teaching method they experienced. The survey is not to evaluate the instructor, but rather the method of instruction. Responses will reveal student feelings and attitudes about the content, learning activities, and usefulness of the information.

On **Answer Sheet**, indicate the degree to which you agree or disagree with each statement based on the following scale:

A. Strongly Agree B. Agree C. Neutral or Undecided D. Disagree E. Strongly Disagree

1. Objectives, or what was to be learned, was presented and met during the unit
2. Unit of instruction was organized for a sequence of learning
3. Resources used provided good information and examples
4. Unit helped me understand better what interior design work involves
5. Content prepared me for room analysis and problem solving
6. A productive learning environment was created
7. Learning environment was respectful of student opinions & differences
8. Technology used for the unit was good and worked well
9. Assignments increased my understanding of the subject
10. Project directions were complete and useful
11. Teacher was available for assistance and feedback
12. Activities promoted interactive learning with other students
13. Unit was challenging and motivated my interest
14. Lessons covered information needed for the post test
15. Grading system was fair and impartial
16. Information learned will be used in my personal life
17. Information received during unit is useful for a design career

Learning Activities Information: **Traditional Teaching Method**

The purpose of this page is to identify components of the lessons which best supported your learning. Combined findings will indicate student learning styles and preferences for the different types of activities by rating the effect they had on increasing your knowledge and understanding during the unit.

Indicate the degree to which you agree or disagree that the following **traditional instruction** components contributed to your learning. Continue the same rating scale on your answer sheet:

A. Strongly Agree B. Agree C. Neutral or Undecided D. Disagree E. Strongly Disagree

18. Reading the text assignments
19. Reviewing terminology
20. Lecture information
21. Personal notetaking
22. Printed Handout Information
23. Power Point visuals
24. Class Discussion
25. Class Demonstrations
26. Notebook Activities
27. Group Project
28. Overall, I think traditional class methods were good for learning and using this content.
29. The traditional class method prepared me well for the post test.
30. The traditional method prepared me well for room analysis and problem solving.

Additional Comments: (Write responses on this page below each question)

31. Which learning activity, or activities, in the traditional method did you feel were the most effective?
    Please explain how each was more helpful for you.

32. What recommendations do you have to improve the traditional learning methods used?
    Please be specific with suggestions for interior design content and application projects.

Thank you and enjoy your future with interior design!

Learning Activities Information: **Online Teaching Method**

The purpose of this page is to identify components of the lessons which best supported your learning. Combined findings will indicate student learning styles and preferences for the different types of activities by rating the effect they had on increasing your knowledge and understanding during the unit.

Indicate the degree to which you agree or disagree that the following **online instruction** components contributed to your learning. Continue the same rating scale on your answer sheet:

A. Strongly Agree B. Agree C. Neutral or Undecided D. Disagree E. Strongly Disagree

18. Reading the class textbook readings
19. Reviewing terminology with the glossary
20. Linking to outside internet sources for information and illustrations
21. Linking to instructor developed Web pages in Content Module with area design jobs
22. Scanned reference manual pages with diagrams
23. Picture Gallery of C.S.U. photos and descriptions
24. Team discussions and picture analysis through WebCT email
25. Hands-on computer activities (room selections, furniture layout, and panorama)
26. Group project write-up of virtual fieldtrip
27. My technology skills were proficient enough to participate in the online unit
28. My technology skills were improved during the online unit
29. My home computer equipment was adequate for WebCT pictures and activities
30. Overall, I feel the online teaching method was good for learning and using this content
31. I feel the online teaching has advantages, but not for interior design content at this level
32. After experiencing interior design lessons online, I would like future design courses online.

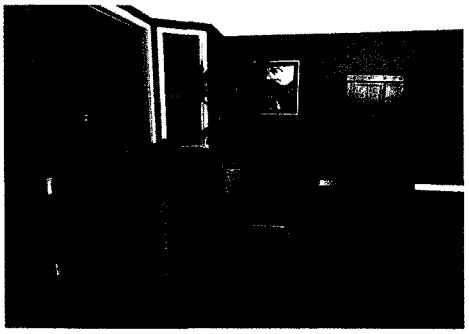
Additional Comments: (Write responses below each question and on other side of page)

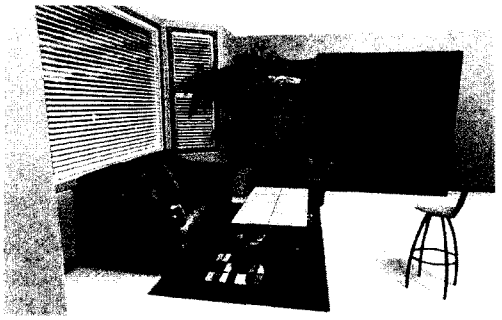
33. Which learning activity, or activities, in the online method did you feel were the most effective? Please explain how each was more helpful for you.

34. What recommendations do you have to improve the WebCT online method of instruction? Please be specific with suggestions for interior design content and application projects.

APPENDIX D – ONLINE ROOM DESIGN PROJECT EXAMPLES

Online Living Room Designs



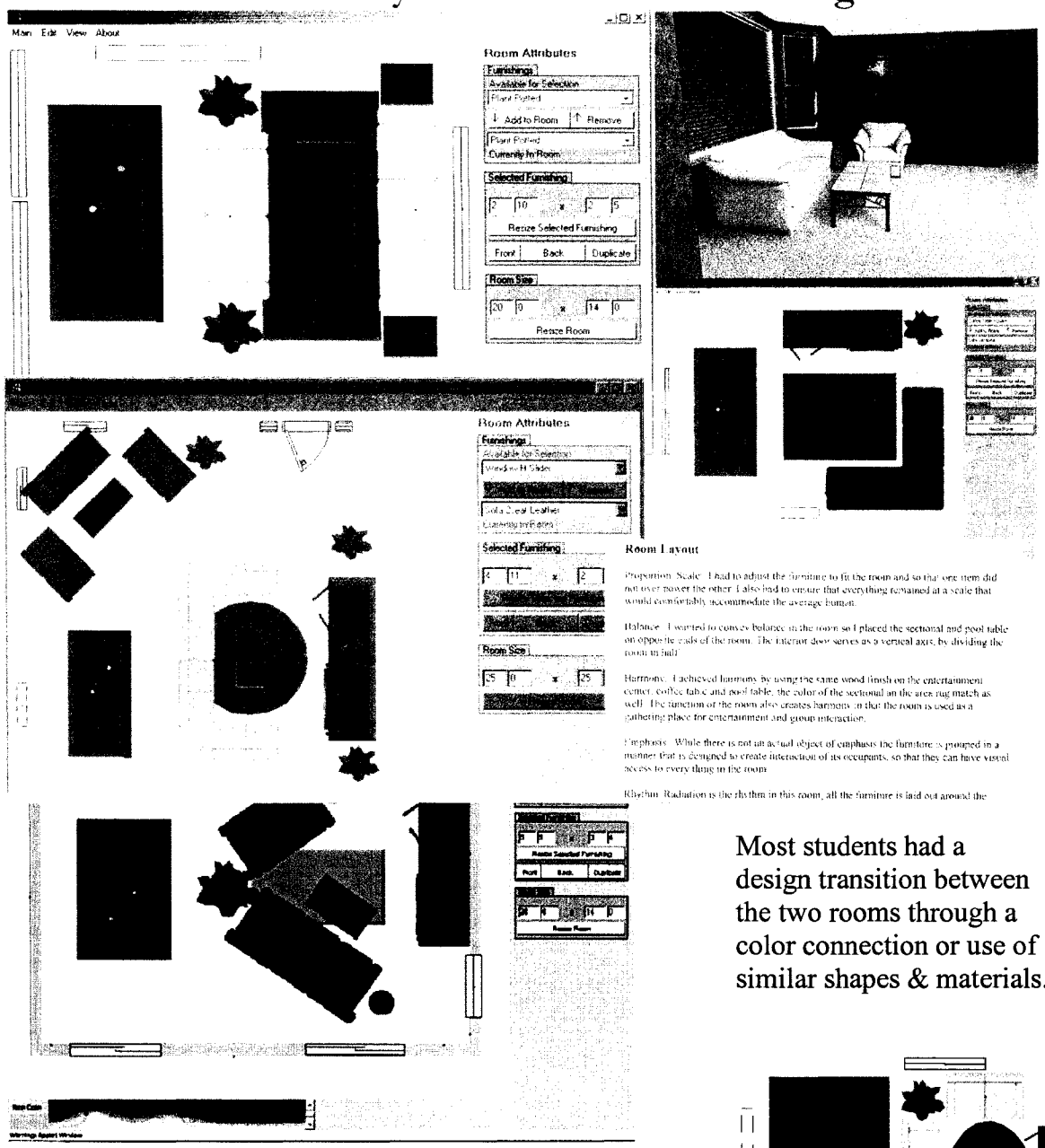


Doing this preview assignment, I felt more like I was a decorator rather than a designer. The reason that I feel this way is because I was only able to pick the furniture and the color scheme, but the layout was already provided. I can however see the Principles of Design. I think that the entertainment center adds emphasis to the room, but the main focal point is the color in the rug. It is supported by the color in the tree and the picture that hangs behind it. This room is an asymmetrical balance, because it is not a mirrored image. The room is also composed of geometric and organic design. The mountains that are seen through the window and the plant support the organic design, and the repetition of the squares in the rug and entertainment center support the geometric design. Rhythm is also represented in the repetitive squares in the rug , followed by the squares in the table and the entertainment center. This room gives a feeling of modernized masculinity because of the dark colors, it also feels stable. Everything in the room is in scale and proportionate.

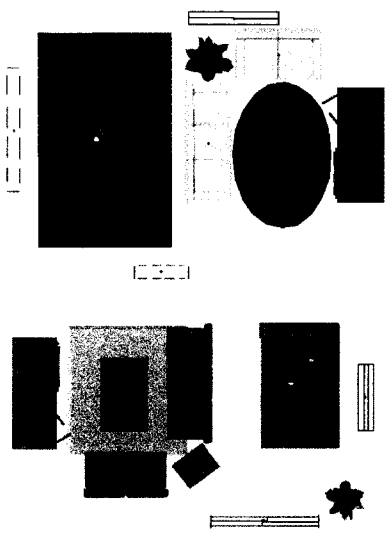
My picture is pretty **harmonious** because it brings unity plus variety. The harmony was achieved by color, shape and size. The colors within my picture really I feel feed off each other. The yellow with the yellow in the carpet really help bring in the brownish couches and the cream carpet. The shapes of the end of the couches match the shape of the ends of the coffee table. As well as the rectangular shape of the carpet, window and picture. I feel that the couches really balance out the size of the carpet, coffee table, and entertainment system. It just puts their size all into perspective and comes together looking really comfortable.

I wanted to design my personal interior space as a comfortable yet chic setting with what little I had. I felt the tan walls would compliment the dark wooden floor and trim well. The brown leather sofa and chairs worked well with this color scheme. The table placed in the room, was the best fit for wood color but not the legs, which I assume are made out of concrete and makes the room look less elegant. Then I added the plant for a nice organic touch and some height, but something felt like it was missing. What was needed was a rug, choices were limited so I chose one that was so dark that it seamed like it would go with just about anything, the few colors that is has doesn't go with the room as well as I would like. The picture that was added is hidden behind the plant and I feel it would look best if placed above the chest located next to the large chair for some additional height.

Online Family Room Furniture Arrangements



Most students had a design transition between the two rooms through a color connection or use of similar shapes & materials.



PRINCIPLES OF DESIGN FOR MY ROOM LAYOUT

I want to start off my saying that I would have rectangular redish pillows on my couches. That was bothering me that I couldn't do that. Once again, I feel I achieved most principles, but achieved it better in this layout, because it was easier to do so.

- **Repetition**: The diagonal couches and coffee tables is an obvious planned pattern. The rectangular couches, pool table, entertainment center, rug and coffee table are all repeated to achieve harmony. The circle at the end of the couches by the plant and side tables create a repetition of circles.
- **Rhythm**: There is definitely rhythm in order to sit on the couches you must go on the far sides of each couch (assuming your walking into the room) making the room have rhythm. The space around the pool table also gives you rhythm by making the people playing see where they walk. The diagonal that the couches are set with suggests activity and allows the eye to follow making it both functional and aesthetically pleasing.
- **Variety**: I achieved variety by bringing in the circular tables at the end of the couches to match the circular flower pot in the middle of the couches. Giving the room a little bit of variety by changing the shape from being all rectangular to introducing the circles.
- **Balance**: Once again I had an asymmetrical balance because the room split in half is not the same but achieves the balance while still being harmonious. The pool table and the entertainment center balance each other out. The sitting area would be split a little but too giving both sides the weight necessary to keep the room balanced. Also the negative space around the pool table achieves the balance because when people are playing they need that space.
- **Harmony**: There is definitely harmony. The rectangular shape of most of the objects are very harmonious. The windows and entrance are also have a rectangular shape. The circles bring in something to balance out all the rectangles making it harmonious. The size of the entertainment center and pool table mixed with the couches gives the room a very harmonious look because nothing overpowers the other. The color is also harmonious because the green plant matches the pool table, the brown woods match on all tables and the entertainment center. The couches are both blue. The rug matches the wall. All these colors feed off one another and come together very well.
- **Proportion**: I have proportion because the size of the entertainment center and the pool table balance each other out making the room very proportionate. (Sorry if I am a little repetitive but all the principles seem as though they intermix with each other a little bit.)

Scale: There is scale because the room is large as well as all the furniture. The room is made for relaxing and comfort human can lay down and watch t.v. There is enough room around the pool table so that people who are playing pool can

APPENDIX E - ONLINE INDIVIDUAL AND TEAM PROJECT RUBRICS

Scoring Rubric: **Internet Room Design** **Total Points** /20

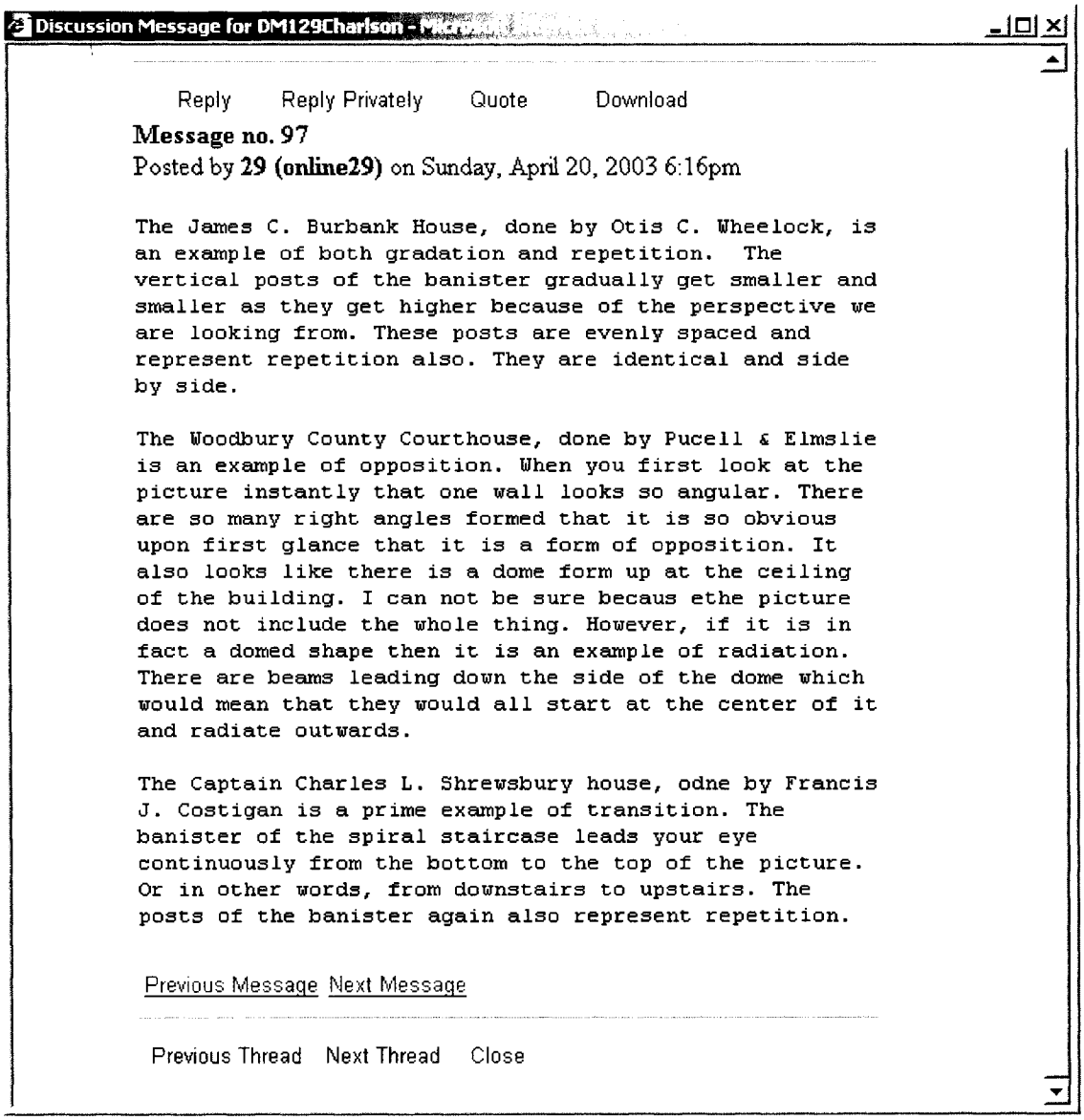
CATEGORY	5	4	3	2	1
Livingroom – Design Selections	**Complete room selections, aesthetic & unique. Applied design principles well.** Wall and floor finishes with trim. Upholstered furniture & tables or entertainment center. Art, rug, or accessories.	Complete & aesthetic room selections. One principle not effective or applied. (ex: no emphasis)	Complete room selections, but combinations could be more unique or carefully coordinated. Or two design principles not used.	Room not look finished or complete. More combinations needed. Or three design principles not applied.	Incomplete room, mismatched materials, balance and scale off. Or without effective emphasis, harmony, or rhythm seen.
Furniture Layout	Room complete with doors & windows. Furniture grouping functional, proper clearances, & aesthetic.	Appropriate room size, but doors or window openings not sized or placed well. Good arrangement.	Scale an issue with room size too large or small with furnishings. Traffic path interference, or insufficient clearance	Something missing in furniture grouping, mismatched scale, or arrangement not balanced with focal point.	Room features missing and furniture arrangement not apply design principles.
Write-up for both parts	All principles of design discussed between parts 1 and 2. Correctly identified types, location, how achieved and effect on the room.	All principles discussed, but how designer achieved them or their effect was missing.	One or two principles were not included, types were not accurate or included, or a reason not given.	Incomplete discussion of applied principles or less than half the principles evaluated.	Brief or inaccurate write-up of the design principles
Work on time, sent as requested & team responses.	In by calendar date & cut off time. Sent to instructor through assignments in WebCT. File sent to team & response to other designs.	In on time, but no response to other compositions.	Picture copies into instructor on time, but copy not sent to team.	Submitted design late, but as requested with response.	Submitted late without copies or response to others.

Online Team Project Rubric :

Design Analysis and Recommendations for Remodel of Governor's Mansion. Panorama of Main Floor for Multidirectional Views and Close-up Zoom of Details

	Governor's Mansion **Scoring Rubric**	**Points** /20
[redacted]	**All six design principles discussed. Proper types identified, location given, and result or effect on room described.**	/6
[redacted]	**Told which design elements were used in creating the design principles.**	/4
[redacted]	**Thoughtful evaluation of design remodel and group suggestions for changes or additions.**	/3
[redacted]	**Essay format used with introduction and conclusion. Good grammar and spelling. Cover page attached.**	/4
[redacted]	**Writing equally divided and team proofed. Email planning by group. Combined document uploaded and sent on time.**	/3

APPENDIX F – ONLINE TEAM DISCUSSION AND PROJECT EXAMPLE



Subject: Re: Library Rendering

Message no. 37 [Reply of: no. 27]

Author: 30 (online30)

Date: Wednesday, April 9, 2003 9:20pm

The proportion of the chairs to the table is off. The chairs are too large for the size of the table. The chairs are also too large for the human body, therefore they are out of scale. Also, the chairs, in proportion to the table, the room, and the size of the plants, are out of scale and proportion. The reflection of what appears to be light fixtures is out of proportion with the size of the room. They should be larger. Harmony was achieved in the selection of a complementary color scheme. There is a proportionate amount of warm and cool colors, therefore, pleasing the viewers eye. Variety is achieved through the use of not only geometric forms, but organic forms and shapes found in the plants. Rythm is achieved through the use of the plants and the use of the curve in the balcony. I think the artist effectively uses these elements to achieve radiation and transitional rythm.

Reply | Reply privately | Quote | Download | Close

Discussion Message for DM129Charlson - Microsoft Internet Explorer

Subject Re: Library Rendering

Previous Thread Next Thread Close

Reply Reply Privately Quote Download

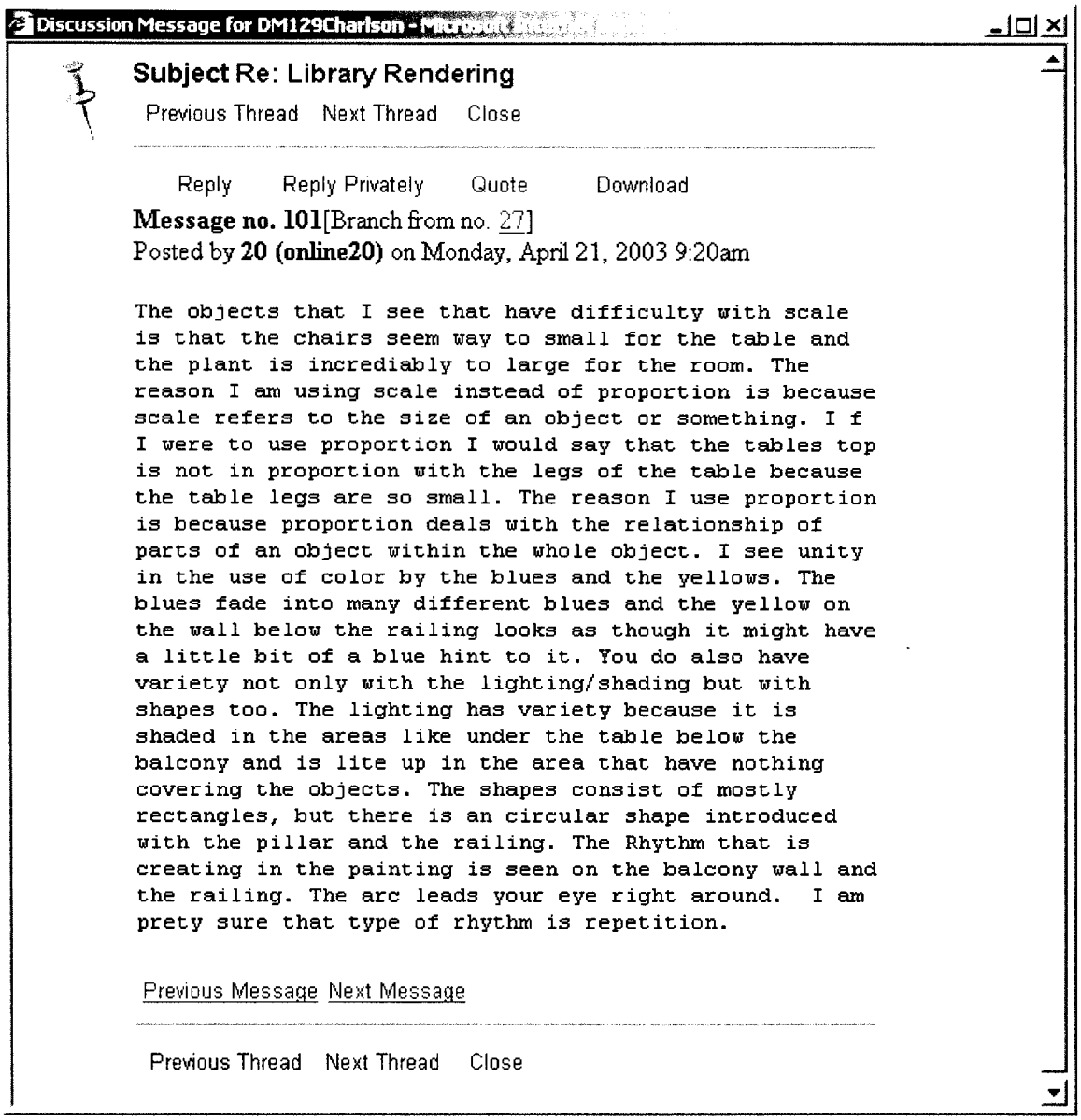
Message no. 102[Branch from no. 28]

Posted by **20 (online20)** on Monday, April 21, 2003 9:24am

I think your analysis on the painting is very good. I like the way you emphasised on color. It's funny how different people see things because my analysis is completely different then yours. Good job!

Previous Message Next Message

Previous Thread Next Thread Close



Governor's Mansion Project

April 18, 2003
ID129 SP03
By:
Online 20
Online 10
Online 14
Online 24

It was very interesting to go onto a website that allows you to go through the Governor's Mansion. It was like you were actually their observing the Mansion. We were having fun flipping and turning the picture all around. We thought it was especially interesting that you can turn the picture and get a whole other room. Both rooms that we looked at had a lot of options that we could work with, but after taking our little tours, our group decided to critique the second Governor's Mansion picture. We will be talking about the 6 Principles of Design in which were all presented within the room and what elements helped to achieve those principles. Then we will perceive to tell you what we thought went really well within the room and what we think could improve the rooms that much more.

This first principle we are going to talk about is **balance.** The whole room had a bisymmetrical balance. You could see this when you first got a hold of the picture and you were zooming out of the hall and you come to a stop with two chairs that have an imaginary line that divide the main room right in half. Both sides were identical. When your entering the dining room from the main area you see 4 pillars that stand tall. They divide into twos on each side then the dining table divides right in half as well. In the sun rooms identical chairs were set up with a coffee table in between that would split then in half identically. Also the well in a sun room splits in half and the room is identical again. When looking at the room you get the sense of stability, dignity, and a very calming area. These features all come into play when you have a bisymmetrical balance.

The next principle we observed was **proportion**. When you are looking for strictly proportion, we personally would of liked to of seen more of it. We found that the rooms had a golden mean in which is a Greek guideline for proportion. We saw this with the chandelier in the main area. The chandelier is hanging down from the ceiling about half its height meeting the expectations of the guidelines for good vertical positioning. Also we found the Greek guideline for good proportion through the golden rectangle. In which most of the rooms were based of a rectangular shape or had a rectangular shape in them. Since rectangles have better proportions then squares theses rooms definitely have what it takes to pass that guideline. Lastly by using anthropometrics we saw that the couches and tables were at perfect height adults. Considering the main area is used for scheduling appointments and for public use the height of the couches and tables are very . important. Also since most of the clientele that go in the place are adults it makes the room really functional.

The third principle that we used was **scale.** The rooms were all to scale we thought. The furniture in the main area was large because the room was so large. The rug was big as well in that room. The furniture in this room was larger then all the furniture in the other rooms because it was the largest room. The well in one of the sun rooms was the perfect size to fit within the half circle window ceils. The size just fit in their so well, made that room really come together. The long rectangle dining room table fit nicely into the long rectangular room. All in all the scale of the second governor's mansion picture was a very strong quality.

The fourth principle is **harmony**. To have a strong sense of harmony you need to key qualities and that is unity and variety. This second picture was able to create a very harmonious place. The main room comes together really well everything is balanced and comes together creating a very comfortable room. The marble tile floors really bring the sense of unity together. They have the rectangular shape that ties in all the other

rectangular furniture and windows. The color allows brings some contrast from the really white walls with the gold trim. It seems as though the tile helps harmonize the brown furniture with the green plants. If it were all on a plain white floor it wouldn't harmonize nearly as well. The circular pillars/columns really bring all the rooms together because they lead you into each room and see you out of each room, giving the theme of stability really shine through. The triangle above the dining room table really gives a new focal point giving the eye a break from all the rectangles. It also adds uniqueness to the room. The part of the Governor's Mansion that we are looking at really harmonizes well.

The next principle we sought out was **rhythm**. There was a lot of rhythm throughout the picture. The picture had gradation that went from some small rectangles on the tile, that produced some bigger rectangles seen with the coffee tables, that lead to larger rectangle rugs that sat nicely in a huge rectangular room. Gradation was also found within the circular shapes in the house. There were round lamps, which lead to larger and darker round tables. Then there was a big round well with a darker look and near the well was huge circular pillars that were white. Repetition was also another strong rhythm that was found. You had the drapery in the sun room that repeated nicely around the window. The golden pillars on all four ends of the main room lead the eye into many different directions. Transition was also achieved with the drapery in the sun room because it moves your eye right around the room without any interruption. The golden line that goes around the ceiling in the main area takes you right around the ceiling. The windows that are arched behind the well also have transition. Lastly, there was some opposition when the pillars met the ceiling at a 90 degree angle.

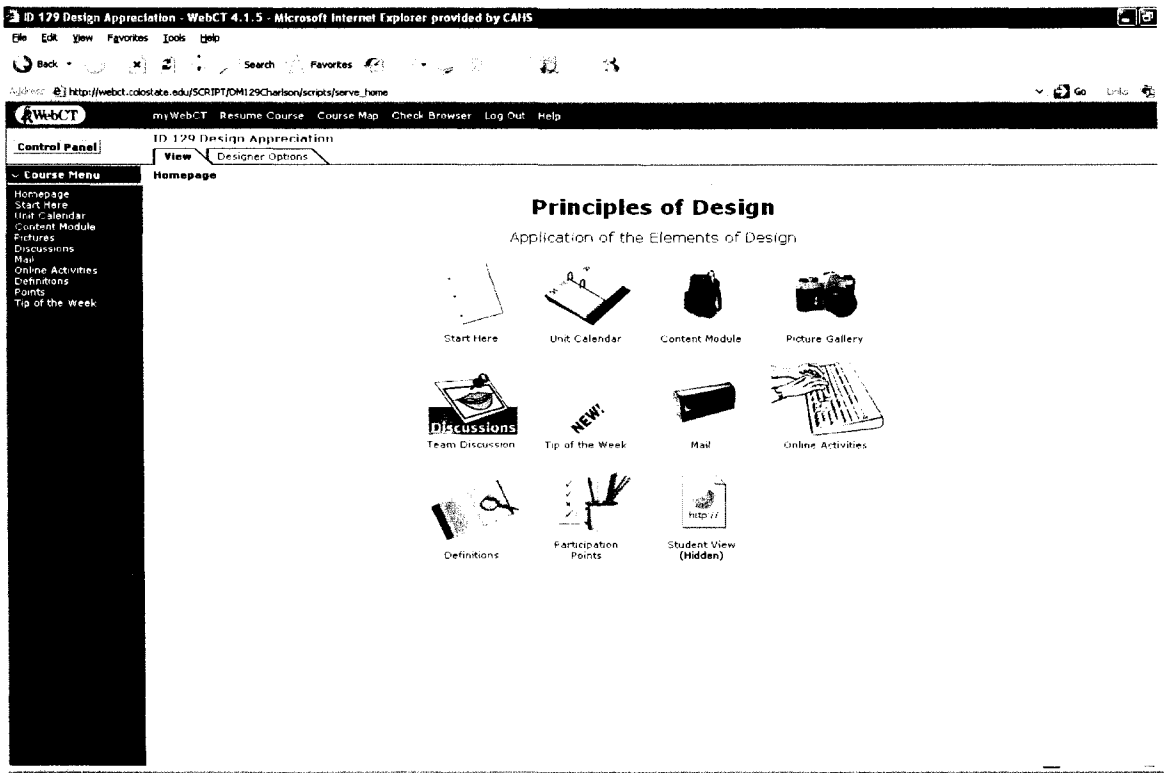
The final principle that makes a room come together is **emphasis**. There was a dominant emphasis in all the rooms. The main room had the chandelier that hung from the ceiling. The main area wouldn't be complete without that chandelier. The well in the sun room that has the plants coming out of it has an emphasis. The plants added to the well make it a dominant emphasis. The triangle above the dining room table has an empathetic emphasis on that room. It really gives the eyes a break from all the rectangles. The window to wall view of the trees and grass outside was also very empathetic. The furniture under the chandelier was subdominant. It supported the chandelier very well. As well as the arched windows behind the well they supported the well's dominance very well. There was subordinate emphasis throughout the rooms because there were plants, and lamps that just really brought the whole room together. The emphasis of the rooms really made this picture harmonize really well. Those two principles go hand in hand.

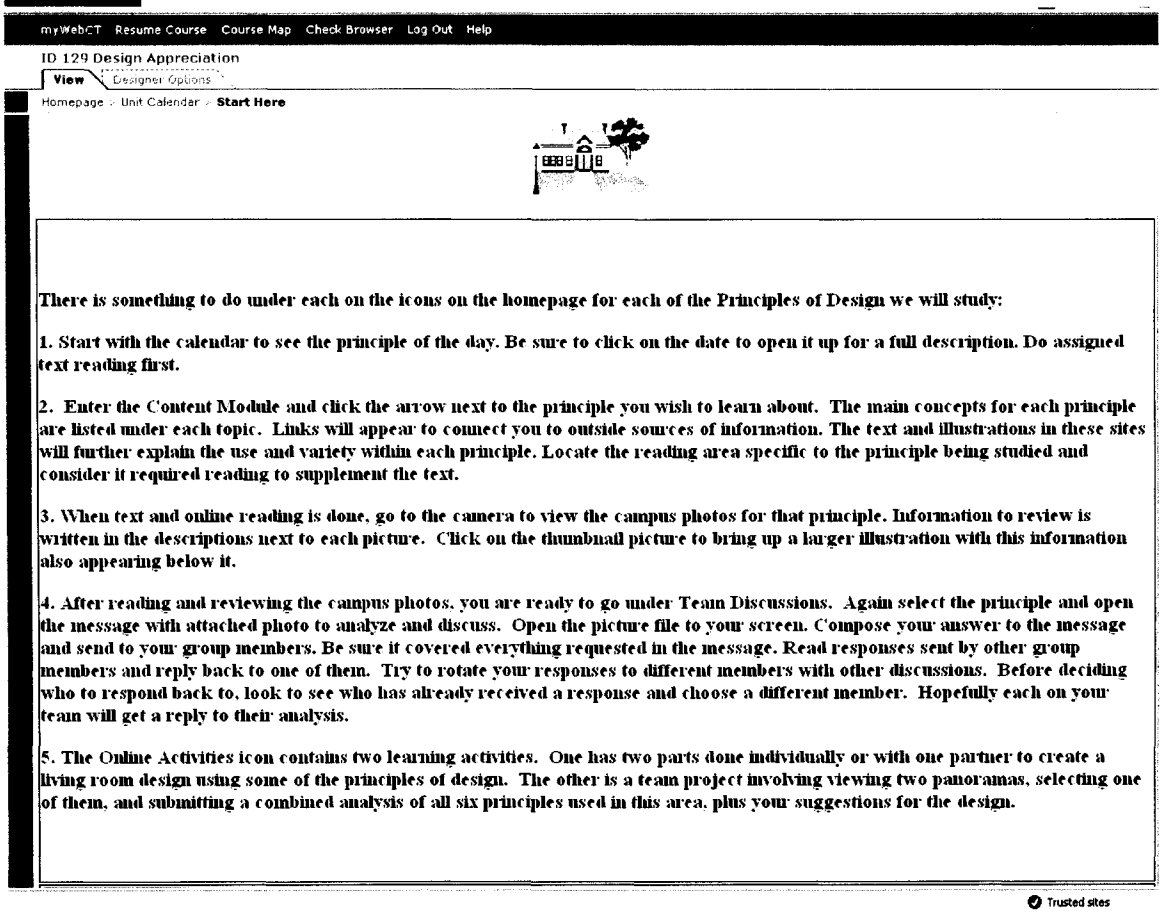
After observing the picture for quite some time, we have come to find that we really enjoyed the rooms. The designer did an incredible job with designing. We especially liked the well in the room with the arched windows behind it. The pillars were also very nice because it gave the place stability. Another thing we enjoyed was the bisymmetrical balance of the whole place. That was such a strong aspect and really brought the whole place together. The last thing we enjoyed was the smooth texture that went throughout the picture. Some of the areas that could be improved on was the space in the main area. There was to much negative space leading out of the hall way into the open room. Everything is white so it made it look that much larger. The pink and red sofa chairs that were in a sun room didn't harmonize all that well because the colors we were working with seemed very neutral. Those colors seemed a little too much for the room.

We couldn't think of much that was wrong with the mansion. It seemed pretty intact and well thought out.

All in all we really enjoyed looking through out the picture. We found the room was well designed and has only a few minor things that we feel as though the could fix. The Governor's Mansion picture 2 contained the 6 principles of design. The elements that make up design were clearly seen. There was lots of shape with rectangles and circles. There were lines that easily showed the room was bisymmetrical. There was color that went from a dark brown to a white. The rooms used very neutral colors and had shiny tiles, walls and wooden furniture. Our project was on overall success just like the mansion was to its designer.

APPENDIX G – WEBCT UNIT FORMAT

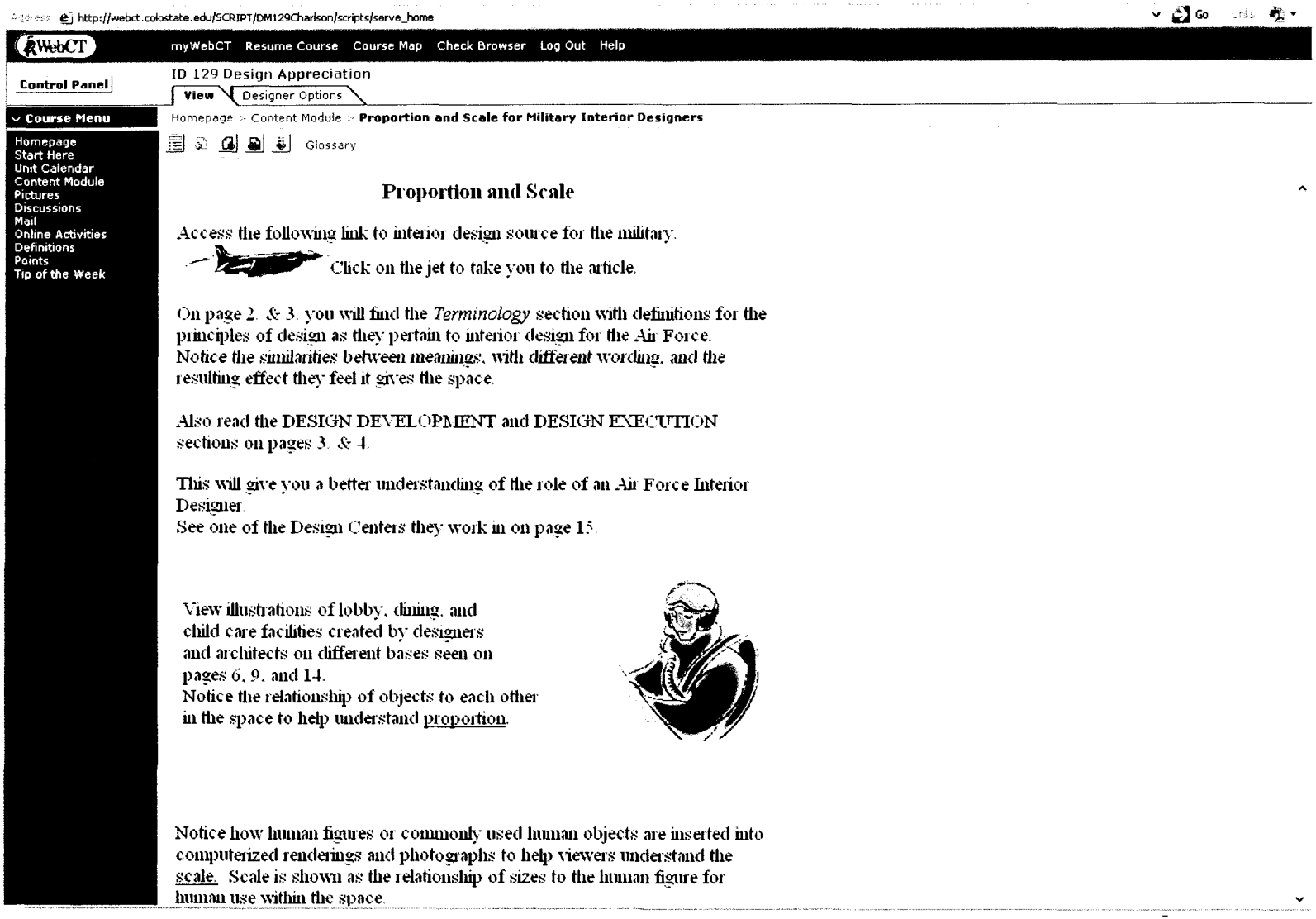




WEBCT UNIT CONTENT MODULE:
Table of Contents

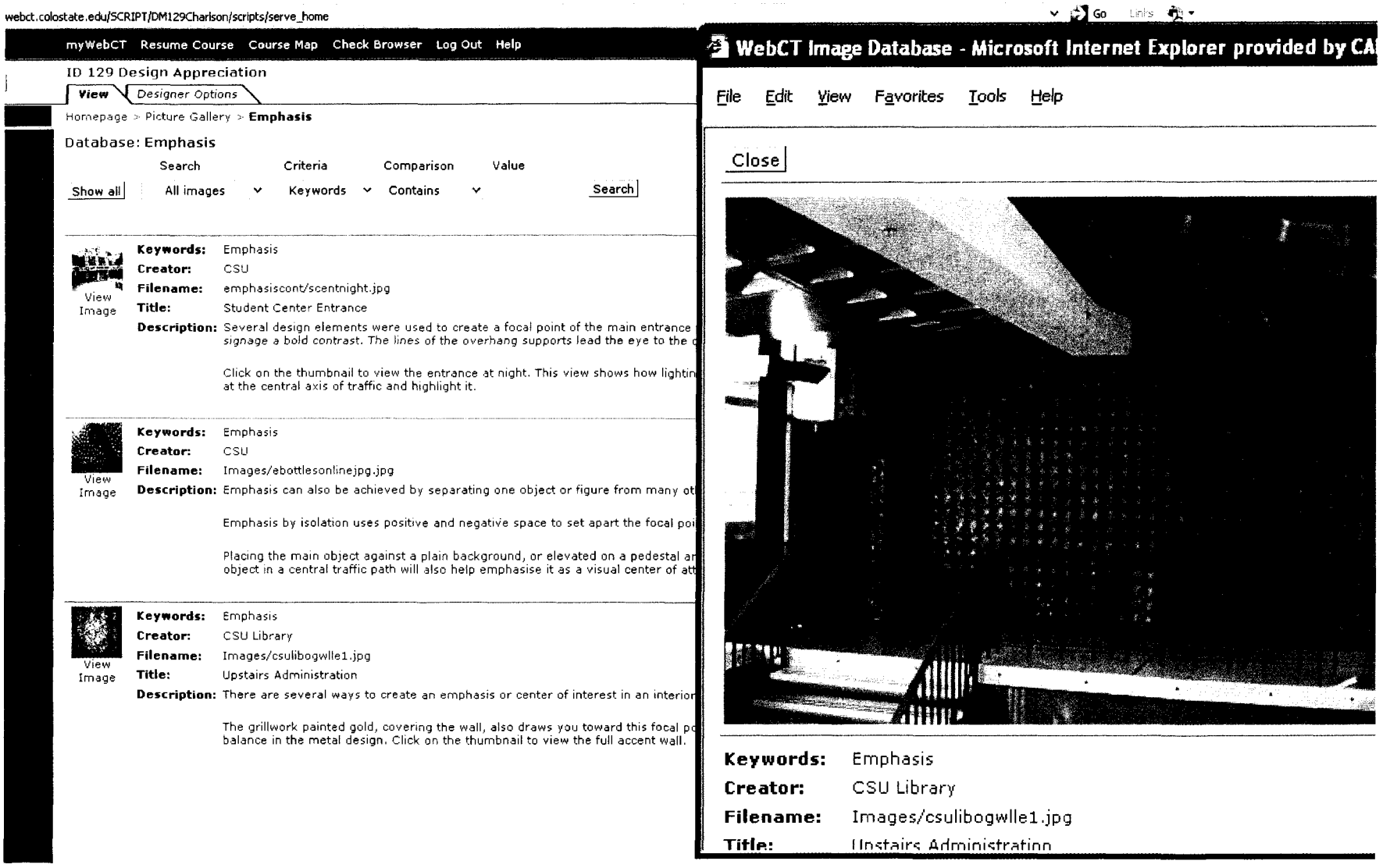
Word Document with Save Conversion as html.Web Page for Content Module

Directions and Links to Website for Information and Visuals on Concepts of Principle of Design



Picture Gallery examples and explanations under **Emphasis** as a Principle of Design

Sized .jpeg files for thumbnails link to larger or different view. Image Database tool provides template for typed information.



Dreamweaver Webpage:
Residential Design Job

Linked views to top center and bottom right photos.

Address M:\ Dissertation\Webpage Design\lauerresharm\TMPaq7anz2bne.htm

H A R M O N Y

Harmony starts by unifying around a design "concept". For this residence, in Ptarmigan, the couple desired a dramatic diningroom reflecting old-world European travels. This was achieved with plum faux-painted walls & raised ceiling. Modern lines of cherry furniture adds some variety.

Click on picture to link to another view of the columns from the entry to the livingroom. Hit "Close" to return

Interior design deals more with space and inside architectural features than decorating does. Columns separate areas in this open floorplan and bracketed beams carry through the old-world concept. There is unity in use of curved lines and arched shapes both in the structure & selections. Click on picture for harmony with exterior

Types:

U N I T Y & V A R I E T Y

Whitewashed wood cabinets and fireplace across from kitchen unify with light walls to enlargen space. Color tones in painting on range hood and print nook fabric are the same, but appear on a light background. Tile color, curved door design, & hood lines pointing up like raised ceiling sections all are unity. Copper is used for variety in accessories & range hood insert.
Click picture to see view of nook at the end.

Janie Lauer, an interior designer, said the color scheme harmonizing the home began with one print fabric from which to pull other colors.

The parlor directly infront of the fireplace area also serves as a music room. The open plan allows guests to mingle through both, each with a unique variation of accented colors but unified with the color scheme and use of elegant textures.
Click on the picture to view the transitional front door. The arched door repeats the window

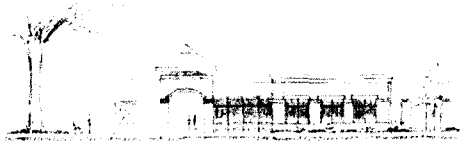
Dreamweaver Webpage:

Commercial Design Job

Text links to second page

LEVELS OF EMPHASIS in Commercial Design Remodel of CHAMBER OF COMMERCE in Fort Collins:

Old Chamber of Commerce building in Ft. Collins



1. EMPHATIC EMPHASIS

New arched tower corner entrance

Architectural center of attention is emphatic level

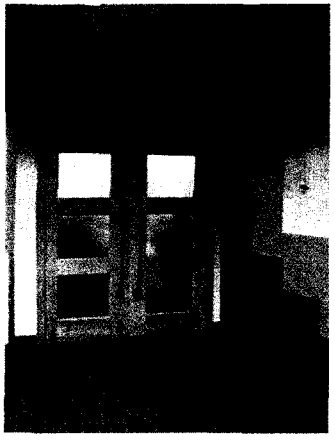
Entrance is main focal point of new building

Link to full view of Reception Station

Second page also shows computer model of interior floorplan & conference room with accent wallpaint.

3. SUBDOMINANT EMPHASIS

If furniture is arranged to support the dominant emphasis it becomes the third level of called subdominant emphasis. This reception workstation is at the same end of the room. Questions can be answered or material picked up on the way into the conference room.



2.DOMINANT EMPHASIS

The second level of emphasis once inside leads members to the conference room. The main function of the Chamber or Commerce is monthly business meetings for area members.

Dominant emphasis is created by the designer. The unusual corner treatment creates a focal point. The door style is custom made and colored wall tile pattern, gradation rhythm, leads eye to the doors.

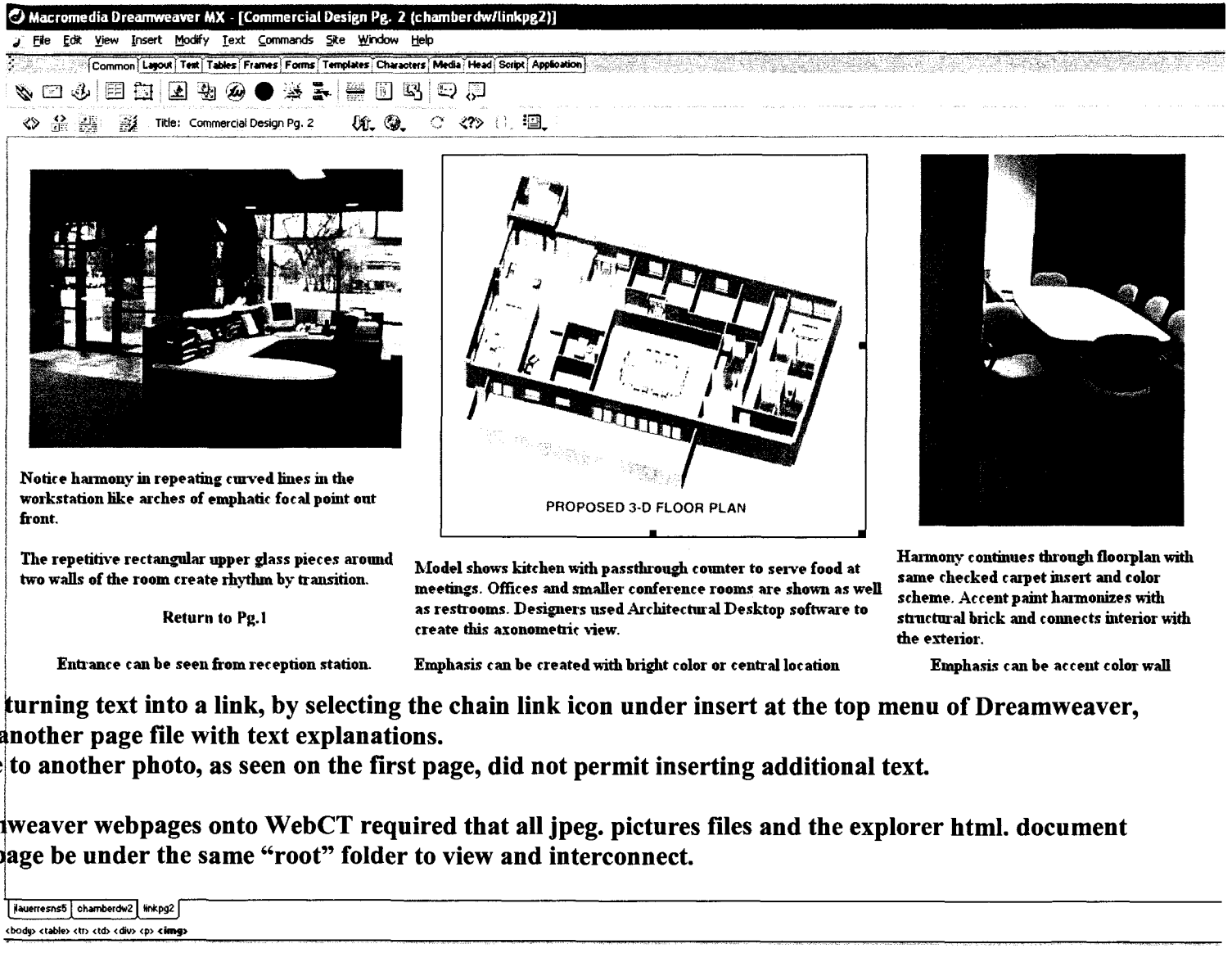
4. SUBORDINATE EMPHASIS

A fourth level of emphasis can be created with accessories or grouping of small items. This bookrack for the Chamber newsletter and pamphets from business members groups this information for pickup while waiting of leaving.

One area can have four levels of emphasis. The primary center of attention its either the emphatic or dominant emphasis areas. A designer frequently needs *to create a dominant emphasis in the absence of an* emphatic feature. Secondary focal points include the subdominant and subordinant levels that work with the main focal point. These lower levels add interest when looking around the space.

Second Page

Commercial Webpage



Linked back to front page

Highlighting and turning text into a link, by selecting the chain link icon under insert at the top menu of Dreamweaver, could connect to another page file with text explanations.
Linking a picture to another photo, as seen on the first page, did not permit inserting additional text.

Uploading Dreamweaver webpages onto WebCT required that all jpeg. pictures files and the explorer html. document file for each webpage be under the same "root" folder to view and interconnect.

Still-copy Views from Panorama 1
Governor's Mansion

Still-copy Views from Panorama 2
Governor's Mansion