INFLUENCES ON LEARNER-LEARNER INTERACTION IN ONLINE CLASSES

A Dissertation

by

SHANNON DIANE FITE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2003

Major Subject: Educational Psychology

INFLUENCES ON LEARNER-LEARNER INTERACTION IN ONLINE CLASSES

A Dissertation

by

SHANNON DIANE FITE

Submitted to Texas A&M University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Approved as to style and content by:

Karen L. Murphy	Stephanie L. Knight
(Co-Chair of Committee)	(Co-Chair of Committee)
Jon J. Denton	Douglas J. Palmer
(Member)	(Head of Department)
M. Carolyn Clark	
(Member)	

May 2003

Major Subject: Educational Psychology

ABSTRACT

Influences on Learner-Learner Interaction in Online Classes. (May 2003)

Shannon Diane Fite, B.S., Texas A&M University;

M.Ed., Texas A&M University

Co-Chairs of Advisory Committee: Dr. Karen L. Murphy
Dr. Stephanie L. Knight

Interaction, particularly learner-learner interaction, needs to be cultivated in online classes in order for students to have a satisfying learning experience. This study considered two graduate level online classes in an effort to determine: 1) is cognitive style related to the quantity of learner-learner interaction in online courses, 2) is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses, 3) how do selected learners differ in their use of interaction elements during online discussion, and 4) how do selected learners perceive their experiences in online courses.

Using the Student Demographic Questionnaire, the Group Embedded Figures Test, the Text Analysis Tool, and an Interview Protocol developed by the researcher, the study was conducted with a mixed method design.   Learner-learner interaction was considered in terms of the students' contributions to the FirstClass discussion activities that were completed as part of the course requirements.

This study found that: a) there is not a correlation between cognitive style and quantity of learner-learner interaction, b) some learner characteristics do influence learner posting preferences, c) interaction elements during online discussion do not

indicate the content of discussion, but do somewhat indicate how the discussion is taking place, and d) students have opinions on how their experiences in online courses should impact online course design, particularly in terms of knowing the learner and communication. Knowing the learner was discussed in terms of time management, motivation, and differences among learners. Communication was discussed in terms of spontaneity, isolation, freedom, and accountability. Course design was discussed in terms of flexibility, organization, accountability, and technology. The results of this study have implications regarding online course design and recommendations for future research.

DEDICATION

To my parents,

Ron and Diane Fite,

who have been the most supportive, most wonderful parents

a daughter could ever dream of having.

ACKNOWLEDGMENTS

Thank you to…

Dr. Karen Murphy for answering the phone in 1996 when I was looking for answers about my graduate career. Thank you also for all of your patience and support over the years as I pursued this degree. Dr. Stephanie Knight for being so supportive and offering such wonderful advice throughout this process. Thanks for stepping up and becoming my co-chair when I volunteered you. Dr. Jon Denton, Dr. Carolyn Clark, and Dr. John Ford for serving on my committee and offering good suggestions and feedback. Thanks for your support.

Aaron Weatherholt, my husband, for the tremendous amount of patience you had with me when I was busy being "evil dissertation Shannon". Your support was endless, and, without it, I would not have made it.

Windy Hollis, my best friend and ray of sunshine when I am having a bad day. I can always count on you for a laugh and to feel better—even when we are both having horrible days.

Mom, Dad, Jennifer, and Brian, thanks for all of the support and understanding!

The others who have made the dissertation process easier—Arlen Strader, Brian Lopez, and the student workers, thanks for understanding when work was not my top priority; Dr. Ralf St. Clair for listening to all of my venting and helping put things in perspective; the ladies at the Thesis Office who have been so supportive of me for so many years; Dr. Sue Mahoney for paving the way; Dr. Steve Downey, for all of the heckling and help; and Angela Gomez—I don't know how, but we finally did it!

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

For those seeking to further their education, whether by enrolling in a single

course, or by completing an entire degree program, the options for accessing educational

resources are becoming unlimited. Class locations and times have become open and

flexible and students no longer have to be in a classroom physically to participate in a

class discussion. The fact is, one of the goals of distance education is to make it

convenient so that students will no longer need to commute to a physical campus (Yi-

Wilson, 2000). Distance education has become less expensive, more accessible, and

possibly even preferred among some learners (Graham, 2002; Wagner, 1994). These

advances are due in part to the improvements in course design for distance education

courses and improvements in technologies used to deliver courses through distance

education strategies.

Improvements in the technology and the increased contributions to the body of

research literature in the area of distance education, particularly in the areas of

interaction, delivery tools, and instructional strategies, have made the distance learning

experience more feasible, effective and overall more enjoyable for students.   Though

better technologies have improved distance education, the exponential growth in the

capabilities of technology has also caused a conundrum in distance education. How do

instructors design their courses for effective delivery via this technology, while at the

---

This dissertation follows the style and format of *American Educational Research Journal*.

same time maintaining the features that draw students into distance education delivered courses? McIsaac and Gunawardena (1996) identified appropriate design as a critical element in the effectiveness of distance education. While cutting edge technologies like online chat software, bulletin board systems, the Internet, online streamed video and audio files allow distance education to reach the students 24 hours a day, 7 days a week, the effort is lost if the design of the instruction is not effective (Brill, 2001; Garrison, Anderson & Archer, 2000; Hara & Kling, 1999). An advantage of this rapid technology growth, however, is that the technology is becoming more capable and researchers are addressing some of the non-technologically based issues like interaction, course design, and instructional strategies with a pedagogical, not technological, emphasis (Wagner, 1994).

One of the important elements in design is the inclusion of the opportunity for interaction. How students and instructors are able to communicate effectively in order to facilitate the overarching purpose of classroom based communications—providing motivation, feedback, and dialogue and creating a learning community is based largely on interaction (Wagner, 1994). Though interaction is heavily emphasized in distance education, and sometimes considered one of the deficiencies of this instructional method, it is important to remember that it is also necessary for learner success in traditional programs as well. Research shows that learners often interact with each other in an online class for relationship building and information exchange in an effort to pursue personal relationships with the other learners, and not necessarily for the purpose of gaining knowledge (Garrison et al., 2000; Kanuka & Anderson, 1998). Distant

students working alone at different times and in different locations have sometimes reported feeling isolated, confused and anxious due to the lack of visual and physical interactions with the other students (Hara & Kling, 1999). Consequently, these feelings of isolation and anxiety are often attributed to the lack of a developed online community or underdeveloped social presence (Gunawardena, 1999) and can ultimately be avoided by creating an environment that lends itself to interaction among the learners (Kanuka & Anderson).

It is also important to realize that learner-learner interaction does not occur only to provide a means for social presence—learner-learner interaction will help students learn (Fahy, 2002; Gunawardena, 1999). Investigating the content of interaction is an issue in distance education courses. Some questions researchers are asking to probe into the content of interaction include, "is interaction really taking place?", "what is the quality of the interaction?" (Tu & McIsaac, 2002), and "what does the interaction contain?" (Fahy).

With the constant advent of new and improved technologies in distance education, instructional strategies need to be reconsidered often—the strategy is the determining factor in an effective distance education course (Morrison, 2001). While the media may influence the way that instruction can be delivered, there are also certain aspects of the learners (e.g., cognitive style, learner preferences, online course experience) that may influence the way students respond to instruction or the delivery medium. Additionally, the learning environment, including course materials, methods for course delivery, and instructional strategies, has the capacity to influence the

characteristics of the learner (Anderson, 2001). It is also important to consider how students use technology in a distance education environment. According to Jonassen (2000), students use technology to articulate knowledge, to reflect on what they have learned, support meaning making, construct personal representations of meaning, and support thinking. These uses of technology for learning need to be considered in the distance education environment, particularly for specific learners and their characteristics.

Cognitive style, such as field dependence/field independence may provide an indicator of how a student may experience a distance delivered course (Ching, 1998). For example, a student who is field dependent may desire an even more interactive, real-time type course than a field independent student. Learner preferences may be partially determined by the student's cognitive styles, but additionally may be influenced by extrinsic factors surrounding the student's life such as having full-time jobs, caring for children, being married, or age (Huang, 2002). These types of influences may present tougher obstacles for a student's course participation than instructor imposed obstacles such as course design and timelines. Learner characteristics may serve as indicators of more specific preferences like posting preferences—the time at which a student may choose to participate in an asynchronous online class (Huang). All of these considerations are a part of the traditional classroom as well, but because one of the supposed benefits of distance education is flexibility due to the potential of synchronous or asynchronous delivery, these considerations must be given even further thought (Conrad, 2002b). Finally, the level of previous online course experience should be

considered. Students new to the online course delivery method, regardless of cognitive style or preferences, may find themselves barraged with deadlines, assignments, and little understanding of how the course delivery system works (Conrad).

Statement of the Problem

Interaction has been identified as one of the most important components of a successful student experience in online courses in terms of motivating and satisfying learners (Fulford & Zhang, 1993). As online course designers and instructors face the challenge of creating courses that are effective in terms of content delivery, they must also strive to create courses that encourage and help facilitate interaction (Wagner, 1994). Studies considering interaction from the student's perspective (Muirhead, 2001) and student's experiences in online courses (Howland & Moore, 2002) are lacking. Therefore, research is needed to identify the influences on learner-learner interaction in online courses and determine how to incorporate these influences into the design for online courses from the student perspective, in an effort to produce high quality learning materials (Anderson, 2001).

Statement of the Purpose

The purpose of this study was to determine how to modify distance education based course design to create a comfortable and effective learning environment for the learner. More specifically, this study was initiated to determine if cognitive style is related to the quantity of learner-learner interaction in online courses and to determine if there is a relationship between learner characteristics and learner posting preferences in

learner-learner interaction in online courses. The study also sought to determine how selected learners differ in their use of interaction elements during online discussion and explore how selected learners perceive their experiences in online courses.

Research Questions

The following questions were addressed in this study:

1. Is cognitive style related to the quantity of learner-learner interaction in online courses?

2. Is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses?

3. How do selected learners differ in their use of interaction elements during online discussion?

4. How do selected learners perceive their experiences in online courses?

For question one, the researcher defined cognitive style in terms of field dependence or field independence. Learner-learner interaction was measured based on the quantity of postings the participants contributed to the online discussion activities. The researcher defined learner posting preferences observed in the online discussion activities for question two in three ways: 1) day of week students posted messages within the units, 2) range of time within each discussion (beginning, middle, or end) students posted messages, and 3) time of day students posted messages within each discussion. The relationship between the learner characteristics and learner posting preferences was investigated using age, online course experience, number of credit hours enrolled, and number of hours employed as learner characteristics. For question three, the researcher

analyzed the interaction elements within the online discussion activities of selected learners. In question four the researcher explored how selected learners perceived their experiences in online courses.

<div align="center">Definitions</div>

The following definitions include terms as they are referred to within this study.

Asynchronous online discussion is a dialogue that takes place through a web-based interface, not in a real-time mode.

Cognitive style is the strategy learners use to solve a problem, learn a concept, or process information (Witkin, 1977).

Field dependent refers to the inability to retrieve a simple geometric figure from within a more complex one (Bruck, 1997). Typically, field dependent students perceive things more globally, are extrinsically motivated, and desire more interaction in their learning strategies (Jonassen & Grabowski, 1993).

Field independent refers to the ability to retrieve a simple geometric figure from within a more complex one (Bruck, 1997). Field independent students typically perceive things analytically, are intrinsically motivated, and do not need a large degree of interaction in their learning strategies (Jonassen & Grabowski, 1993).

Interaction is the totality of interconnected and mutually-responsive messages (Fahy, Crawford, & Ally, 2001).

Interaction elements are defined by the Text Analysis Tool (TAT; Appendix A) for this study. The TAT defines interaction elements in the following categories: 1: Questioning (type 1A, *vertical*; type 1B, *horizontal*), 2: Statements (type 2A, *non-*

referential; type 2B, *referential*), 3: Reflections, 4: Scaffolding/engaging, 5:

Quotations/citations (type 5A, *quotations* and *paraphrases*; type 5B, *citations*) (Fahy,

2001).

Learner characteristics include the age, amount of online course experience,

number of credit hours enrolled, and number of hours employed for the participants in

this study.

Learner-learner interaction is interaction that takes place between one learner

and another learner as individuals or in groups (Moore, 1989).

Learner posting patterns describe the characteristics by which learners present

their responses in online discussion activities. These characteristics may represent a

learner's preference for posting on weekdays or weekends, for posting at certain periods

during the day, and for posting their messages at specific points during a discussion

activity timeline.

Online course is a class offered via an Internet-based or Internet-supplemented

method.

Online discussion is a dialogue that takes place either in real-time or

asynchronously through a Internet-based or Internet-supplemented medium.

Posting preferences are the time and day within asynchronous instructional

discussions at which students participate.

Synchronous online discussion is a dialogue that takes place through a web-based

interface, in a real-time mode; sometimes known as "chats."

Traditional classroom, for the purposes of this study, is a face-to-face classroom utilizing teacher-centered instructional strategies.

Limitations of the Study

Every attempt was made to design this study to eliminate threats to validity. Nevertheless, certain characteristics inherent in the methodology have produced certain limitations. The first limitation concerns the sample. The first issue with the sample was that it was not random—most of the enrolled students were required to take these courses as a part of their degree program. This limitation is important because it affected who the learners were in these courses based on their areas of interest. The second issue is that it was a sample of convenience. The sample needed to be a sample large enough for statistical consideration and had to be a part of online course delivery with observable learner-learner interaction. The last issue with the sample is since these courses were only offered online, some students may have been taking the course online but would have preferred to take it in a face-to-face environment, which may have affected their participation. Therefore, findings may generalize to students in the courses used for this study.

A second limitation is that the learner-learner interaction studied was a required assignment for the courses. As described in the syllabus, the online discussion activities comprised 30% of the student's total course grade. Students were designated as co-facilitators for one of the online discussion activities for the course, and were participants for the others. The expectations of the co-facilitators and participants were described in the course syllabi. The online discussion activity grades were based on the

participation rubrics provided by the instructor, which included points based on the number of quality postings a participant made. This requirement may have encouraged students to post the minimum number of postings in order to receive maximum credit rather than posting in order to attain an understanding of the materials. As a result, students may have posted simply to meet the requirements of the participation rubric. However, the results did not reveal participant requirements as an issue for this study.

A third limitation of the study is that the learner-learner interaction considered for this study was potentially only one aspect of the learner-learner interaction that took place among the students online. A more complete study of learner-learner interaction should have considered all types of possible learner-learner interaction, including synchronous interactions. Including these types of learner-learner interactions would perhaps have had a significant effect on recommendations for course design because some students may prefer synchronous communications over asynchronous.

A fourth limitation of the study is that in order to address the research questions regarding use of interaction elements and perceived online course experiences, non-native speakers were eliminated from the sample. This elimination was necessary in order to eliminate language issues as a variable, since that was an issue not addressed directly in this study.

A fifth limitation of the study is that there was not much variance in the scores from the cognitive style measure. The scores indicated that 85% of all of the students were field independent, making it difficult to determine a relationship between cognitive style and quantity of learner-learner interaction.

Significance of the Study

The aim of this study was to contribute findings related to course design for learner-learner interaction in the online classroom based on learner characteristics. This study investigated whether cognitive style was related to the quantity of learner-learner interaction in online courses. These findings may contribute to an understanding of the role of cognitive style in terms of quantity of interactions. Further, the study determined the relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses. These findings may help instructional designers and online course instructors design classes that are more conducive to learner-learner interaction based on student needs in online learning environments. The study also analyzed interaction in terms of interaction elements in asynchronous online discussion. This analysis helped determine what types of interaction the online discussions contained, and could potentially help instructors determine how interaction is taking place in online courses. Lastly, the study considered the perceptions of online course experiences based on interviews with some of the students. These opinions could further describe how online courses should be designed.

CHAPTER II

REVIEW OF LITERATURE

This chapter reviews the research related to the role of computer-mediated communication, interaction, and field dependence/field independence as cognitive styles. The most important goal of distance education is that effective learning occurs. Thinking back to the traditional classroom and using what researchers, instructors, and course designers have learned in that setting has helped pave the way for successful teaching over distance. While many of the traditional tenets are useful in distance settings, interaction, specifically learner-learner interaction, along with instructional strategies that facilitate interaction, are areas that must be considered carefully for online distance education courses.

Computer-Mediated Communication

One type of delivery method used to facilitate distance education is computer-mediated communication (CMC). This section will describe, within the context of distance education, CMC in terms of its definition and its influence on interaction and learning strategies. Further, CMC instructional design issues and strategies will be discussed.

Giving instructors the capability of reaching students over great distances, distance education has become an important and increasingly necessary concept in modern education. Distance education is an all-encompassing term used for any type of teaching or learning that occurs over a geographical gap. The context of distance education includes many different technologies, such as materials in print, broadcast

radio, broadcast television, computer conferencing, email, interactive video, satellite telecommunications, and multimedia software. These technologies promote the student-teacher interaction necessary for successful distance learning. For the purposes of this study, distance education refers to the holistic approach to teaching over a distance. Distance learning refers to learning through distance education methods.

The number of higher education courses offered through distance education methodologies is growing, particularly because of the emphasis on adult learners that is inherent to distance education. Graham (2002) cites a National Center for Education Statistics study that showed several changes from 1994-1995 to 1997-1998. There was substantial growth in the number of higher education institutions offering distance education courses in all types of institutions except two-year private institutions. In two year public institutions, the number of distance education courses offered grew from 58% to 72%; in four year public institutions, that number went from 62% to 79%. The total number of distance education courses offered was over 50,000 in 1997-98—a figure that had doubled since 1994-1995. Enrollment in distance education courses also had doubled over a three year period and was at 1.6 million in 1998.

McIsaac and Gunawardena (1996) contend that the structure of education will eventually change and the need for separate theories for distance education will blend into the theoretical foundations for mainstream education. There is, however, consensus in current education literature that online course facilitation is the teaching mode of the future (Youngblood, Trede, & Di Corpo, 2001) and that distance education systems that provide high levels of interactivity and learner control best meet instructional needs

(Fulford & Zhang, 1993). McIsaac and Gunawardena (1996) believe that distance education will move from highly individualized forms of instruction to a format that encourages teaching students in small groups, including collaborative learning among peers. Computer-mediated communication (CMC) is one form of distance based instructional delivery that accommodates teaching in small groups as well as collaborative learning.

CMC has many definitions, though one of the most inclusive definitions uses three important concepts of CMC—interactivity, multi-way communication, and synchronous or asynchronous communication. Romiszowski & Mason (1996) define CMC as a "generic term used for a variety of systems that enable people to communicate with other people by means of computers and networks. Communication between different parties separated in space and/or time, mediated by interconnected computers (p. 438)." CMC is one of the earlier methods in which computers have been used in education and began as a mostly text-based form of communication and over time has experienced the effects of rapidly changing technologies and now incorporates graphics, audio, video, and even in some cases, virtual reality. Some examples of uses of CMC in education include computer conferencing, bulletin boards, email, listservs, and discussion lists. Practical issues related to CMC are the content and objectives being used, the importance of interactivity, appropriate learning strategies and tactics, approaches to learner and system control, and attention to outcomes and evaluation related to CMC. CMC lends itself to activities that include discussion, brainstorming, problem solving, collaboration, and reflection (Harasim, 1987). In education, CMC is

not used only for distance education, but also to help make communications within a campus more convenient. Some institutions use CMC for complete instruction, some use it to supplement instruction.

CMC is sometimes limited to communications that take place with other people, not with only the computer, like in computer-assisted instruction. Two-way communication is the most basic level of computer-mediated communication. The communication can be multi-way, including a large group of people who receive and respond and to each other's messages. Sometimes large groups are a disadvantage, however, because with the greater number of participants, it becomes increasingly difficult to track who said what in the conversations (Romiszowski & Mason, 1996), and the instructor may not immediately be there to soothe any sources of conflict.

The roles of the students and instructors are different in CMC from traditional classrooms. Students have the opportunity for more decision-making and independent achievement in CMC, though they will apply many of the learning strategies they learned in the traditional classroom. Strategies based in the traditional classroom that are transferable to the CMC environment include study patterns, time scheduling, working with others, establishing attitudes, setting goals, seeking task and structure information, and demonstrating competence (Romiszowski & Mason, 1996). Learning strategies specific to the CMC environment include dealing with multiple discussions, information overload, asynchronicity, textual ambiguity, processing on-line information, and determining what contributions to make. As learners become more immersed in CMC, they have to determine how, when, and where they will study and at the same

time negotiate their learning activities and maintain content focus. Learners in CMC have more control over these areas than the traditional learner. CMC utilizing both synchronous and asynchronous methods help the students give a more thought out, structured, complex answer to a question, though it may also facilitate procrastination by the student, or even failure to respond. One of the challenges of CMC is that it encompasses a dialogue that is "multilevel and multispeed" (Romiszowski & Mason, 1996, p. 446). Learners sometimes get "lost" in a CMC environment due to technical glitches, physical absence, boredom, cognitive difficulties, illness, dissatisfaction, and impatience (Conrad, 2002a).

Instructors have to understand the importance of course design at a higher level in CMC, incorporating small group activities, conferences, and specific topics. In CMC the role of the teacher is not content provider (Gunawardena, 1992). The teacher is facilitator and guide to resources.

The capacity for either synchronous or asynchronous communications is an advantage that CMC offers. Since one of the desirable characteristics of distance education and CMC is being able to work around time schedules, the ability to communicate either through real-time or asynchronous methods is advantageous. Synchronous communication is much like a face-to-face environment, where the interaction takes place in real-time. Asynchronous communication takes place at different times from the different participants (Bates, 1995), and is one of the major factors that differentiates CMC from face-to-face communication (Howland & Moore, 2002). One frustrating issue associated with asynchronous CMC is the amount of email

that may be involved with online classes. While CMC reduces the constraints of time and location, it also makes huge demands on the instructor and students in terms of reading and responding to messages (Hara & Kling, 1999; Romiszowski & Mason, 1996).

CMC is highly interactive in nature because it has the potential of combining text that can be saved for permanent records with the speed of communicating by telephone. Further, in CMC, interaction can be more flexible and richer than in other forms of computer-based education (Fahy, 2002; Romiszowski & Mason, 1996). CMC is a communications medium that has the potential to provide a more equal social interaction among participants. The participants may be anonymous in terms of race, gender, and physical features (McIsaac & Gunawardena, 1996). These abilities are inherent to the computer-based medium. While CMC is inherently interactive, feedback as a form of interaction is not always given sufficiently.

For a successful experience in CMC, participants need prompt and appropriate feedback often and they need a sense of community, or social presence (Tu & McIsaac, 2002). Social presence is determined by how an online group interacts and grows as they experience the online environment in the instructional context (Fahy, 2002; Tu & McIsaac). According to Tu (2001) social presence has three dimensions that include social context, online communication, and interactivity. The higher the level of social presence an online group feels, the more interaction is likely to occur. CMC offers a more democratic and group discussion oriented experience than the traditional classroom and other telecommunications settings, possibly because CMC allows interaction to

occur at complex levels (Howland & Moore, 2002; Romiszowski & Mason, 1996).

Participation frequency, timeliness of contributions, and the nature of messages being

posted are all factors that affect the interactivity of CMC. Regarding interaction,

research shows that although CMC groups interact less and take longer to arrive at a

decision than face-to-face groups, CMC groups are more inclined to act as equals

(Romiszowski & Mason).

Instructional Design

Distance education, including CMC, has two major design considerations—

design for the content and design for the delivery technology. While traditional

education has elicited much research and debate concerning the content and pedagogy,

the advent of distance education has been so rapid and so tumultuous due to the

technology, that research has reflected rather than driven its practice.

To fully understand distance education beyond its definitions and frameworks, it

is important to identify who the distance learner is. The National Center for Education

Statistics (NCES) reported that for 1999-2000, in 4-year higher education institutions,

that 13.2% of undergraduate students participated in distance education classes. Males

comprised 46.2% while females comprised the other 53.8% of these students. Most of

the students were enrolled in courses part-time (68.2%) and were older than 24 (78%).

Further, 47.7% of these students were employed with 70.5% of the students employed

full-time. The students more than 30 miles from home were about 55% of the distance

education population. NCES described master's students enrolled in distance education

as 12.3% of the total master's population. Huang (2002) described that for this type of

student, schedules and experiences varied widely. Much of distance education is designed with the adult learner, but not necessarily field independent learner, in mind. Learner characteristics have the potential to be a major influence on how and when a student interacts in distance education courses.

Though the technology can easily achieve the goal of minimizing the time and space boundaries in distance education, the associated pedagogy must change from a pedagogy based on traditional face-to-face methods to methods derived from what works in distance education classrooms to achieve this goal as well.

Instructional design is an issue in CMC. Like distance education, the design of CMC must take into consideration learner controlled environments and possibilities for interaction. Fusion of the technology of several fields like the computer sciences, cognitive sciences, and telecommunications sciences will eventually allow CMC to overcome its biggest obstacle—the inability to experience the nonverbal communications elements such as expression, gesture, and touch (Romiszowski & Mason, 1996). According to Fahy (2002), the quality of CMC is dependent on the content of the interaction as well as the environment in which the interaction is created. Creating a quality environment involves cultivating a strong social presence (Gunawardena, 1999; Tu & McIsaac, 2002).

In the future, CMC will grow more robust, not only through the advances in technology, but also because of the growth of international online communications and a better defined role of the online teacher. Researchers will find ways to make more

sensible policy and planning decision within CMC, as well as media and design decisions (Anderson, 2001; Romiszowski & Mason, 1996).

At the design level, distance education needs to investigate how the learner, instructor and technology collaborate to generate knowledge. Further, the key players need to be identified—the students, faculty, facilitators, support, staff, and administrators (Willis, 1994), and their roles developed and implemented. The key players cited in distance education may also be used in CMC environments (Willis). Cifuentes, Murphy, Segur, and Kodali (1997) described two types of design considerations for CMC— administrative design and instructional design. Administrative design included grouping and grading the students while instructional design includes opportunity for collaboration, relevance, and learner control. Carr-Chellman and Duchastel (2000) based design considerations in online courses on a central element called the study guide. The study guide served as the "students main reference to the content, structure, and activities associated with the online course" (p. 233). Carr-Chellman and Duchastel determined that students prefer a textbooks in a traditional form rather than online. Further, students prefer online courses to be designed around a set of assignments that clearly outline the course objectives and desired outcomes.

Instructional Strategies

Instructional strategies for online course development, like those of traditional course development, should focus on the needs of the students and create "an improved learning environment" (Huang, 2002). A major difference between traditional and online instructional strategies is apparent in the area of learner-learner interaction.

Unlike online classes, the traditional class provides limited opportunities for integrating learner-learner into educational settings (Sutton, 2001). In the traditional classroom where didactic instruction is occurring only one person speaks at a time, and the content of the conversation is not preserved.

Instructional strategies in online course development should include activities that encourage community building such as chat sessions or discussion forums (asynchronous and synchronous), e-mail, and voice communication (Romiszowski, 1997). Web-based textual materials are important for relaying course information to the learners such as assignments and deadlines, but research shows that a print-based textbook is still preferred when students are offered a choice between print-based or web-based textbooks (Carr-Chellman & Duchastel, 2000). Other strategies for effective online class design include ones that consider learner control, feedback, and task characteristics (Anderson 2001). Feedback needs to be available during a task rather than after the task is completed, as is the conventional model. The course designer needs to conduct a thorough task analysis for each individual task within the course (Gunawardena , 1999).

There is a need in education research to evaluate strategies that increase learner-learner interaction. Providing these opportunities for students help them form a lasting cohesive bond and improve the effectiveness of learner-centered instruction. Interaction activities must be plentiful, but must also be relevant since activities that are not perceived as important will not improve attitude or motivation (Fulford & Zhang, 1995). Teachers may want to involve learners in designing strategies to improve participation

and make them responsible for their own learning and interaction. A lot of this student buy-in to interaction activities can be attributed to their cognitive style, at least in the use of distance education television (Fulford & Zhang).

Distance education and computer-mediated communication serve in the capacities to reach learners over great geographical distances as well as educational distances. For the most effective use of distance based instructional strategies, methods for incorporating quality interaction should be considered.

Interaction

Interaction takes on several different forms in the distance education process. This section will define interaction and describe the different forms. Further, this section will discuss the roles of interaction in online courses and explain different types of instruments designed to analyze interaction in online courses.

Similar to the importance of interaction for success in traditional classrooms, interaction in the distance classroom is perhaps the most significant issue in student satisfaction (Fulford & Zhang, 1993), particularly because learning is a social process (Conrad, 2002a). Distant learners must have sufficient interaction with their instructors for information exchange. Further, the interaction in a course may take place with the instructor, who may or may not be a designer or content expert in the course. Moore (1989) cites three types of student-centered interaction: learner-learner, learner-instructor, and learner-content. Hillman, Willis, and Gunawardena (1994) add a fourth interaction, learner-technology. The purpose of interaction in online classrooms, like in traditional classrooms, is to provide motivation, feedback, and dialogue (Wagner, 1994).

Online discussion differs from traditional classroom discussion because it allows everyone to talk at once and there is no need for turn taking. Also, the discourse can be preserved electronically, which provides a means for student reflection (Hewitt, 2001). Online discussion also allows less vocal students to participate without interruption and reduces the possibility of domination of conversation by one person, which may be one reason several researchers have determined that distance courses can be more interactive than traditional ones (Roblyer & Ehami, 2000).

Interaction can be defined as the totality of interconnected and mutually-responsive messages (Fahy et al., 2001). Studies have shown that students experiencing higher levels of interaction have positive attitudes and higher levels of achievement (Fulford & Zhang, 1993). Many believe that the defining characteristic of the computing medium is its interactivity (Swan, 2001) with interaction among students as an important factor in the success of online courses (Fulford & Zhang). Learner-learner interactions seek to encourage learners to work together to analyze and interpret data, solve problems and share information, opinions and insight as well as construct and apply targeted skills and knowledge (Hirumi, 2002). These types of activities can lead to high quality interaction with learning materials, between teachers and learners, as well as among learners, and are essential for effective learning (Soo & Bonk, 1998). Further, learner-learner interaction is extremely important during application and evaluation of new knowledge as the learner's peers serve as a base for understanding.

Interaction has been identified as a necessary component for student success in online classes (Fulford & Zhang, 1993). Interaction among students through course

discussions seems to be one of the most influential features of online courses (Swan, 2001). The success of online courses depends on the value instructors place on discussion. The asynchronous nature of most on-line discussion makes it impossible for the instructor to control (Swan), which online students see as beneficial. Other benefits of asynchronous online learner-learner interaction are that some students describe the interaction to be more equitable and democratic than that of the traditional classroom, possibly because the online classroom creates a culture of mindfulness and reflection (Swan). According to Wagner (1997), interaction functions to increase participation, develop communication, receive feedback, enhance elaboration and retention, support learner control/self-regulation, increase motivation, increase understanding, and to increase teambuilding, discovery, exploration and closure for the students. Learner-learner interaction in the online course also encourages experimentation, sharing of ideas, distributed participation, and collaborative thinking (Harasim, 1987). Learning styles do not impact how students interact with media and methods of instruction, but they do affect satisfaction with other learners (Gunawardena & Boverie, 1993). Overall, learner-learner interaction provides an additional dimension to distance education, particularly because it contributes immensely to a learner-centered view of learning (Wagner, 1994).

Since online courses are not inherently interactive, interaction in the online course depends on frequency, timeliness, and the nature of the messages posted, and must be explicitly designed into the course. To cater to the interactive learner, a course designer should consider learner characteristics—cognitive style, attitude, and prior

knowledge, in the instructional strategies. Instructional strategies should also include sufficient instructor facilitation, support and content (Howland & Moore, 2002).

Learner-learner interaction in the traditional classroom can be closely monitored and nurtured if needed, particularly because the traditional classroom is self-contained—the teachers and students are in close geographical proximity. Learner-learner interaction in the traditional classroom is often facilitated by the relationships formed in the real-time environment of the traditional classroom. This interaction fosters future communications and relationships that the students can utilize in and out of class.

The online class, too, can allow for a sense of community and relationship to be formed among the learners, but since there is possibly no opportunity for the students to meet face-to-face and begin forming the relationship, it may have to be formed virtually. Further, online classes may be held completely asynchronously, forcing relationships to be built without the benefits of timeliness and spontaneity (Muirhead, 2001).

The quality of interaction in asynchronous online discussions is an issue concerning learner-learner interaction in online classes. While these discussions are often labeled as a form of interaction, true interaction may not be occurring, due to when and how often the students respond in these discussions (Muirhead, 2001). Further, sometimes students respond only to meet the requirements of a graded assignment, which may or may not be interaction that benefits the student.

Structure, class size, feedback provided to the students, and participants' levels of experience with CMC were four influences on interaction identified by a study conducted by Vrasidas and McIsaac (1999). Their sample contained seven students and

one professor in a graduate online course that was supported by FirstClass and a course web site. The findings were generated by observing the students during the face to face meetings, conducting semi-structured interviews with the teacher and the students, and collecting all student work and messages from the teacher's mailbox. Data analysis was conducted by using inductive and deductive stages to generate statements of the "relationships and generalizations" of the data.

Interaction is significant in any course, particularly computer mediated courses, because of the importance of feedback for learner satisfaction and instructor effectiveness. Instructors often include some sort of required interaction within their course design to encourage collaboration and participation among the learners. This interaction activity should be meaningful and relevant to the course; the students should not interact simply for the sake of meeting a course requirement. Instructors as well as researchers have struggled to devise methods to analyze the contents of learner's online interactions to determine not only the quantity of learner interaction, but also the quality of learner interaction.

Field Dependence/Field Independence as Cognitive Styles

Field dependence/Field independence (FD/I) is a measure of cognitive style developed by Herman Witkin and has been around for over forty years. FD/I is a study of the process of cognitive styles relating to how an individual functions. FD/I as cognitive styles are bipolar and value neutral (Witkin, Moore, Oltman, Goodenough, Friedman, Owen, & Raskin, 1977). The difference between field dependent (FD) and field independent (FI) learners lies in the strategies they use for learning (Witkin, Moore,

& Cox, 1977). A person's FD/I is a dimension of their cognitive style, or a place on a continuum. A person's FD/I can change over time. According to Jonassen and Grabowski (1993), it will change over a life span. They argue that children are typically FD, and adults are more often FI. This would imply that a person's level of field independence increases over time.

FD/I takes into account many factors that contribute to a person's learning style. Jonassen and Grabowski (1993) define FD/I "as the degree to which a learner's perception or comprehension of information is affected by the surrounding or contextual field" and describe the factors that FD/I considers as:

- How much the surrounding framework dominates the perceptions of item within it

- How the surrounding organized field influences a person's perception of its components

- How a person perceives part of the field as a discrete form

- What the organization of the prevailing field determines considering the perception of its components and

- The extent to which a person perceives analytically

The results of the way these factors influence learning determine whether a person is field dependent or field independent.

Field Dependence

According to Brenner (1997), more people on the whole are likely to be field dependent. FD learners rely on the external surroundings of what they are learning in order to process information, whereas FI learners use internal references as guides to information processing (Witkin, 1977). A summary of characteristic differences in FD/I is offered by Jonassen & Grabowski (1993). FD learners are: global; accepting of structure; externally directed; attentive to social information; conflict resolvers; sociable and gregarious; affiliation oriented; interpersonal; conventional, traditional; influenced by salient features; factually oriented; influenced by format/structure; sensitive to others; and affected by stress. Further, FDs need friendship; they often acquire unrelated facts, accept ideas as presented, and get their feelings/decisions from others. As a result, FD are more socially oriented, are not risk takers, and are uncomfortable with ambiguity.

Field Independence

FI learners, in contrast, are analytic; will generate their own structure; are internally directed and inattentive to social cues; are often philosophical and cognitive; individualistic; distant in social relations; reserved, aloof; experimental; will generate their own hypotheses; are conceptually oriented; and acquire information to fit a conceptual scheme. Further, they will represent concepts through analysis, are less affected by format/structure, are comfortable with impersonal orientation, insensitive to social undercurrents, and ignore external stress. FIs do not pay attention to details, are driven by internal motivations, and are good at self-directed learning (Anderson, 2001).

Cognitive Style and Distance Education

In an effort to make distance education more appealing and effective for the learners, researchers as well as course designers are considering learners' cognitive styles as they design courses. Kearsley (1995) emphasizes that interaction is dependent on the personality, age and cognitive styles of the learners. Jonassen and Grabowski (1993) identified the following characteristics of field dependent: FDs are better at collaborative and group-oriented work and they excel at situations where they must follow set patterns for performance. FIs excel at problem-solving tasks, situations where they are required to concept map or outline, language learning, such as syntax and structural rules, identifying the salient or important aspects of information, especially when the information is ambiguous or poorly organized, and transfer tasks. Research has not shown a significant correlation between being field dependent or field independent and success in distance education, though it seems that FIs are better suited for the distance education environment than FDs, based on the analysis shown above.

Several studies investigated interaction and cognitive style. Bowman (as cited by Thompson & Knox, 1987, p. 20), in his study of interaction with the instructor and other students found the FD persons engaged in nearly twice the contacts and were more likely to initiate the interaction than those identified as FI. Greule (1996, p. 30) cites a study by Shipman and Shipman that found FI perform better with little structure or feedback. He goes on to say FD types pay closer attention to visual cues, like facial expressions, and show reliance on other's opinions.

There is little research on FD/I in distance education and even less on the effects of interaction on FD/I students in distance education courses. Two studies that investigated FD/I in distance education were Gruele (1996) and Miller (1997). Gruele's (1996) study on FI as a predictor of attitude towards two-way video instruction, used a sample that consisted of approximately forty-three students enrolled in a two-way video course. He administered the GEFT to determine the FD/I independence of the students and a telecourse evaluation questionnaire to assess student attitudes toward distance classes delivered by interactive television. Then Pearson's correlation was used to correlate the GEFT results with the telecourse questionnaire. Ultimately, he determined that FI does not serve as a conclusive predictor of satisfaction. Though this study did not focus on interaction in distance education, the finding that FI was not influential in satisfaction is important because it is one of only a few studies that specifically studies field independence in conjunction with distance education.

Miller's (1997) study considering distance education and FI was carried out using 191 students enrolled in an off-campus professional agriculture degree program. Miller was attempting to determine if FI learners are better suited for the distance education program than FD learners. In his study, Miller administered the GEFT and labeled scores below the group median on the GEFT FD, and scores above, FI. He also administered a scale for assessing attitudes toward distance delivery media. Miller found that the agricultural distant learners were relatively more FI than the norms. Further, the FIs were more positive about the courses delivered by videotape and interactive communications network, being more inclined to enroll in additional courses

delivered via these methods. FDs were equally satisfied with the videotape delivery,

though they were slightly more satisfied with the interactive communications network

(ICN) method. Miller attributes the more positive attitude toward ICN to the

interactivity that ICN offers over the videotaped instruction. Overall, the difference in

results was less than the researcher had expected, and he concluded that the distance

learning programs could be adapted to satisfy both cognitive styles (Miller, 1997).

Neither Greule nor Miller included a qualitative component to their studies to determine

why the participants felt the way they did regarding their distance education experiences.

Studies by Summerville (1998), Shih, Ingebritsen, Pleasants, Flickinger, &

Brown (1998), and Brenner (1997) sought to investigate learner differences based on

FD/I in technology based courses. Summerville (1998) conducted a study to examine

variables that may be important in the design of instructional environments adapted to

accommodate individual differences. The purpose of her study was to determine the

effects of the learner being FD/I on the use of hypermedia. The study involved grouping

FD/I students with HyperCard stacks designed specifically to target FD/I learners while

they actually were learning how to construct their own HyperCard stacks. She

conducted the study on 177 students enrolled in instructional technology courses and

used the GEFT to determine if the students were FD/I. Summerville's study differed

from Gruele's and Miller's because she informed half of her sample of their cognitive

style. Of the 177 students, 94 were FI and 83 were FD.

While the study mostly considered the empirical results, Summerville (1998) did

include a qualitative element that yielded important information. A satisfaction

questionnaire was administered at the end of the study to determine if the students were satisfied with their learning environments and to function as a self-assessment.

The empirical data did not indicate any significant results that contributed to Summerville's (1998) research questions. As previously stated, however, the open-ended questions from the satisfaction questionnaire determined that a number of FDs indicated that they wanted and needed human involvement throughout the learning process, and attributed any failure to the absence of the instructor. The FI learners liked learning via computer, but wanted access to outside resources. Further, the FI learners cited the HyperCard stacks designed for the FD learners as too easy, and too step-by-step—they were looking for inquiry and discovery-based learning.

Summerville (1998) concluded by offering three suggestions for the use and design of hypermedia learning environments. First, she determined that additional support may be needed regardless of cognitive style for complex tasks. Next, she determined that support does not always correlate with structure. FIs did not like the structure of the FD treatment. They would have liked to ask questions of the researcher. Lastly, she determined that providing plenty of resources is important for FD students as well as FIs, though maybe for a different reason: FI learners considered the resources as resources, while FD learners considered the resources as structure.

The study by Shih et al. (1998) examined how students with different learning styles function in Web-based courses. The courses used in this study included materials and resources that were accessed and delivered by the Internet. The researchers administered an on-line questionnaire to determine the students' motivations for taking

the web-based course. The GEFT was administered and it was found that more than two-thirds of the respondents were FI learners. Shih et al. found that student learning styles, patterns of learning toward Web-based instruction, and student characteristics did not have an effect on their Web-based learning achievement. They also found no difference between the FD/I in learning strategies or patterns of learning in Web-based courses.

Brenner conducted a study on success of FD/I in asynchronous distance education telecourses in 1997. Brenner used the GEFT to determine the FD/FI of his subjects. Success was determined by an overall grade of "C" or better in the telecourse and failure was a grade of "D" or below, or a student who withdrew, or received an incomplete grade in the course. Brenner's assumption was that the 40 FI students would excel over the 114 FD students. The results of the study showed no significant difference in the probability of success or failure based on FD/I cognitive style. A description of the courses used in this study indicated that they function much as a print-based correspondence course would, though the courses did include a video component. No interaction took place among the students or faculty member other than receiving a grade on the assignments and exams.

According to Brenner (1997), a study on FI and successful interaction in online courses would be important since a majority of the learners in distance education courses are FI. Studies by Greule (1996), Miller (1997), Summerville (1998), and Shih et al. (1998) found a majority of FI learners in distance based courses. While FI learners do not necessarily depend on a social environment and interaction as the FD learners do,

often the education experience is enhanced, as well as their achievement in a course

scored, by their participation in discussions and interactions in online courses, which are

often group-learning based (Greule, 1996). Wang & Newlin's (2000) research posited

that encouraging opportunity for learning communities in online classes would

encourage the distance learners to integrate socially and have lower dropout rates. A

study based on the instructional design implications of interaction and the field

independent learner in distance education could provide invaluable information to make

learning more fulfilling for the student.

<p style="text-align:center">Summary</p>

As distance education methodologies become more pervasive and permanent in

education, the instructional needs of the students should constantly be considered.

Research has shown that interaction is one of the most important components in a

satisfying distance education experience (Fulford & Zhang, 1993). More research in

distance education needs to be done from the student perspective, particularly in the area

of interaction and instructional design (Fulford & Zhang, 1995). Because learner-learner

interaction is more prominent than other interactions in online courses (Gunawardena &

Boverie, 1993), the focus of this study was to determine the influences on learner-learner

interaction in online classes in an effort to offer suggestions on how these influences can

be incorporated into a successful online course design strategy. The next chapter

describes the methodology used to investigate the research questions included in this

study.

CHAPTER III

METHODOLOGY

This chapter describes the methodology that was used in this study. To examine the influences on learner-learner interaction in online classes, data were gathered and then analyzed using a mixed-method approach. The quantitative methodologies in the study helped determine if cognitive style is related to the quantity of learner-learner interaction in online courses, if there is a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses, and to determine how learners differ in their use of interaction elements during online discussion. Instruments that were used in the study to contribute to the quantitative findings were the Student Demographic Questionnaire, the Group Embedded Figures Test (GEFT), and the Text Analysis Tool (TAT). Qualitative methodology was used to understand the interaction process and the perspectives of the people involved and bring new meaning to their experiences through description and analysis of their perceptions (Merriam, 1998). The interview protocol, which examined how selected learners described their online course experience, contributed to the qualitative findings.

Participants

For this study, the researcher needed a sample that met two major criteria: the course needed to be conducted online and observable learner-learner interaction had to be a component of the course. Participants for the study were enrolled in two graduate level educational technology courses taught at Texas A&M University in Fall 2001 by the same instructor and teaching assistant. One of the courses that provided participants

for this study was an educational technology (ET) foundations course on field, theory, and profession of educational technology. The other course was a foundations course on distance learning (DE). At the beginning of the semester, the educational technology course had 22 students enrolled, with only one of those not completing the course. All 21 students were female. The distance education course began with 20 students, and one student dropped the course. One student was enrolled in both courses simultaneously; only data from the ET course was considered for this student. The gender composition of the DE course included six males and 12 females. For the ET course the age of the students ranged from 22 to 57 with a median age of 27.5 years of age. The age of the DE course students ranged from 22 to 43 with a median age of 30. The students in the ET course were enrolled in an average of 7.42 credit hours with a range of 3 to 12 enrolled credit hours. The DE course students were enrolled from 3 to 13 credit hours with a mean of 7. The sample size for each research question was varied. Table 1 describes the sample specific to each research question.

Table 1
Samples Used for Each Research Question

Research Question	Sample Used	N for Each Question
Is cognitive style related to the quantity of learner-learner interaction in online courses?	ET Course and DE Course were used as a combined sample.	38
Is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses?	ET Course and DE Course were used as separate samples.	Approximately 20 for each sample
How do selected learners differ in their use of interaction elements during online discussion?	Four students chosen based on the criteria described in chapter.	4
How do selected learners perceive their experiences in online courses?	Four students chosen for interaction elements research question.	4

The two course enrollments were combined for analysis of the research question pertaining to the relationship of cognitive style and quantity of learner-learner interaction in an effort to create a sample large enough for reliable results. To answer the question regarding the relationship of learner characteristics and learner posting preferences, the enrollments were analyzed separately.

Selection Process for the Four Selected Learners

For the research questions pertaining to interaction elements and perceived experiences in online courses, four students were selected to participate. These selected learners were determined using the following criteria. First, the students from the two

courses were combined into one sample, yielding a sample of 40 students. Recall that one student was enrolled in both of the courses included in the sample. She was excluded from this combined sample, also. Then the researcher determined that students who spoke English as a second language might have experiences influenced by a language or cultural barrier rather than the online environment, as learning styles and strategies have a strong cultural component (Aragon, Johnson, & Shaik, 2002). The course instructor designated 12 students as English as a second language (ESL) speakers; these students were not considered in the pool of learners, decreasing the sample to 27. Next, learners were classified based on their level of online course experience based on their responses to the Student Demographic Questionnaire. They were divided into no experience, low, middle, and high levels of experience. The learners that fell in to the middle categories were discarded, leaving a total of six students with no online course experience and three students with a high level of online course experience. The low and high online course experience students were retained in order to obtain a comparison between the two extremes. The reduced sample included nine students consisting of eight field independent students and one field dependent student. At this point, the researcher decided to study field independent students since they were more indicative of the typical student in the reduced sample—only 15% of the total students were field dependent. Given that only one field dependent student remained, a qualitative comparison between experiences of students with no experience in online courses and students with high levels of online course experiences would not be possible. After this distinction was made, four students were chosen at random from

the no online course experience and high online course experience categories. GEFT scores and ESL designations are included in Appendix B. These four selected learners, two from the ET course and two from the DE course, comprised the sample used to investigate how selected learners differed in their use of interaction elements during online discussion and how selected learners perceived their experiences in online courses.

Courses

Both courses were required for graduate students in the Educational Technology Master's program at Texas A&M University, though many of the students who enrolled in these courses were from other university departments. The same instructor and teaching assistant taught both of the courses. The educational technology course introduced the student to the historical foundations of educational technology. Learning theory, general systems theory, and uses of educational media were three concepts presented in the course. The distance education course studied the communication and learning theories related to distance education and how to apply effective instructional methodologies via distance education technologies. See Appendices B and C for the course syllabi for the educational technology and the distance education course, respectively.

The courses were taught online using FirstClass and a web-based supplement for the syllabus and delivering grades. Most students also attended a required one-day face-to-face orientation held for both classes in September, 2001. One student from each course was not present for the orientation. FirstClass (http://www.centrinity.com) is an

electronic bulletin board system that encompasses e-mail, threaded discussion, collaborative documents, and real-time chat features into one software package. FirstClass is accessible through a web site or through a downloaded client that logs into the FirstClass server within the College of Education, though for these courses, the students were required to use the installed client, as it is more robust than the web-based option.

<p align="center">*FirstClass Discussion Activities*</p>

The students posted messages to the FirstClass co-facilitator/participation activities as part of their course responsibilities. Each course was divided into discussion units in which the students were grouped as either participants or co-facilitators. From three to six students served as a co-facilitator for a unit while the remaining students served as participants. ET students co-facilitated one two-week FirstClass discussion activity while participating in an additional four discussion activities throughout the semester. As co-facilitators, the students were responsible for facilitating and moderating the content discussion for their unit. The units or modules, for the educational technology course are listed and described in Appendix C. DE students facilitated one two-week FirstClass discussion activity while participating in an additional five discussion activities throughout the semester. The discussion units, or modules, for the distance education course are listed and described in Appendix D. The respective responsibilities of the co-facilitators and participants were described in detail within each course syllabus, as was the method for evaluation of the students' performance in either role.

Before the units began, the co-facilitators were to develop and post a group learning contract, study the readings thoroughly, and plan the facilitation content and approach. By the first Monday of each unit, the co-facilitators were instructed to post three stimulus questions that covered the objectives of the unit. The participants should have posted an initial thoughtful and substantive reply to one of the questions by the second Sunday of the unit. The co-facilitators should have commented on the responses of the participants, promoted further discussion, and synthesized the discussion on a daily basis by the second Sunday of the unit. The participants should have become involved with the other students' responses by replying a minimum of four times in order to get at least 3 points. Five or more replies received a maximum of four points. Finally, by the third Tuesday, the co-facilitators should have synthesized the discussion for the unit, and completed the private group evaluation.

Instrumentation

The study utilized the following instruments; 1) the Student Demographic Questionnaire, which includes student demographic information and online course experience, 2) the Group Embedded Figures Test, to measure cognitive style in terms of field dependence and field independence, 3) the Text Analysis Tool (TAT) to analyze interaction elements in computer conferences, and 4) the Interview Protocol, which was used to collect the perceptions of learners' experiences in online courses. Each instrument is described in the sections that follow.

Student Demographic Questionnaire

The Student Demographic Questionnaire (See Appendix E) is a self-report survey that investigates students' demographic information, including their academic classification, academic department, number of enrolled credit hours, hours employed, and level of online course experience. The questionnaire was adapted from the instrument used by Sue Mahoney in her doctoral dissertation (2001). This section of the questionnaire consisted of completion items that included 13 questions. When this survey was administered, the researcher gave oral examples of answers to each question, e.g. Department: Educational Psychology. The data collected from the Student Questionnaire were used for two reasons: 1) to collect demographic information about the participants to help determine influences on learner-learner interaction, and 2) to determine if online course experience and experience with technology can be identified as influences on learner-learner interaction.

Group Embedded Figures Test

The researcher administered the Group Embedded Figures Test (GEFT) in order to determine the students' cognitive styles based on field dependence or field independence in an effort to determine if cognitive style influences the quantity of learner-learner interaction a student contributes.

Instruments have been devised to measure field dependence/field independence based on the amount of emphasis put on internal or external structures. Witkin argues that the relationship between cognitive and social skills in FD/I determination makes it a bipolar dimension, which is value neutral (Witkin, Moore, Goodenough & Cox, 1977).

Witkin devised many instruments for measuring FD/I, including the body adjustment test, the rod-and-frame test, and the rotating room test (Witkin & Goodenough, 1981). All three of these instruments require devices that take up as much space as an entire room and challenge the participant to align an object in an upright position with external diversions. Measurement was conducted by determining how the surrounding field influenced a student's perception of upright. Written instruments that serve the same purpose have ultimately replaced these cumbersome instruments. The instruments that most commonly appear in research methodology are the Embedded Figures Test (EFT) and the Group Embedded Figures Test (GEFT), both devised by Witkin and his colleagues (Melancon & Thompson, 1989).

The EFT and the GEFT are both timed tests and are similar in nature. The EFT is individually administered, with a three-minute time limit for the twelve-item test. There are two sets of 12 cards with complex figures and one set of eight cards with simple figures (Jonassen & Grabowski, 1993). The GEFT is group administered and consists of 3 separate sections. Two of the sections are two minute timed, and the third section is five minutes. In the GEFT, you are to find and trace a simple figure inside of a complex figure. The higher the score, the greater the level of field independence (Greule, 1996). The test only measures field independence, so if the test taker lacks field independence, then it is inferred they are field dependent (Bonham, 1988). The reliability estimate for the GEFT was determined by correlating the 9-item first section scores and the 9-item second section scores using the Spearman-Brown prophecy formula. Reliability for the GEFT was .82 for both genders. Validity was determined

using correlation formulas and comparing GEFT results against similar field dependence/field independence instruments such as the embedded figures test and the rod and frames test. Validity was determined to be .63 for females and .82 for males (Witkin, Oltman, Raskin, & Karp, 1971).

The GEFT has three sections. The first section has a time allowance of two minutes and consists of seven figures. This section does not contribute to the overall score, but serves to acclimate the students to the test design. The second and third sections have time allowances of five minutes each, and each has nine figures. To determine field independence/field dependence, the participant is supposed to trace as many of the simple figures within the more complex figures within the allotted time period for all three sections. The simple figures are provided within the test booklet.

The tests are scored by comparing the participant's tracings to the answer key provided with the instrument. The tracings must match the answer key exactly, or the answer is considered wrong. Each correct answer is worth one point, with a score of 0-9 being considered field dependent and a score of 10-18 considered field independent (Brenner, 1997).

Text Analysis Tool

Several instruments have been developed to analyze online discourse. Henri (1992) is a pioneer who developed criteria based on a cognitive view of learning for computer conferencing content analysis. Hara, Bonk, and Angeli (2000) used this model to examine students' levels of information processing. Gunawardena. Lowe, and Anderson (1997) selected Henri's model as the starting point to analyze interactions of

an online debate transcript. The Gunawardena et al. tool addressed whether knowledge was constructed within a group due to the exchanges of the participants and whether individual participants' knowledge was influenced by the groups' interactions. Garrison, Anderson, and Archer (2000) developed separate instruments to measure cognitive presence, social presence, and teaching presence within a model of a community of inquiry. Zhu (1996) created a tool for analyzing interaction based on the concepts of horizontal and vertical interaction. Fahy, Crawford, and Ally (2001) developed the Text or Transcript Analysis Tool (TAT), based on Zhu's tool, to determine interaction elements present in learner's online interaction.

Zhu's (1996) instrument contained two coding schemes; one was to determine the nature of interaction taking place while the other was to determine the students' role in the discussion. Interaction was divided into two main categories: type I questions and type II questions. Type I questions were vertical interactions which asked for information or an answer to a question. Type II questions were horizontal interactions and included questions that would start a dialogue, answers, information sharing, discussion, comments, reflections, and scaffolding comments. To determine the student's role in the discussion, the instrument included participant categories: contributor, wanderer, seeker, and mentor. According to Fahy (2002), Zhu's work provided a major contribution to the concept of text based transcript analysis when she limited her instrument to five categories and recognized that interaction is an indicator of the students' relationships to each other and the content they studied.

The interaction analysis instrument chosen for this study was developed by Fahy, Crawford, Ally, Cookson, Keller, and Prosser (2000). The instrument (Appendix A) was chosen because it did not analyze the meaning of interaction, but rather functioned to categorize the interaction, thereby eliciting patterns. The Text or Transcript Analysis Tool (TAT) has been developed and used to determine the interaction elements present in learner's online interaction. The focus of the TAT is to allow computer conferencing transcripts to be coded reliably and efficiently by using sentence units to determine the types of interaction elements present based on the TAT categories. The TAT was created based on Zhu's model, but collapses the eight interaction categories (Table 2) into Questioning (horizontal or vertical), Statements (non-referential or referential), Reflections, Scaffolding/engaging, and Quotations or Citations (Fahy, 2001). The design of the TAT allows for high values of reliability, sometimes as high as 86% agreement for an intra-rater code-recode design and 71% for inter-rater reliability based on Cohen's kappa values. The TAT designers attribute the high reliability value to the reasonable number of coding categories and specific units of analysis. Pilot studies using the TAT ultimately determined that interaction patterns can be observed and measured in a computer conference (Fahy et al.).

Table 2
Primary and Secondary Categories in the Text Analysis Tool (TAT)

Primary Categories	Secondary Categories
T1 – Questioning	T1(a): vertical
	T1(b): horizontal
T2 – Statements	T2(a): direct
	T2(b): answers or comments
T3 – Reflections	
T4 - Scaffolding	
T5 – References, authorities	T5(a): references, quotations, paraphrases
	T5(b): citations or attributions

Vertical questions are statements with a definite answer, and the question can be answered if the "person with the right answer can be found" (Fahy, 2001). Horizontal questions may not have a definite answer or solution, so others are invited to help describe the question. Non-referential statements do not invite a response or dialogue and are offered only to impart facts or information. Referential statements include answers to questions. Reflections are often personal opinions or private information. Scaffolding/engaging comments are offered to initiate or continue interaction. Quotations/citations contain references and quotations to other sources, or are direct citations of sources. Examples of each category are located in Appendix A.

The researcher was trained to use the TAT through a series of phone conversations and email correspondence with Dr. Patrick Fahy, one of the TAT developers. Sample material was coded and recoded until the researcher was knowledgeable and comfortable with the instrument.

Interview Protocol

Qualitative information was also obtained from the participants. The selected students described their experiences in these online courses through interviews completed via the online chat feature of FirstClass. The interviews were completed through real-time online chats because that method best supported the research question regarding perceived online course experiences (Bianco & Carr-Chellman, 2002) and to stay consistent with the course delivery method. Online interview procedures helped to recreate the online learning environment for the participants. Additionally, many of the potential interviewees were not in the geographical vicinity, so face-to-face interviews would have been difficult to accomplish. Each interview lasted approximately 45 minutes to one hour. The interviews were semi-structured using the Interview Protocol (Appendix H) developed by the researcher.

The interview protocol was pilot tested using one student who had dropped the DE course and three students who had previously taken the ET course or the DE course and were familiar with the courses. After a preliminary analysis of the pilot interview data, the researcher determined the Interview Protocol was effective in helping the students describe their experiences in online courses, but needed to be more open-ended, as Tu and McIsaac suggest (2002). Revisions to the Interview Protocol included producing the sequence in which the questions would be asked, and restructuring the questions so they were more open ended, with room for more discussion. The topics for discussion and questions included in the Interview Protocol were open ended and included questions such as 1) Describe your experience in the online classroom, 2) What

are some features of the online course that made it difficult in nature, and 3) Describe

your interaction experience in the online classroom. Other questions in the Interview

Protocol included questions regarding the course design and issues dealing with

interaction, allowing the students to reflect on their experiences in online classes.

<div align="center">Analysis of Instrumentation</div>

This section discusses the analysis of the instruments used in this study. The

following instruments were used in this study; 1) the Student Demographic

Questionnaire, which includes student demographic information and online course

experience, 2) the Group Embedded Figures Test as a measure of field dependence and

field independence, 3) the Text Analysis Tool (TAT), and 4) the Interview Protocol.

Each instrument is described in the sections that follow.

<div align="center">*Student Demographic Questionnaire*</div>

The Student Demographic Questionnaire (Appendix E) is a self-report survey

that was used in this study to gather the pertinent demographic information. The data

collected from the Student Questionnaire were used to collect demographic information

about the participants to help determine if these learner characteristics could be

identified as influences on learner-learner interaction. Descriptive statistics such as the

mean, median, mode, and standard deviation were performed using the statistical

functions included in the Excel software package to determine if there were any outliers

in the data.

Group Embedded Figures Test

To determine reliability in the GEFT instrument scoring, the researcher scored the instruments against the answer key provided with the instrument manual shortly after the instrument was administered. The scores were recorded. According to Greule, (1996), most researchers score the GEFT once and then rescore it again several days later for accuracy. In previous studies, reliability for the GEFT was determined by correlating similar tests with identical time limits (Witkin, Moore, Oltman, Goodenough, Friedman, Owen, & Raskin, 1977). The reliability estimate was .82 for both males and females. Validity was assessed by using the parent test of the GEFT (the PRFT), the Embedded Figures Test, and the Rod-and-Frame Test. Validity of the GEFT was r = .63 for females and r = .82 for males (Witkin et al.). Reliability of the scoring for the sample used in this study was determined as the researcher scored the instruments once, then again one week later. For this sample, the researcher did not have to make any changes to the scoring. In accordance with the procedure outlined by Greule (1996), the instruments were rescored several days later. No changes were necessary for the participants' scores. Internal consistency of the GEFT instrument for this sample was measured using the Kuder-Richardson 20 calculation. For the sample, with 38 reported scores, the Kuder-Richardson 20 score was .83. A higher Kuder-Richardson 20 value indicates a strong relationship between items on the test.

In this study, the GEFT scores were used as continuous values. The range for GEFT scores was from 5 to18. A score from 0-9 indicates field dependence; a score of

10-18 indicates field independence. However, in order to determine a relationship between cognitive style and quantity of learner-learner interactions, the degree of field independence was considered, rather than a dichotomous value.

Text Analysis Tool

The Text Analysis Tool (Appendix A) was used to analyze the interaction elements in the FirstClass discussion activity transcripts of the selected learners. Reliability of the TAT analysis has been confirmed in previous studies through a process of several coding trials in order to achieve agreement among the coders (Fahy et al., 2001). Trials have been conducted until a kappa value of .8 is achieved, though that is considered quite high and hard to achieve (Fahy et al.). Reliability for this study was achieved by having two other doctoral students code the FirstClass discussion activity transcripts for the selected students with the TAT until a Cohen's kappa value of .7 was achieved. Analysis using the TAT data provided information on the frequencies of interaction elements present in the interactions of selected learners during online discussion.

Procedures

This section describes the data collection process, which occurred in three phases. The first phase, which included administration of the Student Questionnaire and GEFT, took place during the face-to-face orientations held in September, 2001 for both the ET and DE courses. Since this study involved the use of human subjects, the research protocol was reviewed and approved by the Institutional Review Board at Texas A&M University (see letter in Appendix I). Students enrolled in the two courses

were given a description and overview of the research study and were asked to sign a

consent form. The consent form described the study and the efforts that were taken to

protect the participants' identities. Further, the researcher reassured the students that the

instructor and teaching assistant would not know who consented to participate in the

research study until after the instructor had submitted semester grades, in an effort to

protect their course grades.

The participants' identities were kept confidential. Confidential coding of the

participants' identities was done by assigning the participants an identifying and

exclusive code. Anonymity was impossible due to the demographic information

collected, as well as the identifiers in the FirstClass postings. After obtaining consent

forms from the participants, the researcher administered the demographic portion of the

Student Questionnaire and the GEFT.

The second phase of data collection included compiling the asynchronous

FirstClass discussion activities from all of the participants. The researcher collected the

FirstClass discussion activity transcripts for all 40 students as they completed the units

throughout the semester and analyzed the transcripts for quantities of postings and

interaction elements. The researcher analyzed the four selected students' transcripts

using the TAT to investigate the interaction element components of the interaction.

The third phase of data collection included 45-60 minute interviews that were

conducted online through the FirstClass chat feature. The interviews were completed

after all other data had been collected and analysis of the GEFT, learner characteristics,

and learner posting preferences had been completed to help separate the participants into

the categories that eventually yielded the four selected learners. The interview protocol was followed to help the participants describe their experiences in the online course in order to yield information relevant to their opinions on online course design.

Data Analysis

This section discusses the procedures for data analysis for this study. Data were collected from the FirstClass discussion activities for both courses throughout the semester. The data gathered were used to identify if cognitive style was related to the quantity of postings for the FirstClass discussion activities, to determine if there was a relationship between learner characteristics and learner posting preferences in online courses, to determine how selected learners differed in their use of interaction elements during online discussion, and to investigate how the selected learners perceived their experiences in online courses. The interview data were analyzed using a constant comparative method (Merriam, 1998; Tashakkori & Teddlie, 1998).

Cognitive Style

To answer the question, "Is cognitive style related to the quantity of learner-learner interaction in online courses?" the data gathered from the GEFT for 38 students were analyzed. The GEFT provided information about each participants' cognitive style based on field dependence and field independence. Next, data from the FirstClass discussion activities for each module from both courses were analyzed. Each discussion activity posting was tallied according to the participant who posted it. These values were then organized into an Excel spreadsheet. Only those postings that were submitted within the allowed timeline for each unit were considered for the data analysis.

Data analysis included descriptive statistics (mean, median, range) and computation of Pearson's correlation coefficients. The researcher used these data to identify if cognitive style is related to the quantity of learner-learner interaction in online courses.

Learner Posting Preferences

To answer the question "Is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses?" an analysis of the FirstClass discussion activities for 40 students was conducted. The FirstClass discussion activities included for the Educational Technology course were units 2, 3, and 4. The first and fifth units were omitted from analysis for the Educational Technology course because the first unit served as an introductory unit; the fifth unit had several extra days added to it to accommodate a university holiday, thus allowing more opportunity for interaction than the other units did. For the Distance Education course, all six units included in the course were analyzed. The learner characteristics identified by the GEFT and Student Demographic Questionnaire were age, number of semester credit hours currently enrolled, number of hours employed, and level of online course experience. These characteristics were categorized for data analysis. Age categories were 20s, 30s, and 40s and greater. The categories for number of semester credit hours were 3 hours, 6 hours, 9 hours, and >9 hours. These were used categorically and not continuously. Hours employed included none, part-time, and full-time categories. Level of online course experience categories were low, medium, and high. Learner posting preferences were identified as day of the week messages were posted within the units,

the time within units, and the time of day the messages were posted within the units.

Categories for day of the week were each day of the week. For time within unit, the

discussion units were divided into three categories—beginning, middle, and end. The

beginning category included days 1 through 5 of the unit, the middle category included

days 6 through 9 of the unit, and the end category included days 10 through 14 of the

unit. The time of day categories were morning (4:01 a.m. – 12:00 p.m.), afternoon

(12:01 p.m. – 8:00 p.m.), and night (8:01 p.m. – 4:00 a.m.). Data analysis included

descriptive statistics (mean, median, range) and computation of chi-square values for

each learner characteristic/learner posting preference combination.

Interaction Elements in Online Classes

To answer the question, "How do selected learners differ in their use of

interaction elements during discussion?", the researcher used an interaction element

analysis of the messages posted by the four selected students using the Text Analysis

Tool (Appendix A). The researcher analyzed all messages posted by the selected

learners in the FirstClass discussion activities to determine the quantity of interaction

elements contained in the messages based on the categories described within the TAT.

Using the primary and secondary categories (questioning, statements, reflections,

scaffolding, references) defined by the TAT, the frequencies of TAT types within the

postings were calculated. Data analysis was done using descriptive statistics and

computing frequencies and percentages for all of the selected learners' postings, for the

selected learners' postings as co-facilitators, and for the selected learners' as

participants. The researcher also included sample postings from the participants in an

effort to explain the TAT categories. Findings from the TAT analysis addressed how the interaction elements in online learner-learner interaction for the selected learners differed.

Perceived Experiences

To answer the question, "How do selected learners perceive their experiences in online courses?" semi-structured, FirstClass chat-based interviews with the four selected learners identified in Question Three were used. The interviews were conducted using the Interview Protocol (Appendix H). The data were analyzed using the constant-comparative method (Merriam, 1998). The data were read and then compared for similarities and differences. The similarities and differences were categorized into units such as interaction, time management, overall thoughts, and course design. These units revealed information that was relevant and related to the study. The units were broadened into these categories: knowing the learner, interaction, and course design for reporting the data. Throughout the interview process and after the interview data were analyzed, the participants were asked to clarify and review statements through member check, to make sure their meanings were interpreted correctly, though it was not necessary due to the clarity inherent to computer-mediated interviews (Bianco & Carr-Chellman, 2002).

Summary

This chapter outlined the methodology and research design for this study. The next chapter presents the findings and discussion that resulted from the data analysis techniques that were described here.

CHAPTER IV

RESULTS

For each of the research questions identified throughout this study, this chapter

discusses the results. The purpose of the study was to: a) determine if cognitive style is

related to the quantity of learner-learner interaction in online courses, b) determine if

there is a relationship between learner characteristics and learner posting preferences in

learner-learner interaction in online courses, c) determine how the selected learners

differ in their use of interaction elements during online discussion, and d) explore how

the selected learners perceive their experiences in online courses.

Results Related to Quantitative Research Questions

This section evaluates and discusses each of the following research questions; 1)

Is cognitive style related to the quantity of learner-learner interaction in online courses?

and 2) Is there a relationship between learner characteristics and learner posting

preferences in learner-learner interaction in online courses? This section will deal with

the quantitative results of this study.

Cognitive Style

To answer the question, "Is cognitive style related to the quantity of learner-

learner interaction in online courses?" the researcher administered the Group Embedded

Figures Test (GEFT) to the participants in order to determine their cognitive style based

on field dependence/field independence. The quantity of learner-learner interaction was

determined by the total number of postings by each participant in the FirstClass

discussion activity transcripts for the entirety of both courses. For the ET sample 20

students were included. The original sample included 21 students, but one student was

not present during the administration of the GEFT. For the DE sample, 18 students were

included. The original sample included 20 students, though two were omitted from the

sample; one student was not present during the administration of the GEFT and one

student was enrolled in both courses. Though the courses covered different content, the

two courses were structured similarly. Table 3 details the demographic descriptive

statistics for the ET sample. Table 4 details the same statistics for the DE sample.

Table 3
ET Course: Descriptive Statistics from Student Demographic Questionnaire (n=21)

	Semester Credit Hours Enrolled	Hours Employed Per Week	Level of Online Course Experience	Age
Mean	7.42	27.38	1.30	31.75
Median	9.00	40.00	1.00	27.50
Mode	9.00	0.00	0.00	26.00
Standard Deviation	3.22	22.06	1.49	10.11
Range	3-12	0-65	0-4	22-57

Note: Level of online course experience is in terms of number of online courses
completed.

Table 4
DE Course: Descriptive Statistics from Student Demographic Questionnaire (n=19)

	Semester Credit Hours Enrolled	Hours Employed Per Week	Level of Online Course Experience	Age
Mean	7.79	28.16	1.72	31.06
Median	9.00	20.00	2.00	30.00
Mode	9.00	20.00	2.00	32.00
Standard Deviation	2.97	15.20	1.32	6.42
Range	3-13	0-55	0-4	22-43

Note: Level of online course experience is in terms of number of online courses
completed.

In terms of semester credit hours enrolled there was a minimal difference of .37 between the ET and the DE sample means. The median and mode were identical for the two samples, and the range showed only a slight difference. Hours employed showed a difference between averages of .78 hours and the differences between medians was 20 hours, indicating that the distribution was skewed (someone claimed to work 65 hours/week). Online course experience was similar. A difference of .42 existed between the means of the two samples and a one course difference in the median. There was only a slight (.69) age difference between the means of the samples. Due to the similarity of the two separate samples in demographic composition based on the Student Demographic Questionnaire, it was determined the samples could be combined for statistical analysis.

Table 5
Descriptive Statistics for Combined Sample (n=40)

	Semester Credit Hours Enrolled	Hours Employed Per Week	Level of Online Course Experience	Age
Mean	7.61	27.75	1.5	31.42
Median	9.00	25.00	1	29.00
Mode	9.00	40.00	0	26.00
Standard Deviation	3.06	18.88	1.41	8.46
Range	3-13	0-65	0-4	22-57

For the combined sample (Table 5), the mean for number of semester credit hours enrolled was 7.61. The median was 9 credit hours with a mode of 9 credit hours and a standard deviation of 3.06. The range for the combined sample was 3-13. The number of hours employed per week for the combined sample had a mean of 27.75, a

median of 25, a mode of 40, a standard deviation of 18.88, and a range of 0-65. These

data were skewed because seven of the students were employed 50 or more hours a

week. The number of online courses completed, or level of online course experience, for

the combined sample had a mean of 1.5, a median of 1, a mode of 0, a standard deviation

of 1.41, and a range of 0-4. The mean age for the combined sample was 31.42, with a

median age of 29. The age range was from 22-57 years.

The descriptive statistics for data gathered from the GEFT are included in Table

6. For the combined sample, the mean GEFT score was 12.97, indicating a slightly field

independent sample. The median score was 13.50, and the range for GEFT scores was

from 5-18.

Table 6
Descriptive Statistics for GEFT Scores for the Combined ET and DE Sample (n=38)

Category	Total Reporting	Mean	Median	Mode	Range	Standard Deviation
GEFT Score	38	12.97	13.50	17.00	5-18	4.00

For the sample, a Pearson's Correlation Coefficient, *r*, was calculated for the

GEFT score and total number of postings using the statistics functions available in the

Microsoft Excel spreadsheet program. In order to standardize and combine the quantity

of postings for the correlation statistics, the numbers of postings were turned into

proportions of the number of individual postings by students divided by the total number

of postings for the sample. Pearson's Correlation Coefficient is a measure of linear

relationship and strength of linear relationship of variables and can equal any value between +1.00 and -1.00 (Witte & Witte, 1997). The correlation result was .110 with a standard error of .013 for the combined sample. The correlation value indicated there was not a relationship between cognitive style and quantity of postings that could not be explained as due to chance.

Learner Posting Preferences

To answer the question "Is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online classes?" the participants completed the Student Demographic Questionnaire to determine learner characteristics. The participant postings from the FirstClass discussion activities were used to determine learner posting preferences. For the students in the ET course, three units were analyzed. For the students in the DE course, six units were analyzed.

For this research question, learner characteristics included the age, the students' level of online course experience, the number of semester credit hours the students were enrolled in, and the number of hours the students were employed. Three different learner posting preferences were considered: the day of the week (e.g., Monday, Tuesday) the messages were posted, the time of day (e.g., 3:00 p.m., 2:00 a.m.) the messages were posted, and finally, the part of the unit within the two-week unit the messages were posted (e.g., the first day of the unit, the last day of the unit). For the purpose of analysis, the learner posting preferences were categorized. The day of the week was separated into each day of the week. The time of day was categorized into AM (4:01 a.m. – 12:00 p.m.), PM (12:01 p.m. – 8:00 p.m.), and night (8:01 pm. – 4:00

a.m.). The part of unit was divided into beginning, middle, and end. The beginning part of the unit was day 1 through day 5, the middle was day 6 through day 9, and the end part was day 10 through day 14.

During the process of collapsing the categories to compute the statistics, the researcher observed some trends in the learner characteristic/learner posting preferences combinations. The learner characteristic/learner posting preferences were further analyzed using chi-square analysis.

Age

According to Table 7, the students in their 30s posted most of the messages in the ET course. In the DE course, the students in their 20s posted the most messages. The students over 40 posted the fewest number of times with19% in the ET Course and 11% in the DE course.

The results in Table 7 indicate that the number of postings contributed in the AM, PM, and night categories were consistent for both courses. The ET course posted 20% in the AM while the DE course posted 24% in the AM. The ET course posted 44% in the PM while the DE course posted 40% in the PM. Both courses posted 36% at night. The students followed the same posting trends in each course. Overall, except for DE students in their 30s, students posted the fewest messages within the AM period, the most messages in the PM period, with the rest falling in the night period. In comparison with the quantity of messages posted in the PM and night, the students in their 20s in both courses posted fewer messages in the AM than did the other age groups, who posted more consistently across the day.

Table 7
Observed Quantity of Postings for Age and Time of Day as Percentages

			ET Course		
Age	N	AM	PM	Night	Total
20s	11	9%	23%	16%	49%
30s	5	6%	13%	13%	32%
Over 40	4	4%	8%	7%	19%
Total	20	20%	44%	36%	100%
			DE Course		
Age	N	AM	PM	Night	Total
20s	9	7%	21%	21%	49%
30s	6	12%	9%	10%	31%
Over 40	3	4%	9%	6%	19%
Total	18	24%	40%	36%	100%

Results for age and day of week within unit (Table 8) showed that the participants posted the most messages on Sundays (20% for ET Course, 28% for DE Course). In both courses, the students posted consistently throughout the week, though the students in their 20s in the DE course posted 13% of their messages on Sunday, which is the highest daily percentage. The discussion units began on a Monday and ended on a Sunday, which may explain why there was a larger number of postings on Sunday.

Table 8
Observed Quantity of Postings for Age and Day of Week Within Unit as Percentages

| | | | | ET Course | | | | | |
Age	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
20s	11	6%	6%	11%	5%	6%	3%	12%	49%
30s	5	5%	4%	5%	4%	1%	8%	4%	32%
Over 40	4	2%	1%	3%	3%	3%	4%	4%	19%
Total	20	14%	11%	19%	11%	10%	15%	20%	100%
				DE Course					
Age	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
20s	9	5%	3%	8%	8%	5%	8%	13%	49%
30s	6	3%	3%	4%	5%	4%	3%	9%	31%
Over 40	3	2%	4%	1%	3%	2%	1%	5%	19%
Total	18	10%	10%	13%	16%	11%	12%	28%	100%

Table 9 contains the values for the quantities of postings for age and part of unit as percentages. Overall, the students in the ET course posted most of their messages (47%) during the middle of the units while the students in the DE course posted most of their messages (48%) at the end of the units. For both courses, the fewest messages were posted at the beginning of the unit. The students followed the same trend whether they were in their 20s, 30s, or over 40 by posting fewest messages in the beginning of the unit. There were negligible differences in the quantity of messages posted by age groups in the middle and end of the units, except for the students in their 20s and 30s in the DE course, who posted approximately 10% more in the middle of the units than in the end.

Table 9

Observed Quantity of Postings for Age and Part of Unit as Percentages

Age	N	ET Course Beginning of Unit	Middle of Unit	End of Unit	Total
20s	11	3%	23%	23%	49%
30s	5	3%	15%	14%	32%
Over 40	4	4%	9%	7%	19%
Total	20	9%	47%	43%	100%
Age	N	DE Course Beginning of Unit	Middle of Unit	End of Unit	Total
20s	9	6%	17%	27%	49%
30s	6	5%	12%	14%	31%
Over 40	3	5%	7%	7%	19%
Total	18	15%	37%	48%	100%

Semester Credit Hours

This section considers the number of semester credit hours the students were

enrolled in as a learner characteristic. Table 10 contains the values for the number of

semester credit hours enrolled and the time of day messages were posted. The table

shows that students enrolled in a full course load (9 hours) posted a majority of the

messages (over 40%). In the ET course, there was a drop off in the number of postings

from the students enrolled in 3 credit hours to the students enrolled in over 9 hours. The

students enrolled in 3 hours contributed 26% of the total postings while the students

enrolled in more than 9 hours only contributed 12%. The PM category (48% for ET and

40% for DE) was utilized the most overall for message posting, while the AM category

(20% for ET and 24% for DE) was used the least. The students enrolled in 3 or 9 hours

followed the same posting trend by posting the fewest messages in the AM and the most

messages in the PM. Students in both courses enrolled in more than 9 hours posted

messages almost equally across the AM, PM and night categories.

Table 10
**Observed Quantity of Postings for Semester Credit Hours Enrolled
and Time of Day as Percentages**

Semester Credit Hours Enrolled	N	AM	PM	Night	Total
ET Course					
3 Hours	5	3%	16%	7%	26%
6 Hours	3	3%	7%	7%	17%
9 Hours	8	11%	20%	14%	45%
> 9	3	3%	5%	4%	12%
Total	19	20%	48%	32%	100%
DE Course					
3 Hours	3	3%	7%	5%	14%
6 Hours	5	1%	9%	9%	19%
9 Hours	8	15%	19%	16%	49%
> 9	3	6%	6%	7%	18%
Total	19	24%	40%	36%	100%

Table 11 indicates that the most postings were contributed on Sundays (21% for

the ET course, 28% for the DE course), though it appears that the remaining postings

were contributed consistently throughout the week. In the ET course, the largest

percentage of postings was on Saturdays (11%) by students enrolled in 9 semester credit

hours. The students enrolled in 9 semester credit hours in the DE course posted 12% of

their messages on Sundays.

Table 11
**Observed Quantity of Postings for Semester Credit Hours Enrolled
and Day of Week Within Unit as Percentages**

				ET Course					
Semester Credit Hours Enrolled	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
3 Hours	5	3%	2%	3%	5%	4%	2%	8%	26%
6 Hours	3	4%	2%	6%	0%	1%	1%	3%	17%
9 Hours	8	5%	6%	6%	4%	5%	11%	6%	45%
> 9 Hours	3	2%	2%	2%	1%	1%	1%	4%	12%
Total	19	14%	12%	17%	10%	11%	15%	21%	100%

				DE Course					
Semester Credit Hours Enrolled	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
3 Hours	3	2%	2%	4%	2%	1%	2%	2%	14%
6 Hours	5	2%	2%	1%	3%	2%	1%	8%	19%
9 Hours	8	5%	4%	6%	9%	7%	5%	12%	49%
> 9 Hours	3	1%	2%	2%	2%	2%	4%	6%	18%
Total	19	10%	10%	13%	16%	12%	12%	28%	100%

Table 12 shows the percentages of postings for semester credit hours enrolled and the part of unit in which the messages were posted. The students enrolled in the ET course posted most of their messages during the middle portion (49%) of the units. The students enrolled in the DE course posted most of their messages during the last portion (49%) of the units. Both courses posted the fewest messages at the beginning of the units (15% for ET and 9% for DE). Students in the ET course, with the exception of the students enrolled in 3 hours, posted the fewest messages in the beginning, the most in the middle of the units, and a moderate amount of messages during the end of the units. Except for the students enrolled in 6 hours, students in the DE course posted consistently fewer messages in the beginning of the units, more messages in the middle of the units, and the most messages in the end of the units.

Table 12
Observed Quantity of Postings for Semester Credit Hours Enrolled
and Part of Unit as Percentages

Semester Credit Hours Enrolled	N	Beginning	Middle	End	Total
		ET Course			
3 Hours	5	1%	12%	13%	26%
6 Hours	3	1%	9%	8%	17%
9 Hours	8	6%	20%	18%	45%
> 9	3	1%	7%	4%	12%
Total	19	9%	49%	43%	100%
		DE Course			
3 Hours	3	2%	6%	7%	14%
6 Hours	5	2%	8%	8%	19%
9 Hours	8	7%	17%	24%	49%
> 9	3	4%	5%	9%	18%
Total	19	15%	36%	49%	100%

Hours Employed

This section presents observations on hours employed as a learner characteristic. Table 13 shows the quantity of postings for the number of hours a student was employed per week and the time of day in which they posted messages. The results indicate for the ET course, the students that were employed full-time posted the most messages (57%) while in the DE course, the part-time employed students posted the most messages (50%). In the DE course the students that were not employed posted the fewest messages (9%). The students employed part-time in the ET course posted the fewest messages (13%). The students in both courses posted the fewest messages during the AM and the most messages in the PM. Students employed full-time in both courses posted the fewest messages in the AM and the most messages in the PM. There were

not major differences for the students who were not employed or worked part-time—

they posted least in the AM and approximately the same in the PM and night.

Table 13
Observed Quantity of Postings for Hours Employed Per Week and Time of Day as Percentages

Hours Employed Per Week	N	AM	PM	Night	Total
ET Course					
None	6	7%	13%	11%	30%
Part-Time	4	3%	7%	3%	13%
Full-Time	11	10%	26%	22%	57%
Total	21	19%	45%	35%	100%
DE Course					
None	2	1%	3%	5%	9%
Part-Time	9	11%	20%	19%	50%
Full-Time	8	12%	17%	13%	42%
Total	19	24%	40%	36%	100%

Table 14 reveals that students posted messages consistently throughout the week,

with concentrated amounts of postings on Sunday for both courses (21% for ET course,

28% for DE course). The students in the ET course who were not employed posted

consistently throughout the week, while the unemployed students in the DE course

posted less on Monday and Friday, but consistently otherwise. The students who

worked part-time in the ET course posted consistently throughout the week and the part-

time students in the DE course posted consistently, but the most on Sunday of all of the

students (13%). The students employed full-time posted consistently throughout the

week in both the ET and DE courses, but in ET course posted 13% of their messages on

Wednesday and 12% on Sunday. The DE students posted 12% of their messages on

students while working full-time.

Table 14
Observed Quantity of Postings for Hours Employed Per Week and Day of Week
Within Unit as Percentages

Hours Employed Per Week	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
				ET Course					
None	6	4%	4%	4%	2%	3%	7%	5%	30%
Part-Time	4	1%	2%	1%	2%	1%	1%	4%	13%
Full-Time	11	8%	5%	13%	8%	6%	5%	12%	57%
Total	21	13%	11%	18%	12%	10%	14%	21%	100%
				DE Course					
None	2	0%	1%	2%	2%	0%	1%	3%	9%
Part-Time	9	4%	3%	6%	9%	6%	8%	13%	50%
Full-Time	8	5%	6%	5%	6%	5%	3%	12%	42%
Total	19	10%	10%	13%	16%	12%	12%	28%	100%

Table 15 indicates that students chose to participate mostly during the middle and

ends of the units, no matter how much time they spent working. The ET course posted

46% and 45% during the middle and end of the units, respectively. The DE course

posted 36% and 49% during the middle and end of the units. The students posted less in

the beginning than in the middle for both courses. A difference of 12% between the

number of postings in the middle (15%) and end (27%) of the units was evident for the

DE students who were employed part-time.

Table 15

Observed Quantity of Postings for Hours Employed Per Week and Part of Unit as Percentages

| Hours Employed Per Week | N | ET Course | | | |
		Beginning	Middle	End	Total
None	6	2%	15%	13%	30%
Part	4	1%	5%	7%	13%
Full	11	5%	26%	25%	57%
Total	21	9%	46%	45%	100%
Hours Employed Per Week	N	DE Course			
		Beginning	Middle	End	Total
None	2	2%	3%	4%	9%
Part	9	7%	15%	27%	50%
Full	8	6%	18%	17%	42%
Total	19	15%	36%	49%	100%

Level of Online Course Experience

This section deals with the trends observed regarding level of online course experience as a learner characteristic. Table 16 shows the percentages of postings for level of online course experience and time of day. The students in the ET course with the highest amount of online course experience posted the fewest messages (26%). The students in the DE course with the highest amount of online course experience posted a moderate amount of messages (25%). The students with the lowest amount of course experience in the DE course posted the fewest messages for that course (17%); in the ET course, the lowest experience students posted approximately the same quantity of messages as the medium level of online course experience students.

The students in both courses posted the fewest messages in the AM (20% for ET and 24% for DE) and the most messages in the PM (44% for ET and 40% for DE). Both

courses posted 36% of their total messages at night. There was a significant difference

in the amount of messages posted between the AM and PM (14-16%), but not a

significant difference between the PM and night (4-8%).

Table 16
**Observed Quantity of Postings for Level of Online Course Experience and Time of
Day as Percentages**

Level of Online Course Experience	N	AM	PM	Night	Total
ET Course					
Low	8	6%	13%	17%	36%
Medium	7	8%	19%	11%	37%
High	5	6%	13%	8%	26%
Total	20	20%	44%	36%	100%
DE Course					
Low	4	3%	7%	8%	17%
Medium	9	18%	23%	17%	57%
High	5	3%	10%	12%	25%
Total	18	24%	40%	36%	100%

Table 17 shows that the courses shows the students posted most of their

messages during the weekdays, regardless of their level of online course experience. For

both courses, the most messages were posted on Sundays (20% for ET course, 28% for

DE course). Messages were posted consistently throughout the week other than the

slight concentration of messages posted on Sunday.

Table 17

Observed Quantity of Postings for Level of Online Course Experience and Day of Week Within Unit as Percentages

Level of Online Course Experience	N	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
				ET Course					
Low	8	5%	4%	7%	3%	1%	8%	8%	36%
Medium	7	7%	4%	7%	4%	4%	5%	7%	37%
High	5	2%	3%	5%	4%	5%	2%	5%	26%
Total	20	14%	11%	19%	11%	10%	15%	20%	100%
				DE Course					
Low	4	1%	1%	3%	2%	1%	2%	6%	17%
Medium	9	7%	8%	7%	9%	7%	7%	14%	57%
High	5	3%	1%	3%	5%	3%	3%	9%	25%
Total	18	10%	10%	13%	16%	11%	12%	28%	100%

Table 18 shows the results of the quantity of the level of online course experience and the part of the unit during which the students posted messages. Participants with a medium amount of online course experience posted most of the messages (37% for ET, 57% for DE). Students in both courses posted the fewest messages during the beginning of the units, regardless of level of online course experience. The students with high levels of course experience in the ET and DE course posted more messages as the units progressed. The students in the ET course with a low level of experience posted mostly in the middle of the units (18%) while the students with a low level of experience in the DE course posted mostly at the end of the units (10%).

Table 18

Observed Quantity of Postings for Level of Online Course Experience and Part of Unit as Percentages

Level of Online Course Experience	N	Beginning	Middle	End	Total
ET Course					
Low	8	2%	18%	16%	36%
Medium	7	3%	20%	14%	37%
High	5	5%	8%	13%	26%
Total	20	9%	47%	43%	100%
DE Course					
Low	4	2%	5%	10%	17%
Medium	9	10%	23%	24%	57%
High	5	3%	9%	14%	25%
Total	18	15%	37%	48%	100%

Chi-square analyses were conducted in combinations of learner characteristic/learner posting preferences in order to determine if there was a relationship between learner characteristics and learner posting preferences (see Table 19). The researcher chose to complete a non-parametric statistical analysis because the results for the sample in terms of learner characteristics and learner posting preferences was not normally distributed. The first combination was a combination of the number of credit hours the participants were enrolled in (learner characteristic) and when messages were posted in the beginning, middle, and ends (learner posting preference) of the units or modules for the FirstClass discussion activities.

Table 19
Chi-Square Combinations Completed

	Learner Posting Preference		
Learner Characteristic	Day of Week Within Unit	Time of Day Within Unit	Part of Unit
Level of Online Course Experience	X	X	X
Hours Employed Per Week	X	X	X
Semester Credit Hours Enrolled	X	X	X
Age	X	X	X

Note: "X" indicates a chi-square calculation was completed for that particular learner characteristic/learner posting preference combination.

Table 20 shows the values for the chi-square analysis for each learner characteristic/learner posting preference combination for the ET course. The results show that there is a relationship between level of online course experience and the day of week within the unit, the time of day within the unit, and the part of unit in which messages are posted. A relationship is evident between hours employed per week and day of week messages are posted, though there is no relationship with time of day or part of unit. Semester credit hours enrolled seems to be related to the day of week, time of day, and part of unit in which messages are posted. Age is related to the time of day and part of unit in which messages are posted.

Table 20

Chi-Square Analysis for Combinations Completed for ET Course

| Learner Characteristic | Learner Posting Preference | | | | | | |
	Day of Week Within Unit	df	Time of Day Within Unit	df	Part of Unit		df
Level of Online Course Experience	35.55	0.000***	12	16.20	0.003**	4	24.13	0.000***	4
Hours Employed Per Week	36.70	0.000***	12	7.20	0.126	4	3.63	0.458	4
Semester Credit Hours Enrolled	86.47	0.000***	18	14.60	0.024*	6	15.33	0.018*	6
Age	45.19	0.000***	12	59.83	0.000***	4	13.44	0.009**	4

* $p < .05$
** $p < .01$
*** $p < .001$

Table 21 shows the values for the chi-square analysis for each learner

characteristic/learner posting preference combination for the DE course. The results

show that there is a relationship between level of online course experience and the day of

week within the unit, the time of day within the unit, and the part of unit in which

messages are posted. A relationship is evident between hours employed per week and

day of week, time of day and part of unit in which messages are posted. Semester credit

hours enrolled seems to be related to the day of week and time of day in which messages

are posted. Age is related to the day of week, time of day, and part of unit in which

messages are posted.

Table 21

Chi-Square Analysis for Combinations Completed for DE Course

Learner Characteristic	Learner Posting Preference							
	Day of Week Within Unit		*df*	Time of Day Within Unit		*df*	Part of Unit	*df*
Level of Online Course Experience	39.89	0.000***	12	38.24	0.000***	4	13.18	0.010*	4
Hours Employed Per Week	33.87	0.001**	12	23.97	0.000***	4	19.39	0.001**	4
Semester Credit Hours Enrolled	77.71	0.000***	18	84.93	0.000***	6	9.10	0.168	6
Age	34.65	0.001**	12	23.56	0.000***	4	24.70	0.000***	4

* p< .05

** p < .01

*** p<.001

Results Related to the Qualitative Research Questions

This section evaluates and discusses each of the following research questions; 1) How do the selected learners differ in their use of interaction elements during online discussion? and 2) How do the selected learners perceive their experiences in online courses? This part of the chapter will deal with the qualitative results from this study.

In order to consider how selected learners differ in their use of interaction elements during online discussion and how selected learners perceive their experiences in online courses, the original sample of 40 students was narrowed to four. Ultimately, the four learners chosen to participate in this portion of the study were classified as field independent, fell into either the highest or lowest online course experience category for their course, and were chosen at random.

Overview of the Four Selected Learners

For each student, a short profile was developed using the demographic data

obtained from the Student Demographic Questionnaire and GEFT instrument. Further,

any relevant information from the other research questions was included in order to

develop a complete profile of each student as it relates to this study. Table 22 shows the

demographic data collected for each of the four selected learners, Addison, Reagan,

Dean and Austin.

Table 22
Demographic Information for Four Selected Learners

Selected Learner	Course	GEFT Score	Gender	Age	Classification	Hours Enrolled	Hours Employed	Level of Online Course Experience
Addison	ET	12	F	30	Masters	3	40	0
Reagan	ET	17	F	50	Ph.D.	9	40	4
Dean	DE	18	M	26	Masters	9	0	0
Austin	DE	17	M	27	Masters	6	40	4

Addison

Background Information and Posting Preferences

Addison was a 30 year old Educational Psychology master's student. She scored

a 12 on the GEFT and this was her first online course experience. Addison was

employed full-time and was enrolled for 3 credit hours during the semester the study was

conducted. Her learner posting preferences indicated that she posted to the FirstClass

discussion activities mostly during the PM time period (from 12:00 pm – 8:00 pm)

consistently throughout the week, and her participation in the FirstClass discussion

activities occurred during the middle of the units. She posted 28 messages as a participant and 8 messages as a co-facilitator during the 3 two-week long FirstClass discussion activities in the ET course.

Interaction Elements

Analysis of interaction elements in the FirstClass discussion activity transcripts (Table 23) revealed that Addison, when contributing as a participant in the activities, used an overwhelming 75% majority of expository statements throughout her FirstClass discussion activities. As a participant, she used no vertical or horizontal questions, and no citations. Her participant based discussion activities yielded low percentages of referential statements, reflection statements, scaffolding/engaging comments, and quotations/paraphrases.   As a co-facilitator (Table 24), Addison did not use any vertical questions, reflection statements, or citations. She did use horizontal (27%) and expository (27%) statements, scaffolding/engaging comments (19%), quotations/paraphrases (19%), and some referential statements (8%).

Table 23
TAT Results for Addison as a Participant

	Addison	
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	0	0
2A: Expository Statements	133	75
2B: Referential Statements	18	10
3: Reflections	11	6
4: Scaffolding, engaging	14	8
5A: Quotations, paraphrases	1	1
5B: Citations	0	0
Totals	177	100

Table 24
TAT Results for Addison as a Co-Facilitator

	Addison	
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	7	27
2A: Expository Statements	7	27
2B: Referential Statements	2	8
3: Reflections	0	0
4: Scaffolding, engaging	5	19
5A: Quotations, paraphrases	5	19
5B: Citations	0	0
Totals	26	100

Reagan

Background Information and Posting Preferences

Reagan was a 50 year old Educational Psychology doctoral level student. She

scored a 17 on the GEFT and this was at least her fourth online course experience.

Reagan was employed full-time and was enrolled for 9 credit hours during the semester

the study was conducted. Her learner posting preferences indicated that she posted to

the FirstClass discussion activities consistently throughout the day, consistently

throughout the week, and her participation in the FirstClass discussion activities

occurred consistently throughout the units. She posted 39 messages as a participant and

12 messages as a co-facilitator during the 3 two-week long FirstClass discussion

activities in the ET course.

Interaction Elements

Analysis of interaction elements in the FirstClass discussion activity transcripts

(Table 25) revealed that Reagan, when contributing as a participant in the activities, used

expository statements 57% of the time throughout her FirstClass discussion activities.

She used no vertical questions or citations. Her participant based discussion activities

yielded a low percentage of horizontal questions. Reagan did use referential statements,

reflection statements, scaffolding/engaging comments, and quotations/paraphrases, 14%,

7%, 10%, and 9% of the time, respectively.   As a co-facilitator (Table 26), Reagan did

not use any vertical questions, quotations, or citations. Again, she used a majority of

expository statements (71%). She used horizontal questions (6%), referential statements

(10%), reflections (2%), and scaffolding/engaging comments (10%).

Table 25
TAT Results for Reagan as a Participant

	Reagan	
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	5	2
2A: Expository Statements	141	57
2B: Referential Statements	35	14
3: Reflections	18	7
4: Scaffolding, engaging	25	10
5A: Quotations, paraphrases	22	9
5B: Citations	0	0
Totals	246	100

Table 26
TAT Results for Reagan as a Co-Facilitator

	Reagan	
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	3	6
2A: Expository Statements	35	71
2B: Referential Statements	5	10
3: Reflections	1	2
4: Scaffolding, engaging	5	10
5A: Quotations, paraphrases	0	0
5B: Citations	0	0
Totals	49	100

Dean

Background Information and Posting Preferences

Dean was a male Educational Technology master's student. He scored an 18 on

the GEFT. This course was Dean's first online course experience and he was enrolled in

9 credit hours for the semester. He was not employed. Dean posted in the FirstClass

discussion activities mostly during the nighttime period (8:00 pm – 3:59 am). He posted

his messages throughout the week with more messages on Thursday than any other day.

His posting pattern indicated that he would post more frequently at the beginning of the

units and then taper off as the unit progressed. Dean posted a total of 54 messages (33 as

a participant and 21 as a co-facilitator) during the 6 two-week long FirstClass discussion

activities in the DE course.

Interaction Elements

Dean's participant based FirstClass discussion activity transcripts (Table 27)

showed a 68% usage of expository statements. He used a very small percentage of

horizontal questions (2%) and scaffolding/engaging comments (4%). He used referential

statements and reflection statements approximately 13% of the time he was a participant

in the discussion activities. He did not use any quotations/paraphrases or citations as a

participant in the discussion activities. As a co-facilitator in the FirstClass discussion

activities (Table 28), Dean used much fewer expository statements (21%). He used

vertical questions (3%), referential statements (3%), reflection statements (3%), and

citations (1%) in his co-facilitator based discussions. Horizontal questions (31%) were

the most frequently used type of interaction element throughout Dean's facilitation, but

he also used scaffolding/engaging comments (23%) and quotations/paraphrases (16%).

Table 27
TAT Results for Dean as a Participant

| | Dean | |
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	3	2
2A: Expository Statements	125	68
2B: Referential Statements	23	13
3: Reflections	24	13
4: Scaffolding, engaging	8	4
5A: Quotations, Paraphrases	0	0
5B: Citations	0	0
Totals	183	100

Table 28
TAT Results for Dean as a Co-Facilitator

| | Dean | |
TAT Types	#	%
1A: Vertical Questions	2	3
1B: Horizontal Questions	24	31
2A: Expository Statements	16	21
2B: Referential Statements	2	3
3: Reflections	2	3
4: Scaffolding, engaging	18	23
5A: Quotations, Paraphrases	12	16
5B: Citations	1	1
Totals	77	100

Austin

Background Information and Posting Preferences

Austin was a 27 year old master's level student in the Educational Technology
program. Austin scored an 17 on the GEFT, was employed full-time, and had a high
level of online course experience (minimum of 4 courses). Austin was enrolled in 6

credit hours during the semester this study was conducted. Austin generally posted his messages to the FirstClass discussion activities during the nighttime period (8:00 pm – 3:59 am) during the middle of the unit durations. He posted most of his messages on Sundays. Austin posted 15 messages as a participant and 14 messages as a co-facilitator during the 6 two-week long FirstClass discussion activities in the DE course.

Interaction Elements

The analysis of Austin's messages as a participant with the Text Analysis Tool indicated that none of these postings were vertical questions, horizontal questions, or citations (Table 29). Expository statements were used 47% of the time, along with 27% reflection statements, 15% referential statements, 6% scaffolding/engaging comments, and 4% paraphrases. As a co-facilitator of the FirstClass discussion activities (Table 30), Austin did not use any quotations/paraphrases or citations. Scaffolding/engaging comprised 28% of the comments, 20% were horizontal questions, 20% were expository statements, 15% were reflection statements, 11% were referential statements, and 7% were vertical questions.

Table 29
TAT Results for Austin as a Participant

	Austin	
TAT Types	#	%
1A: Vertical Questions	0	0
1B: Horizontal Questions	0	0
2A: Expository Statements	46	47
2B: Referential Statements	15	15
3: Reflections	26	27
4: Scaffolding, engaging	6	6
5A: Quotations, Paraphrases	4	4
5B: Citations	0	0
Totals	97	100

Table 30
TAT Results for Austin as a Co-Facilitator

	Austin	
TAT Types	#	%
1A: Vertical Questions	3	7
1B: Horizontal Questions	9	20
2A: Expository Statements	9	20
2B: Referential Statements	5	11
3: Reflections	7	15
4: Scaffolding, engaging	13	28
5A: Quotations, paraphrases	0	0
5B: Citations	0	0
Totals	46	100

Comparison of the Interaction Elements for the Four Selected Learners

The interaction element profiles for the four selected learners looked similar for all four of the learners when they were participants and co-facilitators in the FirstClass discussion activities. Figure 1 details interaction elements for the four selected learners as participants. Figure 1 shows that Austin had a spike in reflections that the other

learners as participants did not. Figure 2 details interaction elements for the four

selected learners as co-facilitators. Figure 2 shows that Reagan had a spike in expository

statements that the other learners as co-facilitators did not.
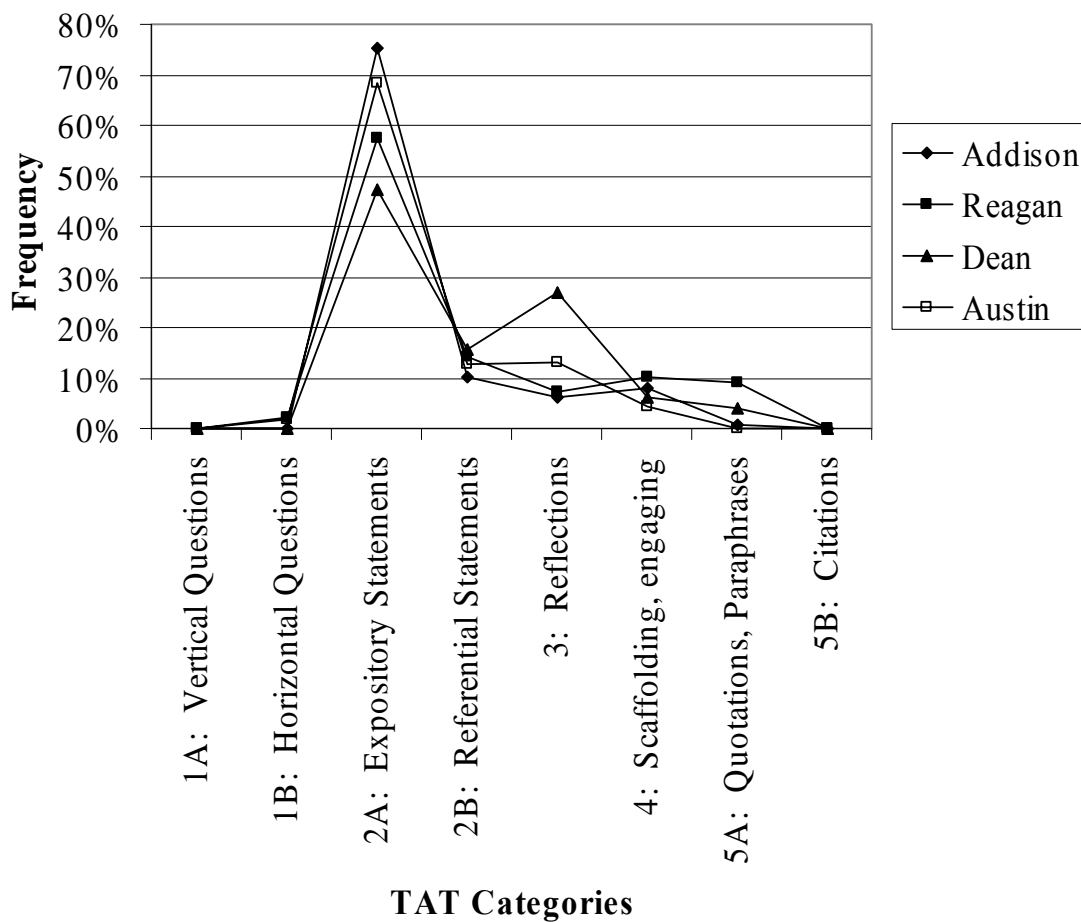
Figure 1. **TAT Analysis of Selected Learners as Participants.**

Figure 2. **TAT Analysis of Selected Learners as Co-Facilitators.**

Interaction Elements in Online Classes

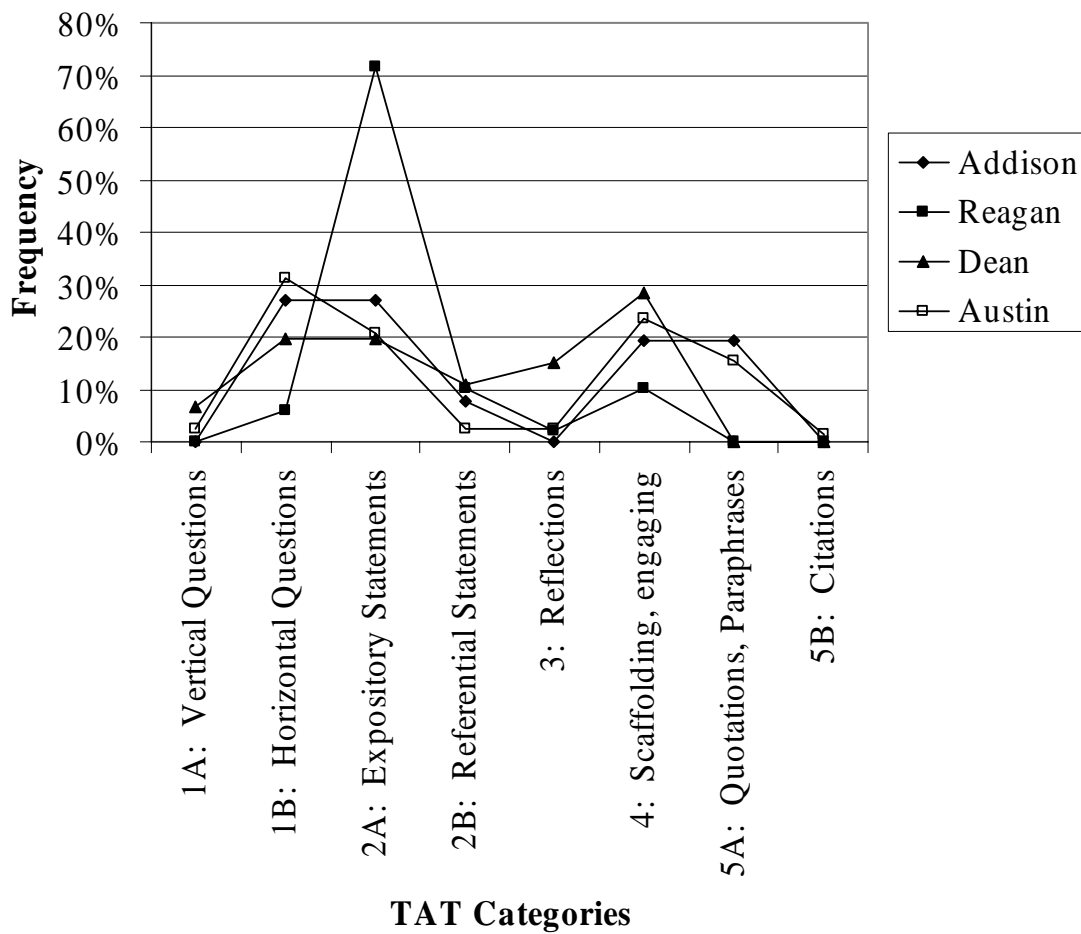To answer the question, "How do selected learners differ in their use of interaction elements during online discussion?" the researcher analyzed all FirstClass discussion activity transcripts for the four selected learners using the Text Analysis Tool (TAT).

The researcher analyzed the selected learners' FirstClass discussion activity transcripts with the Text Analysis Tool to see how the learners used interaction elements. Addison and Reagan were enrolled in the ET course, for which only three units were suitable for analysis due to the course structure. Dean and Austin were enrolled in the DE course. Six units were used for analysis for the DE course. Frequencies were used for descriptions of how the elements were used. Table 31 contains the frequencies for all TAT interaction elements for the four learners as participants. Table 32 contains the frequencies for all TAT interaction elements for the four learners as co-facilitators. The frequencies were calculated by dividing the total for each type of interaction element by the total of all interaction elements.

The quantity of interaction elements for the selected learners as co-facilitators appears a little different from the overall numbers (Table 33). The overall number of interaction elements is significantly lower for the co-facilitators than the total numbers (because the learners only facilitate one unit, while they are participants in 3 other units for the ET course and 5 other units for the DE course). Type 2A, expository statements, were not the majority of interaction elements, as was the case in the participant's findings. The lower number of Type 2A statements demonstrates that the co-facilitators

were effectively provoking discussion with Type 1B, horizontal questions and Type 4, scaffolding or engaging statements. Types 5A and 5B also show a dramatic emphasis while the learners were facilitating, demonstrating that the co-facilitators introduced resources and readings to the participants. Addison and Reagan did not include any vertical questions in their messages as co-facilitators, even though the co-facilitators were required to post vertical questions at the beginning of each unit. Each co-facilitator group determined who would post the vertical questions for their group, therefore it was possible that Addison and Reagan were not designated to post the questions for their co-facilitator groups.

Table 31
TAT Interaction Elements for Four Selected Learners as Participants

	Addison		Reagan		Dean		Austin		Total	
TAT Categories	#	%	#	%	#	%	#	%	#	%
1A: Vertical Questions	0	0%	0	0%	0	0%	0	0%	0	0%
1B: Horizontal Questions	0	0%	5	2%	3	2%	0	0%	8	1%
2A: Expository Statements	133	75%	141	57%	125	68%	46	47%	445	63%
2B: Referential Statements	18	10%	35	14%	23	13%	15	15%	91	13%
3: Reflections	11	6%	18	7%	24	13%	26	27%	79	11%
4: Scaffolding, engaging	14	8%	25	10%	8	4%	6	6%	53	8%
5A: Quotations, Paraphrases	1	1%	22	9%	0	0%	4	4%	27	4%
5B: Citations	0	0%	0	0%	0	0%	0	0%	0	0%
Totals	177	100%	246	100%	97	100%	183	100%	703	100%

Table 32
TAT Interaction Elements for Four Selected Learners as Co-Facilitators

TAT Types	Addison		Reagan		Dean		Austin		Total	
	#	%	#	%	#	%	#	%	#	%
1A: Vertical Questions	0	0	0	0	2	3	3	7	5	3
1B: Horizontal Questions	7	27	3	6	24	31	9	20	43	22
2A: Expository Statements	7	27	35	71	16	21	9	20	67	34
2B: Referential Statements	2	8	5	10	2	3	5	11	14	7
3: Reflections	0	0	1	2	2	3	7	15	10	5
4: Scaffolding, engaging	5	19	5	10	18	23	13	28	41	21
5A: Quotations, paraphrases	5	19	0	0	12	16	0	0	17	9
5B: Citations	0	0	0	0	1	1	0	0	1	1
Totals	26	100	49	100	77	100	46	100	198	100

Table 33
TAT Interaction Elements for All Interactions from Four Selected Learners

TAT Categories	Addison		Reagan		Dean		Austin		Total	
	#	%	#	%	#	%	#	%	#	%
1A: Vertical Questions	0	0	0	0	2	1	3	2	5	1
1B: Horizontal Questions	7	3	8	3	27	10	9	6	51	6
2A: Expository Statements	140	69	176	60	141	54	55	38	512	57
2B: Referential Statements	20	10	40	14	25	10	20	14	105	12
3: Reflections	11	5	19	6	26	10	33	23	89	10
4: Scaffolding, engaging	19	9	30	10	26	10	19	13	94	10
5A: Quotations, paraphrases	6	3	22	7	12	5	4	3	44	5
5B: Citations	0	0	0	0	1	0	0	0	1	0
Totals	203	100	295	100	260	100	143	100	901	100

According to Table 35, Type 1A, vertical questions, were the least visible elements and were comprised of questions with specific answers. Examples of vertical questions were, "Is it A day or a B day" or "What is the difference between systematic and systemic?" Type 1b, horizontal questions, were slightly more prevalent (6%) than type 1A questions. Examples of horizontal questions were "Would it not be wonderful

to imagine that students carefully encouraged to become more active in their own learning, continue to learn?", "I wonder if there is a risk that teachers may not get involved enough?", and "How do you motivate students?"

Type 2A, expository statements, comprised the majority (57%) of the interaction elements. Examples of type 2A statements included; "The owners of the copyright have to decide how rules of the copyright are enforced.", "Right now, the primary type of reporting back to the general faculty/staff is a word of mouth report from team representatives.", and "By the third year, our system was running smoothly." Type 2A statements do not invite dialogue and generally offer factual information.

Type 2B, referential statements were used 12% of the time by the four selected learners. These types of statements include answers to questions. Some examples from the transcripts are "That's right.", "If you own it, then you can enforce the rules anyway you like.", and "Yes, there are some needed reforms."

The selected learners contributed reflections (type 3) approximately 10% of the time. Examples of these opinions or private information included "I must admit the long list of questions and replies in the folders is somewhat overwhelming" and "An instructor aware of these ideas must actually work harder, I believe."

Type 4, scaffolding or engaging comments were contributed to continue interaction. They were used 10% of the time by the selected learners. One example was, "I ask because I really want to know."

Type 5A, quotations/paraphrases was used 5% of the time by the learners. Examples included references to course materials and outside resources. One student,

for example, referred to F.C. Bartlett, "to understand and remember new information, we must make it meaningful." Type 5B, citations, were used only once by one of the four students.

Compared with Fahy's TAT analysis in a 2001 study which pilot tested the TAT instrument (Table 34), it appears as though the frequencies of interaction elements for this study are expected. With the exception of reflections, the quantities for the other TAT categories are similar. The percentage of reflections observed in this study was 10%, while in Fahy's (2001) study, reflections composed 21% of all interaction elements. The difference for reflections was the most significant difference observed between the two studies.

Table 34
Frequency of TAT Types as Described by Fahy (2001)

TAT Types	#	%
1A: Vertical questions	26	1
1B: Horizontal questions	47	2
2A: Expository statements	1329	52
2B: Referential statements	246	10
3: Reflections	526	21
4: Scaffolding, engaging comments	252	10
5A: Quotations, paraphrases	89	3
5B: Citations	43	2
Total	2558	100

Perceived Online Course Experiences

This section describes the results of the research question, "how do selected learners perceive their experiences in online courses?" The results are presented in a case study format for each of the four selected learners. Through a constant comparative analysis by grouping meaningful units into categories, knowing the learner, communication, and course design are the three findings that Addison, Reagan, Dean, and Austin discussed. Knowing the learner was discussed in terms of time management, motivation, and differences among learners. Communication was discussed in terms of spontaneity, isolation, freedom, and accountability. Course design was discussed in terms of flexibility, organization, accountability, and technology.

Each of the interviews was unique in some way. For example, Addison's interview was the shortest of the four interviews conducted, with the interview ultimately taking place during a conference period after having been rescheduled several times. Rather than using the interview as an opportunity to describe her experience in a stream of consciousness manner, Reagan wanted a directed interview, asking many questions as well as inquiring about the quality of her answers. Reagan asked for a more guided approach to the interview than the other learners did. The researcher began the interview with Reagan by asking her to describe her experiences in online courses. Reagan responded with many questions, the most telling one being, "teaching them or as a student?" Reagan's question indicated a level of online course experience that exceeded the number of online courses she had taken; she had online course experience both as a student and as an instructor. The online chat method for the interview with

Dean yielded pointed and precise thoughts regarding his perceived experiences in online courses. Austin's interview was concise and to the point, yet it yielded some concerns the others did not address.

Addison

Addison was a 30-year-old Educational Psychology master's student. Addison scored a 12 on the GEFT and was new to the online course experience. Addison's perceptions of her online course experience are described in this section. She discussed her perceptions in terms of knowing the learner, communication, and course design.

Knowing the learner. As a learner, Addison had many concerns such as time management and motivation. She explained that she thought the issue of time management was due to the course being conducted online, through a computer interface, since face-to-face classes have definite meeting times and places. Keeping up with the self-directed workload required of online courses was an issue for Addison as she said several times throughout her interview, "I have to be very diligent about working; it is easy to ignore that computer."

Addison's motivation to put forth effort in online courses had improved since she was an undergraduate in a face-to-face course. She attributed the improvement to "maturity and monetary motivation", meaning that she had gained life experience since she was an undergraduate and was responsible for providing for herself during her graduate education. Addison believed many of her classmates were motivated to participate in the FirstClass discussion activities because of the fact that many of them worked as teachers and that the discussions were interesting. "As teachers", she said,

"we actually seek 'over-participation' from our students." She added, the "discussions were thought provoking—I wanted to get into those discussions."

Communication. Addison discussed communication in terms of interaction. When addressing issues concerned with when and how interaction in online courses took place, Addison mentioned that her only experience was with the asynchronous instruction during the course included in this study, specifically the FirstClass discussion activities. She did, however, meet with her group a few times for online chats. These chats were her only "real-time" interaction with other students in her class, other than the face-to-face orientation held at the beginning of the course, and one phone call from a classmate regarding an assignment—interaction she described as not taking place on a personal level. Addison did not make any attempt to create opportunity for personal interaction because "it seemed hard to make a personal connection with classmates because of the physical distance."

Addison said that at first she did feel isolated, but as she began participating in the FirstClass discussion activities and other group work the feeling of isolation subsided. She mentioned she never "knew her classmate's faces", but she did recognize their names and could follow their line of thinking. She did not feel the lack of personal interaction was necessarily a disadvantage of the online course delivery method. She said that based on her prior experience with face-to-face classes, the interaction that took place in the online environment would not have been as effective in a face-to-face environment. The difference was because the professors in a face-to-face environments

teach more in a lecture based format instead of student-centered group activities and presentations.

Course design. When considering course design, Addison described the flexibility that online courses make possible as an advantage, but mentioned the possibility for procrastination as a drawback. Addison described flexibility as a "catch-22" because "if a class had time limitations and constraints the procrastination issue would subside, but the flexibility would be lost." Addison thought a very organized, instructor-led course design with clear timelines and instructions would help her stay organized and involved in an online course.

Reagan

Reagan was a 50-year-old Ph.D. student. She scored a 17 on the GEFT and was enrolled in 9 hours, and she worked full-time. Reagan had a high level of online course experience, and she shared in-depth perceptions of online course experiences. She described her experiences in terms of knowing the learner, communication, and course design.

Knowing the learner. For Reagan, knowing the learner included issues such as time management, motivation, and differences for "old or young" learners. Reagan appreciated the discussions inherent to online courses even though these discussions took a lot of her time—she said she found that she put "a TON of time into online classes." To manage her time in an online course, Reagan said she asked herself the question "What do I absolutely have to do today?" She said she kept a calendar and plans and that it was imperative to try not to get behind in assignments. As a student in

online courses, she worked on each class every day of the week. Reagan credited her motivation to be a good online student to the fact that she loved being back in school. She explained, "I LOVE learning!"

According to Reagan, grades are what motivate students to interact with each other. She explained that if a grading rubric requires students to post at least three entries for an "A", then they would post those three entries. She said that overachieving by posting above the required amount was due to competition among the students—students have a commitment to be the best. She went on to say, however, that sometimes "students can get 'into' a discussion!!! That's what every teacher must dream of!"

Reagan observed a difference between older and younger students. Older students often feel more confident about asking questions, so they will go try to get the information they need, whether it be in an online or face-to-face course environment. Even so, she said that all of the course work should be laid out clearly; older students who are new to online learning "can be just as confused as the young ones."

Communication. For Reagan, communication in online courses had many facets. To Reagan, collaborative projects in online courses are somewhat problematic. Reagan did not feel a successful online course had to revolve around collaborative projects, even though she realized "that's one of the big focus points these days." She explained that the group situation always included some group members who did their work as expected. She said there were also those who did not do their work, which was not

necessarily a result of laziness or not caring, but rather differing levels of experience. She did not like having to depend on the less participative group members for her grade—accountability was a big issue to Reagan.

Reagan did, however, appreciate the interaction opportunities provided by online discussion activities. While describing the benefits of FirstClass, Reagan added that she "likes 'getting to know' my classmates through discussions." "The trick to good discussions is for the instructor to present leading or even controversial questions, not asking for facts but making students interpret and yes, 'argue'." Reagan said she has never felt isolated in an online course environment, but attributed that to the type of student she considers herself to be. She said, as a student she has always wanted to get the assignment, complete the assignment by herself, and then submit it—even before "distance ed."

At times the online class can allow students too much freedom, causing confusion among those who are not used to the freedom or who are unable to handle it. Reagan suggested that online course instructors would have to work "freedom" into the course gradually. She expanded her statement by saying that other students need someone around while they are learning or completing assignments, and they find isolation more of a problem, especially new online students, since they are not used to "being on their own." Reagan explained that the tradition of face-to-face education meant that for years students have had someone there to guide and present lessons to the class.

The biggest issue for Reagan regarding communication in online courses was that it must be very clear and must have all of the detail in order to be effective. She explained that the face-to-face environment yields far more "visually" based communication than the online environment. She argued, though, that this "visual communication" could be captured online through clear, effectively written communication that includes many details. She explained that one of the challenges of online written communication was that "words that I think will 'say' it all, somehow do not carry the entire message online!" She said she thought instructors and students in online courses need to write in such a way that there is limited room for interpretation. She added, that in her experience someone always interprets a meaning in her written communication that no one else has.

According to Reagan, time, along with the students' differing levels of commitment to learning, is the biggest barrier to learner-learner interaction. Reagan said that graduate students will discuss "until the cows come home", but undergraduate students will do only the minimum. She said in her online course experiences she had not found "race, social levels, or ESL problems" to have much effect on learner-learner interaction, except for grammatical issues.

Course design. Reagan spent a lot of time in the interview writing about her opinions on course design as they related to her online course experience. To her, course design depended on the instructor, regardless of whether the instructor was the actual course designer or merely a facilitator. She said, "I've most been impressed by the instructor who has his/her act together [with regard to course design] with lots of

material." The pieces of the online course should flow together toward an effective goal. She said she likes to "know what is expected out of her as a student", how the course components will work together, and that the instructor is available for help should the student need it. Further, a "great" instructor in online courses will present challenges and questions through the course design in order to facilitate the students sharing and working together, but the instructor will, all the while, "maintain a presence." If group work could be done together, but based on separate contributions, accountability would not be such an issue, especially if work was done through a package such as FirstClass, where the instructor "sees who's working and who's not." Reagan explained that through FirstClass, the instructor can view conversations that take place through discussions in FirstClass, as well as looking at the "histories" of messages. She said that the FirstClass method creates an environment where "no one has to 'report' or blame."

One design benefit of online classes is that she "can dedicate that time any time during the night or day", though she does not really appreciate having to contribute to what she termed as "busy work." She said she loved challenging assignments, though. Discussions based on controversy will encourage students to contribute, except that the students are always aware of a "teacher watching" and know that "certain things cannot be said."

Reagan said that she still saw technology and technology skills as an issue for students in online courses. In FirstClass, for example, Reagan said the help feature guided the students into the program, but taking the time to learn the technology contributed to the success of the online course experience. She said that instructors

should aim for the lowest skill level in order to present the smallest technological challenge possible, and then make learning the technology as enjoyable as possible. She said that she still had classmates who had to learn the technology tools from scratch in order to get the class work done. "And this", she added, "in Ed Tech classes!"

Technology is not the driving force in education. Reagan said that she thought the technology, online learning, and multimedia can be terrific tools in education. The technology must be made to work for and with education, rather than making the education work for the technology. She said students must "think", but they must also "learn."

Dean

Dean was a 26 year old masters student who scored an 18 on the GEFT. Dean was enrolled in 6 hours and was not employed. Dean seemed to be passionate about knowing the learner in online courses as well as design of online courses, and he also had strong opinions regarding communication.

Knowing the learner. Dean's perspective on his online experiences included a comparison of face-to-face preferences and personality. Overall, Dean's experiences in online courses were good; he thought the online environment worked well and he really enjoyed it. In fact, Dean said he had heard more complaints about face-to-face courses than the online ones. He also said that he hated "being stuck in a classroom and lectured to (especially when the person is BORING)." He also said that the online environment made him a more interactive student than the face-to-face environment did. He

described himself as "not the most outgoing person ever", so he was more likely to ask questions and participate in an online course than in a face-to-face course.

Communication. Dean did not describe many issues with communication in online courses. He mentioned, however, that interaction could help alleviate problems with courses that did not include detailed instruction or lacked sources for the information the students are responsible for learning. Dean, when commenting on the role of international students and online communication, thought the only issue with international students was the language, not the technology. He said that some of the students new to the United States sometimes had problems writing responses, but it was not anything he could not "decipher and overcome." Beyond the interaction that took place through the FirstClass based activities throughout his first online course, Dean said that the only means of communication he pursued with other students was through email. He did not feel the need to talk "real-time" with the other students.

Course design. One of the reasons Dean cited for liking the online environment was the fact that the environment was flexible, allowing him to do his work in his online course anytime. He described himself as a "night owl" who sometimes did not start doing work until 10:00 or 11:00 at night. He also said that he liked that fact that he could learn when he wanted to instead of when the class was in session. The online environment also accommodated a flexible environment between the instructor and students, according to Dean. He liked the fact that he could get help from the instructor when he needed it, but not have it "spoon fed" to him when he did not.

The key to designing a successful online course, according to Dean, is to design a course that includes a web site where the syllabus, resources, a calendar, unit information, and assignment information are contained. He emphasized the need for a calendar, particularly because he believed they help organize time and deadlines.

Overall, Dean thought that online courses were better organized than face-to-face courses. His experience had been that the instructor's expectations of the students were more clearly outlined for online courses. Further, the technology behind online courses allowed for a well-organized and structured environment, making it easy for novices to learn.

Austin

Austin was a 27 year old masters student. He scored a 17 on the GEFT. He was enrolled in 6 credit hours and worked full-time. Austin described his experiences in online courses with regard to knowing the learner, communication, and course design.

Knowing the learner. For Austin, knowing the learner meant accommodating the need for being familiar with his classmates and being able to talk to them in a real-time environment. For Austin, improving the existing technology, or including multiple technologies would make an online course tolerable. Austin said he preferred a video-conferencing based distance learning environment.

Communication. Austin did not mind receiving course materials or turning in assignments online, but as a communication medium, he thought the online environment was "awkward." Two issues Austin identified with online communication are bandwidth and the ability for online communication to be recorded. The ideal distance

education class, according to Austin, would include technologies that are not necessarily feasible for global use today due to bandwidth issues. He would like online courses to include computer-based videoconferencing and collaborative white board applications, both of which he identified as necessitating high bandwidth for adequate performance.

With regard to recording online communication, Austin felt that there is no anonymity in online courses. The student's names are posted with every message, and "someone could easily print out something" he said and send it to his boss. Recording synchronous chats was much less an issue to Austin, though he acknowledged they could still be "logged." The fear of his communications being distributed beyond the classroom was apparent even in the way that Austin communicated in the online environment. Austin said that he was much more reserved in online asynchronous communication than he would have been in person for two reasons. The first reason was that in a face-to-face environment, "as far as we know, people aren't carrying around tape recorders." The stated second reason was that asynchronous communication "doesn't have the same feeling as a conversation." For example, Austin said, "I talk to my mom differently in a letter than I would on the phone."

In a synchronous chat, Austin said he was closer to how he would interact with that person face to face. Austin said that he was a perfectionist, and that asynchronous writing actually made it harder for him to participate because he had to "put it in writing", which made him uncomfortable because it was not what he considered to be "spontaneous communication." Synchronous communication in an online environment did not have the same sense of formality to Austin that asynchronous communication

did, though he used synchronous means with other students only when there was a group project involved. Even this type of interaction had fault, though, according to Austin, because he did not know when students were completely through entering a comment, or if they were simply breaking up a longer comment into smaller pieces. "Different people use different conventions", he said. He said that he did help an international student with an online course by communicating via e-mail and telephone.

For Austin, all interaction that took place with the other students was course related, though he also said that he missed the "social" interactions of running into people in the hallway or before face-to-face class sessions. He said that sometimes these conversations would include information that he would not necessarily want a teacher to have access to, explaining why these interactions did not occur in the online environment, but did occur in the face-to-face environment.

Course design. According to Austin, online course design should use online communication as a supplement to face-to-face courses. The supplement should extend conversation past the timeline of a face-to-face class. Austin thought even this "supplemental" communication would have the same faults as identified in completely online based communication.

Because online courses take more time than "traditional courses" due to the amount of reading required, Austin believed that an ideal online course would include a synchronous communication component. Further, it would be even better if the synchronous component could be face-to-face. At the very least, an online course would include at least one videoconference or face-to-face orientation meeting at the beginning

of the course. He also said that in any type of online interaction, it would be preferable if a video image or picture of the person "talking" could be displayed to make it "feel" more like a real person on the other end of the communication. He would like to include real-time videoconferencing, collaborative whiteboards, round table facilitated chats, and picture icons of the participants in online course design—the "best of both worlds", he said.

Comparison of Perceived Online Course Experiences for the Four Selected Learners

All learners had their own perceptions about their online course experiences. Addison's perceptions dealt mostly with time management and how an online course should facilitate it. Reagan's perceptions were concerned with course design and the instructor's role. Dean seemed to be most concerned about flexibility and organization of online courses, while Austin was specifically concerned about the privacy of his online interactions and the absence of visual cues from the online environment. All of the learners acknowledged the roles of interaction in online courses as vehicles for learning content as well as for social interaction. Addison and Austin seemed to attribute the need for interaction to cultivating social presence while Dean and Reagan used interaction more for learning and meeting course requirement. Though they mentioned missing the "social presence" of the face-to-face environment, none of them made extra effort to create a social relationship with any of their classmates.

Summary

This chapter presented the findings of the study. The quantitative findings were related to determining if cognitive style is related to the quantity of learner-learner interaction in online courses, if there is a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses. Qualitative findings were related to how selected learners differ in their use of interaction elements during online discussion. Case studies were used to discuss how selected learners perceive their experiences in online courses. The next chapter will include a discussion of the findings, conclusions drawn from the findings, a proposed model for online course design, implications for further research and implications for online course design.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

This chapter is divided into four sections. The first section summarizes and discusses the research findings. The second section offers conclusions based on the findings. The third section describes a proposed model for online course design. The fourth section offers recommendations for further research and discusses the implications of the study on instructional design for online courses.

Summary and Discussion

As stated in Chapter I, the purpose of this study was to: a) determine if cognitive style is related to quantity of learner-learner interaction, b) determine if there is a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses, c) determine how selected learners differ in their use of interaction elements during online discussion, and d) explore how selected learners perceive their experiences in online courses. This section explains what the results determined in Chapter IV mean to the purpose of this study.

Cognitive Style

To answer the question, "Is cognitive style related to the quantity of learner-learner interaction in online courses?" the researcher administered the Group Embedded Figures Test (GEFT) to the participants in order to determine their cognitive style based on field dependence/field independence. The quantity of learner-learner interaction was determined using the total number of participants' postings from the FirstClass discussion activity transcripts for the entirety of both courses.

Witkin et al.'s (1971) research shows that field dependent learners need interaction for emotional support. Field independent learners do not crave interaction to the same extent that field dependent learners do, but when they do need interaction, it is focused on obtaining an answer to a question or gaining further information. Research on student needs in distance education shows that distant students need at least as much interaction as their traditional classroom counterparts during learning to be satisfied and for learning to be effective (Fulford & Zhang, 1993). Ironically, cognitive style research focusing on distance education shows that most distance learners are field independent (Brenner, 1997; Greule, 1996; Miller, 1997; Shih et al., 1998; Summerville, 1998). Research on field independence also shows that this type of cognitive style does not require social interaction in order to be satisfied with learning.

The present study utilized courses that had learner-learner interaction built into them in the form of the FirstClass discussion activities. While the activities had minimum requirements in terms of quantity and quality of messages in order to receive full credit for participation, nearly every student received full credit, based on participation scores provided by the course instructor. The students far exceeded the requirements for the number of postings. The statistical results indicated that there is no relationship between cognitive style and quantity of learner-learner interaction postings. Other studies have found similar results when trying to correlate cognitive style based on field dependence/field independence with issues in the distance learning environment. Brenner (1997) studied success of FD/I learners in asynchronous distance education telecourses, but found that there was no significant difference in the probability of

success or failure based on cognitive style. When trying to predict learner satisfaction in a two-way videoconferencing distance education environment, Greule (1996) found that field dependence/field independence did not serve as a predictor. When determining if distance education is better suited for field dependent or field independent learners, Miller (1997) found that the environment can be equally suited for either type of learner, therefore, a relationship was not found. Shih et al. (1997) attempted to find a relationship between cognitive style and learning strategies in web-based courses. They were unable to identify any differences between the two cognitive styles. Finally, Summerville (1998) studied how students with different cognitive styles function in web-based courses. Summerville found no observable differences between cognitive styles.

Learner Posting Preferences

To answer the question "Is there a relationship between learner characteristics and learner posting preferences in learner-learner interaction in online classes?", the researcher first analyzed results of the Student Demographic Questionnaire to determine learner characteristics. The participant postings from the FirstClass discussion activities were used to determine learner posting preferences. The learner characteristics considered in this study were number of semester credit hours the students were enrolled in, the number of hours students were employed, the students' level of online course experience and the students' age. The learner posting preferences considered were time of day messages were posted, day of week messages were posted, and part of unit messages were posted.

Analyzing the quantity of postings as percentages based on learner characteristic categories showed trends indicating that to a certain extent, the busier a student was, based on credit hours and employment, the more total messages were posted.

The results of the chi-square analysis showed that certain learner posting preferences were influenced by certain learner characteristics. Level of online course experience as a learner characteristic influenced the day of week, time of day, and part of units in which messages were posted. The number of hours employed per week seemed to influence the day of the week within units that the students in the ET course posted, but the relationship was small. The number of hours employed per week influenced the time of day and part of unit in which the DE students posted messages.

The number of semester credit hours a student was enrolled in influenced the day of week, time of day, and part of unit that messages were posted for the ET and DE courses. Age influenced message posting only where time of day and part of unit were concerned.

All of these relationships are difficult to explain based on other research, as empirical data are limited in this area. One study that sought to consider learner characteristics and preferences in order to understand student success in online courses cited that these issues are important to consider, but that no data are available (Robyler & Marshall, 2002).

Interaction Elements in Online Classes

To answer the question, "How do selected learners differ in their use of interaction elements during online discussion?" the researcher analyzed the FirstClass discussion activity transcripts for the four selected learners using the Text Analysis Tool (TAT).

The Text Analysis Tool, a relatively new instrument limited to studying the structure of interaction, was used for analysis of computer conference transcripts published in few studies. The results from the published studies are consistent with the results found in this study. For example, the frequencies of interaction elements determined from the analysis of the interaction elements from the FirstClass discussion activities in this study were nearly identical to the patterns found in a 2001 study by Fahy, Crawford, and Ally. For this study and Fahy's study, the fewest interaction types were vertical questions, horizontal questions, quotations/paraphrases, and citations. Expository statements were the most frequently used interaction elements in both studies. An interesting, but not surprising, finding of this study is how the interaction elements differed according to the role of the selected learners (participant or co-facilitator) in the FirstClass discussion activities. Fahy, Crawford, Ally, Cookson, Keller, and Prosser (2000) identified the student role in online discussion as it influences patterns of interaction elements as an area needed for further research.

As participants, the majority of interaction elements contributed by the selected learners were expository statements, which include "little self-revelation and usually do not invite response or dialogue" (Fahy, 2001). Referential statements were included

much less frequently than the expository statements, but more so than the remaining

categories, which were citations, scaffolding/engaging comments, and questioning.

Referential statements are "direct or indirect answers to questions, or comments

referring or alluding to preceding statements or ideas" (Fahy). The selected learners, as

participants, answered questions posed by the co-facilitators, added comments to

comments made by other learners, and offered their opinions more frequently than

asking more questions.

As co-facilitators, the majority of interaction elements included by the selected

learners were also expository statements. For co-facilitators, however, horizontal

questions and scaffolding or engaging comments were more frequent than the other

interaction elements. Horizontal questions are questions without "a correct answer or

solution; thus others are invited to help provide a plausible or alternate 'answer'" (Fahy).

Scaffolding or engaging comments are "intended to initiate, continue, or acknowledge

interpersonal interaction, and to 'warm' and personalize the discussion by being

welcoming and accepting" (Fahy). As co-facilitators, the selected learners posed as

thought-provoking questions to the participants rather than asking questions that have

definite answers. Further, they offered encouragement and praise to the participants.

The appearance of so many expository statements was probably a result of the co-

facilitators answering questions posed by the participants, adding their opinions, and

giving instructions to the participants regarding the discussion activity. In this study, it

seems the learners as participants and co-facilitators had reached the point at which they

felt motivated to contribute to the discussion activities. Aragon et al. (2002) suggest that by reaching that point, students are actively engaged.

<div align="center">*Perceived Experiences*</div>

To answer the question, "How do selected learners perceive their experiences in online courses?" the researcher interviewed the four selected learners individually using the FirstClass chat feature. Common themes in the learners' online course experiences included knowing the learner, communication, and course design in online courses.

Knowing the Learner

One theme identified in the interviews was knowing the learner. The four students who were interviewed described specific issues in online courses such as time management, motivation, and differences among learners.

Time management was an issue in online courses, since the courses were self-directed. The selected learners had developed methods to manage their time. For example, Reagan kept a calendar, worked on each class every day of the week, and asked herself the question "What do I absolutely have to do today?"

Online courses require a lot of personal motivation to keep up with the work, particularly because the work takes place through a computer—not a traditional classroom where the teacher can prod the students (Wang & Newlin, 2000). The selected learners' perceptions of personal motivation varied. Maturity and money were mentioned as motivators, as well as being happy to be learning. Addison and Reagan believed the students were motivated to participate in the discussion activities because they were involved in the discussions. Reagan added that grades probably served as a

motivator, while Addison believed that the students were able to identify with what the instructor was trying to accomplish through the discussions, since many of the students were instructors themselves.

Differences among learners was another issue mentioned in the interviews concerning knowing the learner. Reagan specifically mentioned age of the students as an issue while Dean discussed personality differences among the students as an issue. Both Reagan and Dean indicated that learner differences could cause students to behave in different manners in online courses.

Communication

Communication, as perceived in online courses, was discussed by the four selected learners in terms of spontaneity, isolation, freedom, and accountability Perceptions of communications in the online environment differed according to the learner.

The selected learners differed on their opinions regarding the need for spontaneous communication in online courses. Austin preferred the option of being able to communicate synchronously, while Dean preferred the asynchronous environment because it helped him overcome his shyness and empowered him to communicate more openly. The four learners in this part of the study did not feel that particularly personal relationships were formed with the other students in the class, but they not feel the need to pursue those types of relationships with the tools that were made available to them. Austin's concerns with asynchronous communication extended beyond the issue of spontaneity—he was concerned about his conversation being recorded. Student issues

with privacy and forms of online communication have been documented by Tu & McIsaac (2002), who found that building trust online could provide greater interactivity among the learners. Tu (2001) found that Chinese students would not contribute comments that may be controversial or sensitive in a study on Chinese students' perception of social presence in online environments

The selected learners differed on their feelings of isolation. Reagan said she never felt isolated in an online course environment, but attributed that to the type of student she considered herself to be. Addison said that at first she did feel isolated, but as she began participating in the FirstClass discussion activities and other group work the feeling of isolation subsided.

Freedom was an issue for students who were new to the online learning environment. According to Reagan, at times the online class can allow students too much freedom, causing confusion among those who are not used to the freedom or who are unable to handle it. Online course instructors should integrate freedom into the course gradually.

Accountability in online environments was particularly an issue when it was related to collaborative or group work. The group situation always included some group members who did not complete their work as expected, according to Reagan. She attributed low levels of participation to differing levels of experience.

Course Design

Flexibility, organization, a design that provided for accountability, and technology were issues concerning course design the selected learners discussed. The students expressed that they really enjoyed the flexible environment that online courses offer, though all of the students seemed to be conflicted because they also wanted a structured environment, with their instructor's expectations for them specifically explained. In terms of flexibility, all four of the selected learners appreciated the capability of turning in assignments, receiving materials, or communicating when it was convenient for their schedules.

When considering course design, Addison and Dean described the flexibility that online courses make possible as an advantage. Both students appreciated being able to participate in online courses when it was convenient for them. Addison was concerned about the possibility of procrastination that was inherent with the flexibility, however. Other research has shown that a flexible environment is desired for distance learners (Koszalka, 2001). This perceived struggle between having structure and flexibility in online course design has been documented in other research (Kanuka, 2002). Kanuka discovered that structure is needed in online courses to maintain control, but flexibility is needed to facilitate higher learning.

The selected learners described the desire for a very organized, instructor-led course design with clear timelines and instructions to help stay organized. The pieces of the online course should flow together toward an effective goal. The students wanted to know what was expected of them in a clear and meaningful manner. The students also

described a need for a "one-stop" place for course resources. The students indicated that the perfect environment would include a syllabus, calendar, readings, and other course materials in one easy to access location. Conrad (2002a) suggests that learners get prepared for online courses in advance and learn to integrate learning into life. Conrad is also a proponent for the organization of online courses in a self-contained and organized container that includes expectations, outlines and timelines. The tools included in the "one-stop" place should include capabilities to communicate synchronously as well as asynchronously, and should also include collaborative tools such as whiteboards through which to share documents and graphics (Brill, 2001; Koszalka, 2001; Leonard & Guha, 2001; Murphy & Cifuentes (2001). Further, the technology behind online courses should allow for a well-organized and structured environment, making it easy for novices to learn, since technology skills could potentially be a barrier to students' participation.

Technology for online course delivery should include allowance for accountability. If group work could be done based on separate contributions, accountability would not be such an issue, especially if the technology allowed the instructor to easily monitor the work contributed by the students.

<center>Conclusions</center>

This section contains conclusions relating to a) the relationship of cognitive style to quantity of learner-learner interaction, b) the relationship between learner characteristics and learner posting preferences in learner-learner interaction in online courses, c) how selected learners differ in their use of interaction elements during online

discussion, and d) how selected learners perceive their experiences in online courses. This section explains what the results of each research question mean to the purpose of this study.

The findings showed there is no relationship between cognitive style and the quantity of learner-learner interaction. This finding was probably due to small amount of variance in the sample. These findings were somewhat disappointing because the literature on field dependence/field independence describes the field dependent learner as gregarious and sociable while the field independent learner is reserved, aloof, and socially distant (Jonassen & Grabowski, 1993). Based on the literature, it seemed logical that higher quantities of learner-learner interaction would be related to field dependent learners. Several explanations for the lack of correlation (beyond the issue of variance) are possible. The first possibility is that learners have the capability to adapt their learning style to their environment. The second possibility is that the learner's perceptions of distance learning can change over time (Aragon et al., 2002; Conrad, 2002a; Jonassen & Grabowski, 1993). The third possibility is the disproportion of ESL field dependent learners to field independent learners in this sample. The last possibility is that the course was designed for optimal interaction since the expectations for the students were outlined specifically, the technology was easy to use, and a participation rubric based on quantity of postings was used in the courses.

The findings related to learner characteristics and learner posting preferences indicated there is an empirical relationship between certain learner characteristics and learner posting preferences. Online course design tenets indicate that the online

environment must be malleable and flexible for learner satisfaction and participation (Anderson, 2001).

The observed percentages of postings indicated that participants utilized all possible posting opportunities. These findings show that it is potentially important for course designers to consider flexible discussion environments for the students through the process of designing online delivery systems for courses (Koszalka, 2001) and to allow students the opportunity for better time management (Howland & Moore, 2002).

The use of interaction elements in the FirstClass discussion activity yielded results typical of other studies (Fahy, 2001). As participants, the selected learners contributed interaction typical of adding to a discussion and the co-facilitators contributed interaction typical of facilitating a discussion—asking more questions, leading the other learners. What is the importance of this knowledge? The TAT does not necessarily measure the content of interaction; it is more of a structural type measure. It does determine the type of interaction that is taking place based on asking questions and making statements. Reevaluation of the FirstClass discussion activity transcripts with the TAT may make it possible to create a measure of how engaged a student is in an interactive discussion, particularly if the TAT analysis was used over the duration of a discussion, not just to analyze an entire discussion at its end, particularly since engagement is a facet of learning, and learning is a social process (Conrad, 2002a).

The themes described by the selected learners regarding their perceptions of experiences in online courses were not unusual by research standards. Issues with knowing the learner, communication, and course design are common issues considered

for online course design (Conrad, 2002a; Tu & McIsaac, 2002). The students had suggestions for components to be included in the "ideal online course."

Perhaps more interesting, however, is the absence of several issues from these interviews. The students selected for the interviews had either no previous online course experience, or had a substantial amount of online course experience. Issues such as lack of technical skills, feelings of isolation, missing the instructor, and feeling overwhelmed by the volume of messages involved in online courses were not mentioned in these interviews—none of these students indicated that these were issues for them as learners. Other online learning issues that were not brought up by the selected learners were lacking keyboarding skills, inability to understand the discussions, and being overwhelmed by the discussion environment (Tu & McIsaac, 2002).

Other research has shown that students must spend some time overcoming the technology learning curve in order to pursue the course expectations (Brill 2001; Conrad, 2002a; Koszalka, 2001; Murphy & Cifuentes, 2001). None of the selected learners mentioned technology skills as a huge obstacle or lasting problem. This issue may not have been encountered because the required technologies were addressed during the required face-to-face orientation that was held at the beginning of the course. Further, within each course conference in FirstClass, sub conferences were available for questions and answers and FirstClass practice activities. Additionally, technical support provided by the FirstClass server administrator was available via email. Good technical support is also a solution for preventing and addressing technical issues (Tu & McIsaac, 2002).

The learners did mention that they missed the social interaction with the other students in the classes, but none of them seemed to miss it enough to pursue a social relationship with the students, nor did they feel isolated, which is a common occurrence in online courses (Howland & Moore, 2002). The absence of social interaction is something that is mentioned in literature as an obstacle to distance learning methodologies (Harasim, 1987). Conrad's (2002b) study found that students typically want a "social area" within their online course—an area for meeting and greeting other students.

None of the four students interviewed mentioned that they "missed" the influence of a face-to-face instructor (Kanuka, 2002). A study by Pérez-Prado and Thirunarayanan (2002) that explored student perspectives of online courses confirms that students are generally concerned with self-directed learning and the absence of a physical instructor in online courses. Perhaps the reason these students did not substantially miss the "social interaction" in their online course was because it was actually embedded in the FirstClass discussion activities which took place throughout the duration of the semester. A study by Picciano (2002) on student perceptions of interaction and social presence found that social presence existed for students who participated in weekly discussions much like the FirstClass discussion activities included in this study. Further, since the students had to work in groups, it is possible that more learner-learner interaction was taking place than if they were working alone.

The omnipresence of the instructor possibly provided some unnoticed comfort to the students since she was basically "lurking" in the online discussion activities while the co-facilitators ran the discussions, which is advocated by researchers. Conrad describes the online course instructor's role as one that facilitates and collaborates, invites peer interaction, and shares responsibility with the students (2002a). By designating co-facilitators for each unit, the instructor might have freed up time so she could allocate more virtual one-on-one time to the students (Graham, 2002). Another possibility to explain why these students did not feel isolated or feel like they needed social interaction with the other learners is because their online community had been established in a face-to-face environment during the required face-to-face orientation at the beginning of the course, as recommended by Conrad (2002b).

Tu & McIsaac (2002) provide several contributing factors for positive interaction experiences: a) timely responses by the instructors and learners, b) casual conversation strategies, c) acceptable message length, and d) controlling group size. The ET and DE courses accommodated for timely responses because the instructor designated strict timelines during which the discussions took place. The students may have communicated informally throughout the FirstClass discussion activities. The TAT results for the four selected learners supports this possibility, as the majority of the statements were expository. Use of quotations/citations was minimal, thereby providing a less formal environment than if the students were out collecting many resources and preparing essay type responses for the discussion. Message length was not necessarily controlled by the course design. Again, the students may have compensated since they

not only had to compose and contribute messages, but also had to read the messages that other students posted. Finally, group size was controlled in these two courses by the course instructor who placed a limit on overall course enrollment and designed the FirstClass discussion activities so that the discussions took place within groups in each course, with several co-facilitators for each participant group. Possibly these two courses were so well-designed and facilitated that the students did not encounter these common issues.

<div align="center">Proposed Model for Online Course Design</div>

Based loosely on Anderson's (2001) "Interactive Model of Learner Characteristics and Web-based Courses," the researcher proposes the following model for online course design (Figure 3). Anderson's model was an "interactive model of learner characteristics and web-based courses." Entering characteristics of the learner, course elements, outcomes and how these three elements worked together were considered in Anderson's model. Some of the entering characteristics were field dependence, self-efficacy and motivation. Course elements included control, feedback, and task analysis of web course design, and the outcomes were the students' satisfaction with the course and their performance.
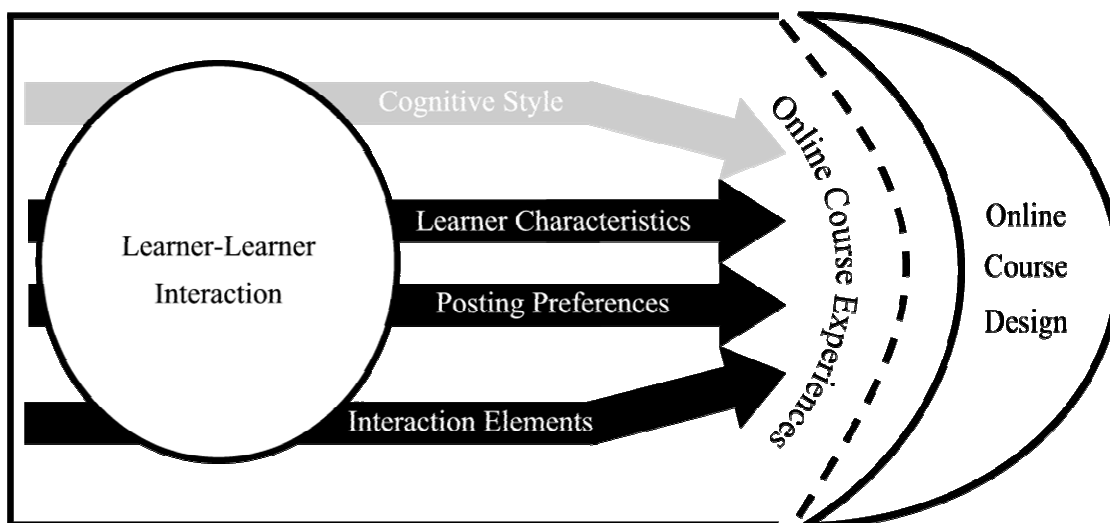
Figure 3. **Proposed Model for Online Course Design.**

Anderson (2001) determined that the removal of geographic boundaries makes it even more important for instructors to recognize individual differences among students. The proposed model for online course design considers individual differences in conjunction with learner-learner interaction. Individual differences are expressed in terms of cognitive style, learner characteristics, learner posting preferences, and the use of interaction elements. Learner-learner interaction is included as an all-encompassing issue because student interaction, as Schrum and Berge (1997) charged, "is central to all other pedagogical decisions in the online classroom" (p. 134). Further, the model considers how each of these potential differences affects the online course experiences of students, and then, in turn, how the combination of these elements affects online course design. Because this study found no direct relationship between cognitive style and quantity of learner-learner interaction, cognitive style is grayed out. The researcher

believes that cognitive style has the potential to cause an effect, but maybe not in terms of field dependence/field independence.

Interaction elements are included in the proposed model for online course design because of their role in determining how interaction takes place in online-based learner-learner interactions. It does not necessarily determine what the student is saying in terms of content, but it does indicate how the student is interacting. Learner characteristics and learner posting preferences are determining factors in learners online course experiences, which ultimately have the potential of influencing online course design.

The dashed line between online course experiences and online course design indicates that the factors may or may not affect perceptions of online course design. The moon shape of online course design in the model is meant to represent the impact of learner-learner interaction, the individual differences, and online course experiences on online course design.

Implications

This section will discuss the implications for future research based on this study. This section will also discuss the implications for online course design as determined by the findings of this study.

Implications for Future Research

This section discusses the implications of this study on future research. Several recommendations for future research became apparent during this study.

The first implication for future research deals with changing the sample for a similar study. One of the most important recommendations would be to conduct

research on learner-learner interactions among undergraduate students. This study focused solely on graduate students, and while interaction did not seem to be at the forefront of their needs for success, this phenomenon should be determined for undergraduate students, particularly since graduate students have unique characteristics such as age and experience. Including a sample of international students in the sample may change the results, also. A study by Tu (2001) on the perceptions of social presence by Chinese students showed that the CMC environment impacted Chinese student learning and affected their online interaction.

Brenner (1997), Gruele (1996), Miller (1997), Shih et al. (1998) and Summerville (1998) attempted to study cognitive style in terms of field dependence/field independence in a distance environment, but experienced issues with their samples being mostly field independent. A useful study would use a pre-determined sample of field dependent learners in an online environment and study their interactions. Another issue that should be researched further would be to investigate why in this study field independent learners were so interactive. Characteristics of field independent learners include the need for interaction only to solve a problem or find an answer to a question (Jonassen & Grabowski, 1993). In this study, the co-facilitators were instructed to offer a few discussion questions per unit, and from the TAT analysis, it was determined that a majority of the interaction elements were statements not requiring further discussion. Was the content covered in this course difficult or were the interaction needs of the field independent learners in this study demonstrative of a changing need or changing cognitive style, as was described in a study done by Aragaon et al. (2002)?

This study was limited to students participating in courses that were extremely similar in nature in terms of design, content delivery, and student composition. Further research could perform the same types of analyses on courses that are not so similar. Perhaps performing the study on courses of different fields, or with a variety of different types of students would offer further information for course design.

Expanding the use of the TAT for types of research not limited to how interaction occurs in text based discussion would be interesting. Modifications of the instrument itself and its administration may make it useful for determining levels of engagement in online discussions and for determining the amount of social presence perceived by learners in online courses. One modification that might be considered is to develop the instrument from a structural, to a more content-based analysis. Mayer (1996) describes the inability to select parts of messages in order to make sense for analyses as one issue with text analyses. Mayer cites that it is important to be able to separate important from unimportant information; the TAT does not allow for that type of separation. While the current instrument does categorize interaction based on meaning, it does not categorize interaction on intent.

Other researchers have encountered the same frustration—demographics and other personal factors are related to success in online distance education experiences, but the data have not been reported yet (Robyler & Marshall, 2002). Perhaps the researchers have not uncovered the correct way to ask the question.

Implications for Online Course Design

This section discusses the implications of this study on online course design. The themes that resulted from this study included knowing the learner, communication, and course design as they relate to online courses.

Several of the interviewees pointed out that an issue with online courses is procrastination. A well-organized course with calendars and specific expectations is one of the keys to preventing procrastination. The interviews revealed that the students appreciate a combination of synchronous and asynchronous course activities. While these students did not specifically seek out spontaneous interactions with their classmates, they appreciated having the ability to do so, if desired. Synchronous components of online courses make this possible for the students. Synchronous discussions do not need to happen often throughout a course, perhaps just once or twice a week in order for the students to develop a better sense of community and acquaintance with each other (Picciano, 2002). An outcome of the interviews with the selected learners was that the secret for learner's satisfaction in the online course is that the course be well-organized and clear. Carr-Chellman and Duchastel (2000) stated in their recommendations for an ideal online course that a study guide, much like the "one-stop shop" described by the selected learners, would provide well-organized and clear expectations for the students. For distance learners, the capability of learning when it is convenient to the learner's schedule is important. The selected learners appreciated being able to study, learn, and participate when there was time in their schedule.

Planning for an online course is imperative for enhancing and promoting interaction (Tuovinen, 2000). The students interacted highly in the required discussion activities in this study. Further, the results of the TAT analysis showed that the expected quality in terms of interaction elements was present, also—students were not posting messages for the sake of having more messages to achieve a higher grade. They said that they were involved in the activities and were learning from them. Online course designers should consider including mandatory discussion activities co-facilitated by the students themselves to encourage students to interact with each other and to provide a forum for discussion of course content. These discussion activities are particularly important since all of the selected learners that were interviewed said that they did not seek out additional interaction with their classmates beyond the discussion activities.

None of the results of this study pointed to the technology as a hindrance. The amount of online course experience varied for the samples, so it is possible that the technology for this course was simple enough for novices to master quickly, yet sophisticated enough for the course requirements. The interviews revealed that the students desired technology that allows for pictorial representation of the course participants, as well as the capacity for both asynchronous and synchronous communications. The technology used for online courses needs consideration, particularly since it has the capacity to influence interaction (Tuovinen, 2000).

REFERENCES

Anderson, M. (2001). Individual characteristics and web-based courses. In C. R. Wolfe (Ed.), *Learning and teaching on the world wide web* (pp. 45-72). San Diego, CA: Academic Press.

Aragon, S. R., Johnson, S. D., Shaik, N. (2002). The influence of learning style preferences on student success in online versus face-to-face environments. *The American Journal of Distance Education, 16*(4), 227-244.

Bates, A. W. (1995). *Technology, open learning and distance education*. New York: Routledge.

Bianco, M. B. & Carr-Chellman, A. A. (2002). Exploring qualitative methodologies in online learning environments. *The Quarterly Review of Distance Education, 3*(3), 251-260.

Bonham, L. A. (1988). Learning style use: In need of perspective. *Lifelong Learning: An Omnibus of Practice and Research, 11*(5), 14-19.

Brenner, J. (1997). An analysis of students' cognitive styles in asynchronous distance education courses. *Inquiry, 1*(1), 37-44.

Brill, J. M. (2001). Distance education, web-based instruction, and today's educator. *The Quarterly Review of Distance Education, 2*(4), 347-356.

Bruck, J. L. (1997). *The influence of field dependence on college students' leadership attitudes and self-perceptions.* Unpublished doctoral dissertation, Texas A&M University, College Station.

Carr-Chellman, A. & Duchastel, P. (2000). The ideal online course. *British Journal of Educational Technology, 31*(3), 229-241.

Ching, L. K. (1998). The influence of a distance-learning environment on students' field dependence/independence. *The Journal of Experimental Education, 66*(2), 149-160.

Cifuentes, L., Murphy, K. L., Segur, R., & Kodali, S. (1997). Design considerations for computer conferences. *Journal of Research on Computing in Education, 30*(2), 172-195.

Conrad, D. L. (2002a). Engagement, excitement, anxiety and fear: Learners' experiences of starting an online course. *The American Journal of Distance Education, 16*(4), 205-226.

Conrad, D. L.(2002b). Inhibition, integrity and etiquette among online learners: The art of niceness. *Distance Education, 23*(2), 198-212.

Fahy, P. J. (2001). Addressing some common problems in transcript analysis. *International Review of Research in Open and Distance Learning, 1*(2). Retrieved February 23, 2003, from http://www.irrodl.org

Fahy, P. J. (2002). Use of linguistic qualifiers and intensifiers in a computer conference. *The American Journal of Distance Education, 16*(1), 5-22.

Fahy, P. J., Crawford, G., & Ally, M. (2001). Patterns of interaction in a computer conference transcript. *International Review of Research in Open and Distance Learning, (2)*1. Retrieved February 23, 2003, from http://www.irrodl.org

Fahy, P.J., Crawford, G., Ally, M., Cookson, P., Keller, V., & Prosser, F. (2000). The development and testing of a tool for analysis of computer mediated conferencing transcripts. *The Alberta Journal of Educational Research, 46*(1), 85-88.

Fulford, C. P. & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *The American Journal of Distance Education, 47*(3), 8-21.

Fulford, C. P., & Zhang, S. (1995, May). *Interactivity in distance education television: A constructed reality.* Paper presented at the meeting of the Third Distance Education Research Symposium, PA.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *Internet and Higher Education, 11*(2), 1-14. Retrieved February 23, 2003, from http://www.atl.ualberta.ca/cmc/CTinTextEnvFinal.pdf

Graham, C. R. (2002). Factors for effective learning groups in face-to-face and virtual environments. *The Quarterly Review of Distance Education, 3*(3), 307-319.

Greule, A.L. (1996). *Field independence as a predictor of attitude towards two-way video instruction.* Unpublished doctoral dissertation, Texas A&M University, College Station.

Gunawardena, C. N. (1992). Changing faculty roles for audiographics and online teaching. *The American Journal of Distance Education, 6*(3), 58-71.

Gunawardena, C. (1999). The challenge of designing and evaluating "Interaction" in web-based distance education. In *WebNet 99 World Conference on the WWW and Internet Proceedings*. Honolulu, HI. (ERIC Document Reproduction Service No. ED448718)

Gunawardena, C. N. & Boverie, P. E. (1993, November). *Impact of learning styles on instructional design for distance education.* Paper presented at the meeting of the World Conference of the International Council of Distance Education, Bangkok, Thailand.

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research, 17*(4), 397-431.

Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of an on-line discussion in an applied educational psychology course. *Instructional Science, 28*, 115-152.

Hara, N. & Kling, R. (1999). *Students' frustrations with a web-based distance education course: A taboo topic in the discourse.* Retrieved February 23, 2003, from http://www.slis.indiana.edu/CSI/wp99_01.html

Harasim, L. (1987). Teaching and learning on-line: Issues in computer-mediated graduate courses. *Canadian Journal of Educational Communications, 16*(2), 117-135.

Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing: The Najaden papers* (pp. 115-136). New York: Springer-Verlag.

Hewitt, J. (2001). Beyond threaded discussions. *International Journal of Educational Telecommunications, 7*(3), 207-221.

Hillman, D. C., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *The American Journal of Distance Education, 8*(2), 30-42.

Hirumi, A. (2002). A framework for analyzing, designing and sequencing planned eLearning interactions. *The Quarterly Review of Distance Education, 3*(2), 141-160.

Holmberg, B. (1989). *Theory and practice of distance education.* London: Routledge.

Howland, J. L. & Moore, J. L. (2002). Student perceptions as distance learners in internet-based courses. *Distance Education, 23*(2), 183-195.

Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology, 33*(1), 27-37.

Jonassen, D. H. (2000). Transforming learning with technology: Beyond modernism and post-modernism or whoever controls the technology creates the reality. *Educational Technology, 40*(2), 21-25.

Jonassen, D. H. & Grabowski, B. L.(1993). *Handbook of individual differences, learning, and instruction.* Hillsdale, NJ:Lawrence Erlbaum Associates.

Kanuka, H. (2002). Guiding principles for facilitating higher levels of web-based distance teaching and learning in post-secondary settings. *Distance Education, 23*(2), 163-182.

Kanuka, H. & Anderson, T. (1998). Online social interchange, discord, and knowledge construction. *Journal of Distance Education, 13*(1), 1-13. Retrieved February 23, 2003, from http://cade.icaap.org/vol13.1/kanuka.html

Kearsley, G. (1995, May). *The nature and value of interaction in distance learning.* Paper presented at the meeting of the Third Distance Education Research Symposium, Pittsburgh, PA.

Koszalka, T. A. (2001). Designing synchronous distance education. A demonstration project. *The Quarterly Review of Distance Education 2*(4), 333-345.

Leonard, J. & Guha, S. (2001). Education at the crossroads: Online teaching and students' perspectives on distance learning. *Journal of Research on Technology in Education 34*(1), 51-57.

Mahoney, S.E. (2001). *Mindset change: Influences on student buy-in to online courses.* Unpublished doctoral dissertation, Texas A&M University, College Station.

Mayer, R.E. (1996). Learning strategies for making sense out of expository test: The SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review,* 8(4), 357-371.

McIsaac, M. S. & Gunawardena, C. N. (1996). Distance education. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 403-437). New York: Macmillan.

Melancon, J. G. & Thompson, B. (1989). Measurement characteristics of the finding embedded figures test. *Psychology in the Schools, 26*(1), 69-78.

Merriam, S. B. (1998). *Qualitative research and case study applications in education.* San Francisco, CA: Jossey-Bass.

Miller, G. (1997). Are distance education programs more acceptable to field-independent learners? In *Proceedings of the National Convention of the Association for Educational Communications and Technology*. Albuquerque, NM. (ERIC Document Reproduction Service No. ED409854)

Moore, M. G. (1989). Three types of interaction. *American Journal of Distance Education, 3*(2), 1-6.

Moore, M. G. & Kearsley, G. (1996). *Distance education: A systems view.* Belmont, CA: Wadsworth.

Morrison, G. R. (2001). Theory research and practice. *Ed at a Distance 15*(40). Retrieved March 17, 2003, from http://www.usdla.org/html/journal/APR01_Issue/article06.html

Muirhead, B. (2001). Enhancing social interaction in computer-mediated distance education. *Ed at a Distance 15*(40). Retrieved March 17, 2003, from http://www.usdla.org/html/journal/APR01_Issue/article02.html

Murphy, K. L. & Cifuentes, L. (2001). Using web tools, collaborating and learning online. *Distance Education, 22*(2), 285-305.

NCES (2000). *Student participation in distance education*. Retrieved February 19, 2003, from http://nces.ed/gov

Pérez-Prado, A. & Thirunarayanan, M. (2002). A qualitative comparison of online and classroom-based sections of a course: Exploring student perspectives. *Education Media International, 39*(2), 195-202.

Picciano, A.G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks, 6*(1), 21-40.

Roblyer, M. D. & Ehami, L. (2000, June). *How interactive are YOUR distance courses? A rubric for assessing interaction in distance learning.* Paper presented at the Distance Learning Association Proceedings, Callaway, GA.

Robyler, M. D. & Marshall, J. C. (2002). Predicting success of virtual high school students: Preliminary results from an educational success prediction instrument. *Journal of Research on Technology in Education, 35*(2), 241-255.

Romiszowski, A. J. (1997). Web-based distance learning and teaching: Revolutionary invention or reaction to necessity? In B. H. Khan (Ed.), *Web-based instruction* (pp. 25-37). Englewood Cliffs, NJ: Educational Technology.

Romiszowski, A. J., & Mason, R. (1996). Computer-mediated communication. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 438-456). New York: Macmillan.

Schrum, L. & Berge, Z.L. (1997). Creating student interaction within the educational experience: A challenge for online teachers. *Canadian Journal of Educational Communication, 26*(3), 133-144.

Shih, C., Ingebritsen, T., Pleasants, J., Flickinger, K., & Brown, G. (1998). Learning strategies and other factors influencing achievement via web courses. In *Proceedings of the Annual Conference on Distance Teaching and Learning.* Madison, WI. (ERIC Document Reproduction Service No. ED422876)

Smith, J. K. & Heshusius, L. (1986). Closing down the conversation: The end of the quantitative-qualitative debate among educational inquirers. *Educational Researcher, 15*(1), 4-12.

Soo, K. & Bonk, C. J. (1998, June). *Interaction: What does it mean in online distance education?* Paper presented at the World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Telecommunications, Freiburg, Germany.

Summerville, J. B. (1998). The role of awareness of cognitive style in hypermedia. In *Proceedings of the National Convention of the Association for Educational Communications and Technology.* St. Louis, MO. (ERIC Document Reproduction Service No. ED423865)

Sutton, L. A. (2001). The principle of vicarious interaction in computer-mediated communications. *International Journal of Educational Telecommunications, 7*(3), 223-242.

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education, 22*(2), 306-331.

Tashakkori, A. & Teddlie, C. (1998). *Mixed methodology. Combining qualitative and quantitative approaches.* Thousand Oaks, CA: Sage Publications.

Thompson, G. & Knox, A. B. (1987). Designing for diversity: Are field-dependent learners less suited to distance education programs of instruction? *Contemporary Educational Psychology, 12,* 17-29.

Tu, C. (2001). How Chinese perceive social presence: An examination of interaction in online learning environment. *Education Media International, 38*(1), 45-60.

Tu, C. & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education, 16*(3), 131-150.

Tuovinen, J.E. (2000). Multimedia distance education interactions. *Education Media International,* 37(1), 16024.

Vrasidas, C. & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education, 13*(3), 22-36.

Wagner, E. D. (1994). In support of a functional definition of interaction. *The American Journal of Distance Education, 8*(2), 6-29.

Wagner, E. D. (1997). Interactivity: From agents to outcomes. *New Directions for Teaching and Learning, 71,* 19-26.

Wang, A. Y. & Newlin, M. H. (2000). Characteristics of students who enroll and succeed in psychology web-based classes. *Journal of Educational Psychology, 92*(1), 137-143.

Willis, B. (Ed.). (1994). *Distance education strategies and tools.* Englewood Cliffs, NJ: Educational Technology.

Witkin, H. A. (1977). Cognitive styles in the educational setting. *New York University Education Quarterly, 8*(3), 14-20.

Witkin, H. A. & Goodenough, D. R. (1981) *Cognitive styles: Essence and origins. Field dependence and field independence.* New York: International Universities Press, Inc.

Witkin, H. A., Moore, D. R., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research, 47*(1), 1-64.

Witkin, H. A., Moore, C. A., Oltman, P. K., Goodenough, D. R., Friedman, F., Owen, D. R., & Raskin, E. (1977). Role of the field-dependent and field-independent cognitive styles in academic evolution: A longitudinal study. *Journal of Educational Psychology, 69*(3), 197-211.

Witkin, H. A., Oltman, P. K., Raskin, E. & Karp, S. A. (1971). *A manual for the embedded figures tests.* Palo Alto, CA: Consulting Psychologists Press.

Witte, R. S. & Witte, J. S. (1997). *Statistics.* Orlando, FL: Harcourt Brace College Publishers.

Yi-Wilson, J. C. (2000, April). *Improved attribution recall from diversification of environmental context during computer-based instruction.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Youngblood, P., Trede, F., & Di Corpo, S. (2001). Facilitating online learning: A descriptive study. *Distance Education, 22*(2), 264-284.

Zhu, E. (1996). Meaning negotiation, knowledge construction, and mentoring in a distance learning course. In *Proceedings of Selected Research and Development Presentation at the 1996 National Convention of the Association for Educational Communications and Technology.* Indianapolis, IN. (ERIC Document Reproduction Service No. ED397849)

APPENDIX A

TEXT ANALYSIS TOOL (TAT)

The TAT coding categories are as follows:

1	Questioning (type 1A, *vertical*; type 1B, *horizontal*)
2	Statements (type 2A, *non-referential*; type 2B, *referential*)
3	Reflections
4	Scaffolding/engaging
5	Quotations/citations (type 5A, *quotations* and *paraphrases*; type 5B, *citations*)

1   *Questioning*:
1A - vertical questions: there is a "correct" answer, and the question can be answered if the person with the right answer can be found.

1B - horizontal questions: there may not be a correct answer or solution; thus, others are invited to help provide a plausible or alternate "answer," or to help shed light on the question.

2   *Statements*:
2A (non-referential) - contain little self-revelation and usually do not invite response or dialogue. The main intent is to impart facts or information. The speaker may take a matter-of-fact, a didactic, or even a pedantic stance in providing information or correction to an audience which he or she appears to assume is uninformed, in error, or in need of information or correction. 2A s*tatements* may contain implicit values or beliefs, but usually these are inferred, and are not as explicit as they are in *reflections* (type 3, below).

2B (referential) - include direct or indirect answers to questions, or comments referring or alluding to preceding statements or ideas. 2B statements express awareness of others' thoughts and contributions, though not necessarily agreement, support or even respect (as *scaffolding/engaging* comments do).
The emphasis in both types of statements is on analysis.

3   *Reflections (significant personal revelations)*: opinions or information which are personal and are usually private. The speaker may also reveal (or hint at) personal values, beliefs, doubts, convictions, thoughts and ideas. The listener/reader receives information about some idea or opinion, as well as insight into the person expressing it. Listeners are assumed to be interested in the personal revelations; a sympathetic (or at least empathic) response is expected. The speaker is implicitly open to questions or comments (including personal ones), as well as self-revelations in turn, and other supportive responses.
Reflections contain hints about the personal meaning or significance of the information given, and may imply or provide some kind of judgment or conclusion about it. The tone or attitude of the writer is somehow apparent, not "just the facts."

4   *Scaffolding/engaging*:   these comments are intended to initiate, continue or acknowledge interpersonal interaction, and to "warm" and personalize the discussion by being welcoming and accepting. Scaffolding/engaging comments connect or agree with, thank or otherwise recognize someone else, and encourage or recognize the helpfulness, ideas, capabilities and experience of others. Also included are comments without real substantive meaning ("phatic communion," "elevator/weather talk," salutations/greetings, closings/signatures, and emoticons). *Obvious* rhetorical questions may be included here (or as type 1 or 2B).

5   Quotations/citations:
- 5A: references to and quotations or fairly direct paraphrases of other sources.
- 5B: citations or attributions of quotations or paraphrases.

<u>**Notes:**</u>
1. While type 2A *statements* may contain elements of values or beliefs, these are not acknowledged as such by the speaker. The speaker appears to believe what he or she is revealing is true, correct, accurate and *factual*, even though it may be highly subjective, value- or experience-based, etc. The distinction between a type 3 *reflection* and a 2A *statement* is in the context: what the speaker believes or recognizes he or she is doing governs the coding.

2. In *reflections* the speaker recognizes and acknowledges *somehow* that what he or she is saying is personal, based on personal values or beliefs, or is somehow coloured by personal experience or outlook. Often, uses of the first person indicate this stance: "I have found that…" "I've always thought…" The context is all important: the statement, "I have been a teacher for 10 years now" is a statement, *unless* it follows something else like, "and I've hated every minute of it." *Something* about a *reflection* must add extra meaning to whatever facts it contains; otherwise, it is simply a *statement* (2A or 2B).

3. Code block or extended *quotations* or obvious *paraphrases* as "blocks" – that is, rather than coding each sentence of a quotation or paraphrase, code the whole block as one occurrence of 5A. That way, long quotes will not inflate the denominator, but may still be reviewed. Note that this practice will result in a count of the occurrence of quotations, but not their length (in number of sentences).

4. 5B can be applied to any citation, whether formal or not. Thus both APA-style citations and "As Bob said,…" may both be 5B.

TAT Examples

1   Questions - 1A (vertical):
- "How long have you been a teacher?"
- "Who wrote *Teaching as a Subversive Activity*"?
- "Is the presenter involved in producing the script?"
- "What do you do with your questionnaire results at the end?"
- "Would I be correct in using 'paradigm pioneer' and 'entrepreneur' in the same way, or would there be differences between the two?"

Questions - 1B (horizontal):
- "What makes a good teacher?"
- "What could make teaching more effective?"
- "What do these indicate about our cultural orientation to 'technology' (as a form of tool-making), and perhaps how this view may have changed over time?"
- "After all, what makes a technology advanced?"
- "Just because we put a course online does that mean that is all that learners can have access to, does that mean we have to forget about the great textbooks and other resources that are available?"

2   Statements - 2A (non-referential):
- "I've been a teacher for 30 years."
- "Long-serving teachers have seen many changes in their profession over their careers."

- "In my organization, strategic planning occurs in a focus group of individuals assigned to the organization and development of course material and yearly plan."
- "We found that keeping content up-to-date, distribution and PC compatibility issues were causing a huge draw on Ed. Centre time."
- "Both excellent and learning organizations have similar characteristics."

Statements – 2B (*referential*):
- "It's interesting that you found teaching more demanding earlier in your career than you do now."
- "I'd like to comment on the group's apparent belief that teaching and training are similar."
- "I suspect there is a lot of truth in your statement."
- "[Name], this is not the only case, I'm afraid, of a technology being acquired in the assumption that a use would be found for it later."
- "In fact, what you have defined nicely here is 'the learning moment'."

3   **Reflections (significant personal revelations):**
- "I have always found teaching hard work."
- "Someday, I'd like to be able to see my own teaching from my students' point of view."
- "So, my view is that if a technology is actually better for some purpose than some another technology, it is genuinely 'advanced'."
- "I personally think a specific technology is only obsolete if it is no longer useful."
- "I have often wondered – still do, in fact – why we were not successful."

4   **Scaffolding/engaging:**
- "What would it be like to be a new teacher today, I wonder?"
- "I wondered what you meant when you said teaching had changed for you."
- "I hope this gives a little more info. about our methods – let me know if it doesn't."
- "Just a reminder, for those of you who feel overburdened by the CMC requirement (you know who you are!): don't feel you're alone."
- "Even as a parent and a teacher (with pretty good math skills!) I still learned some new things :-)."

5   *Quotations/citations - 5A (quotations, paraphrases):*
- "When I was young I read somewhere that 'teaching is the noblest profession'."
- "Maybe, as you say, we need to take the attitude that if we can't beat the for-profit schools, we should join them."
- "You asked, 'What can you tell about a culture by its tools?'"
- "We are told that the medium is sometimes the message."
- "Herbert Simon, Nobel Laureate economist, said, 'What information consumes is rather obvious: it consumes the attention of its recipients.'"

Quotations/citations – 5B (citations):
- "This is how it's put in our district's mission statement."
- "That's from the section of our collective agreement on workload."
- "J. Robert Oppenheimer, *Science and the Common Understanding*, 1953 (I think)."
- "Max Frisch, Homo Faber, 1957."
- "Phillips, Jack. (1998). The return-on-investment (ROI) process: Issues and trends. *Educational Technology, 38*, 4, July-August, 7-14."

The TAT was developed at Athabasca University by Patrick Fahy based on Zhu's (1986) analytic model.

APPENDIX B

GEFT SCORES AND ESL DESIGNATION

Student	Score	ESL	Student	Score	ESL
1	7	x	21	5	x
2	15		22	12	x
3	9	x	23	17	
4	13		24	10	
5	12		25	11	x
6	17		26	17	
7	11		27	16	
8	13	x	28	16	
9	12	x	29	18	
10	10		30	8	x
11	10		31	18	
12	12	x	32	10	
13	16	x	33	6	x
14	16		34	18	
15	15		35	14	x
16	17		36	17	
17	6		37	17	
18	17		38	12	
19	16				
20	14				

APPENDIX C

EDUCATIONAL TECHNOLOGY COURSE UNIT DESCRIPTIONS

Unit 1:Introduction
This unit is an overview of the course and an introduction to the field of educational technology.

Unit 2: Foundations
The foundations unit explores key learning theories, systems theory and communications theory in terms of their historical perspectives and how they have evolved into modern theories.

Unit 3: Research and Practice
The research and practice unit describes research in educational technology, the differences between research and evaluation, the effects of media on learning, and the research processes.

Unit 4: Instructional Systems Design
This unit describes the instructional design process including procedural models and systems theory as well as the influence of text and message design and delivery mode on instructional design.

Unit 5: Trends and Innovations
Distance education and its development, the ongoing changes in educational technology, the impact of the Internet on the U.S. and worldwide, and innovation and change theory are discussed in this unit.

Unit 6: Wrap-Up
This unit is used for course wrap-up, including finalizing other class projects and discussions, and completing assessments and evaluations.

APPENDIX D

DISTANCE EDUCATION COURSE UNIT DESCRIPTIONS

Unit 1: Foundations of Distance Education
This unit serves as an introduction to and an overview of the field of distance education.

Unit 2: Distance Learners
This unit explores the characteristics of distance learners and strategies for learning at a distance.

Unit 3: Distance Technologies
The principles of designing distance education environments and using appropriate technologies are discussed in this unit.

Unit 4: Teaching, Training, and Course Design
This unit discusses computer conferencing, interaction, and the roles and responsibilities of the distance instructor.

Unit 5: Management, Administration, and Policy in Distance Education
The existing and emerging issues in the management and administration of distance education are explored in this unit.

Unit 6: Assessment and Evaluation in Distance Education
This unit covers the importance of feedback in distance education as well as formative and summative evaluation.

APPENDIX E

STUDENT DEMOGRAPHIC QUESTIONNAIRE

Influences on Learner-Learner Interaction in Online Classes

Thank you for taking the time to complete this questionnaire. This questionnaire is part of my doctoral study. I am interested in determining the influences on learner-learner interaction in online classes. Your participation is appreciated. *Shannon Fite*

Date_____

Demographic Information

Name_____Email Address_____
Mail Address_____
Home Phone_____   Work Phone_____
Classification (Master's, Doctoral, etc.)_____
Department (Educational Psychology, Journalism, etc.)_____
Total number of hours enrolled in this semester_____

Are you employed?   _____Yes   _____No
If yes, number of hours per week._____
Employer and Job Title_____

Online Course Experience

Complete the following sentence by circling the correct number.

I have taken _____online course(s) previously.

1   2   3   4+

List the names of the course(s), software used, where and when taken (e.g. Course Name, TAMU, Fall 2000, FirstClass)

	Course	Course Location	Semester/Year	Software Used
1.				
2.				
3.				
4.				
5.				

Information about the study

This portion of the study will consist of the Student Questionnaire. If you agree to and are selected to participate further in this study, you will be asked to complete the following: a) the Group Embedded Figures Test (GEFT), b) if selected, online or face to face interviews. The approximate amount of time required for each item is as follows: a) GEFT—approximately 15 minutes, b) online interview—approximately 30-60 minutes.

I would like to participate further in your study.   _____Yes   _____No

APPENDIX F

INTERVIEW PROTOCOL

1. Describe your experience in the online classroom.

2. What are some features of the online course that made it difficult in nature?

3. Describe your interaction experience in the online classroom.

4. What were some characteristics of the online class that made you feel isolated?

5. How did the type of interaction differ in the online class versus traditional

   classroom experiences? (learner-learner, learner-content, learner-instructor,

   learner-technology, learner-context)

6. What aspects of the course design inhibited your interaction?

7. What aspects of the course design encouraged your interaction?

8. If you have been in online courses before, how did the interaction experience in this course differ?

9. How did the amount of interaction differ in this class than in other online classes?

10. How did the amount of interaction differ in this class than in other traditional classes?

11. How was the interaction different in this class?

12. How much of your interaction for this class was not required?

13. How much of your interaction for this class took place using other means than identified by the course?

14. What other means did you use for interaction in this course?

15. How did you feel about interacting in the online medium?

16. How did the asynchronous aspects of the course design influence your interaction?

17. How did your online relationships with your classmates influence your interaction?

18. How did your online relationships with your instructors influence your interaction?

APPENDIX G

EDUCATIONAL TECHNOLOGY COURSE PARTICIPATION RUBRIC

You will use FirstClass to facilitate and participate in several group activities, primarily discussions, that revolve around each unit's content. Each person will facilitate (in a small group) one activity as well as participate (as an individual) in the other activities. Submit your 1st, 2nd, and 3rd choices for co-facilitating one of the unit discussions by posting your topic choices. Facilitating and activity group assignments will be made during the orientation session. Due to the size of the class, there will be two activity groups, A and B. The activity groups will be re-organized at midterm. Post your facilitation topic choices in the collaborative document in **FirstClass.**

Activities (30 points maximum)
Facilitation = 12 points maximum
Participation (total) = 18 points maximum

Unit 1 : Occupations = 2 points; Definitions (beginning and end of semester) @ 2 points = 4 points
Unit 2: Participation = up to 4 points
Unit 3: Participation = up to 4 points
Unit 4: Participation = up to 4 points
Unit 5: Participation = up to 4 points

Note that you won't earn participation points during the unit that you are facilitating!

Evidence of working effectively as part of a group is critical to the field of educational technology. Each facilitating group will create and follow its own Group Learning Contract. Unit 1 will allow everyone to get comfortable with the process by posting essays on assigned topics. Units 2, 3, 4, and 5 will be facilitated group activities (discussions and one case study). An explanation of each activity appears in its unit. Unit 6 is for wrap-up and evaluation.

Each activity begins on the first day (the first Monday) of the two-week unit and ends on the last day (the final Sunday at midnight) of the unit. The exception is Unit 5, which is a three-week culminating unit based on case study analysis.

Facilitator and Participant Responsibilities

  Before the unit begins
  Facilitator Responsibilities: Develop and post your Group Learning
  Contract. Study the readings thoroughly prior to beginning your assigned
  week. Plan your facilitating content and approach. Invite the teaching

assistant for a planning chat in FirstClass by the Wednesday prior to the unit beginning.

First Monday
Facilitator Responsibilities: Post three stimulus questions covering the objectives of the unit.
Participant Responsibilities: Post an initial thoughtful and substantive reply to one of these questions. Reply to one of your classmates' responses to the same topic by using "reply" or "reply with quote."

Second Sunday
Facilitator Responsibilities: Comment on the responses of the participants, promote further discussion, and weave the discussion on a daily basis.
Participant Responsibilities: Become involved in the other questions or topics by posting shorter well-crafted replies to other questions, and replying to your classmates' replies, i.e., forming threads of discussion. Post a minimum of 4 total additional replies. You may "branch to new threads" (i.e., pick up a thought posted by one of the participants, use "reply with quote", add to the new thought, rename the subject slightly to reflect a new sub-thread heading, and post it as a reply to the existing thread).

Third Tuesday
Facilitator Responsibilities: Synthesize the discussion at the end of the week. Complete Private Group Evaluation and send it privately to both the instructor and teaching assistant. Use the Peer Participation Evaluation guidelines to evaluate participants. Send final evaluations *privately* to both the instructor and teaching assistant in FirstClass.

Participant Responsibilities
The contributions that you post to discussions must be quality ones in order to earn participation points. First, we'll define what we mean by quality. Quality of participation is determined on the basis of your demonstration of the following two criteria:

1) *what you have learned from the readings* by responding to a portion of a post by using two of the following approaches:

- a personal experience relevant to the question
- a personal opinion relevant to the question
- a scholarly response based in academic thought and presented in an appropriate academic manner (e.g., citing course text; citing journal articles that you have read but were not introduced or required by the course; cite personal

conversations that were conducted as scholarly discourse you had with faculty or other learners).

2) *your ability to promote the discussion with in-depth responses* that may lead the discussion into new and/or related areas by responding substantively to postings that will result in deepening the current thread or beginning a new thread (beginning a new thread will be the responsibility of the facilitators; however, learners may contact the facilitators and suggest new threads).

Participation Requirements

You must make a minimum of 5 postings during the unit (again, quality postings!) to earn 4 participation points for that unit. Here is the way we will figure the point distribution: The total quality replies will range within each unit from 0 - 5+. The range of participation points for each unit is 0 - 4. To receive the full 4 points for participation, you must comply with all of the requirements listed above, at a minimum. Then, whether you receive 0, 1, 2, or 3 points depends upon the number of your quality replies. The Participation Points Rubric is below:

0 replies = 0 points
1 reply = 1 point
2 replies = 2 points
3 - 4 replies = 3 points
5 or more replies = 4 points

Peer Participation Evaluation

Each group of facilitators is to assign participation points (0-4) to their peers for taking part in the discussions. Members of each facilitating group should make decisions together and send a single evaluation of their peer participants to the instructors. The participation points are to be based on the quality and quantity of each student's contributions to the discussions, according to the rubric above. The facilitators' point assignments will be used as an aid to help us assign final participation points for student participation.

APPENDIX H

DISTANCE EDUCATION COURSE PARTICIPATION RUBRIC

You will use <u>FirstClass</u> to facilitate and participate in six group discussions that revolve around each unit's content. Each person will facilitate (in a small group) one activity as well as participate (as an individual) in the other activities. You will submit your 1st, 2nd, and 3rd choices for co-facilitating one of the unit discussions by posting your choices. Due to the size of the class, there will be two activity groups. The activity groups will be re-organized at midterm. Post your facilitation choices in the collaborative document in **First Class.**

Activities (35 points maximum)
Facilitation = 15 points maximum
Participation (total) = 20 points maximum

Unit 1: Participation = up to 4 points
Unit 2: Participation = up to 4 points
Unit 3: Participation = up to 4 points
Unit 4: Participation = up to 4 points
Unit 5: Participation = up to 4 points
Unit 6: Participation = up to 4 points

Note that you won't earn participation points during the unit that you are facilitating!

Evidence of working effectively as part of a group is critical to the field of educational technology. Each facilitating group will create and follow its own Group Learning Contract.

Each activity begins on the first day (the first Monday) of the two-week unit and ends on the last day (the final Sunday at midnight) of the unit.

Facilitator and Co-facilitator Discussions

Before the unit begins
Facilitator Responsibilities: Develop and post your Group Learning Contract. Study the readings thoroughly prior to beginning your assigned week. Plan your facilitating content and approach. Invite the teaching assistant for a planning chat in FirstClass by the Wednesday prior to the unit beginning.

First Monday
Facilitator Responsibilities: Post three stimulus questions covering the objectives of the unit.

Participant Responsibilities: Post an initial thoughtful and substantive reply to one of these questions. Reply to one of your classmates' responses to the same topic by using "reply" or "reply with quote."

Second Sunday
Facilitator Responsibilities: Comment on the responses of the participants, promote further discussion, and weave the discussion on a daily basis.
Participant Responsibilities: Become involved in the other questions or topics by posting shorter well-crafted replies to other questions, and replying to your classmates' replies, i.e., forming threads of discussion. Post a minimum of 4 total additional replies. You may "branch to new threads" (i.e., pick up a thought posted by one of the participants, use "reply with quote", add to the new thought, rename the subject slightly to reflect a new sub-thread heading, and post it as a reply to the existing thread).

Third Tuesday
Facilitator Responsibilities: Synthesize the discussion at the end of the week. Complete Private Group Evaluation and send it privately to both the instructor and teaching assistant. Use the Peer Participation Evaluation guidelines to evaluate participants. Send final evaluations *privately* to both the instructor and teaching assistant in FirstClass.
Facilitator Responsibilities
Take the lead with regard to one or more of the readings for the unit. You will have studied all of the readings thoroughly prior to beginning the assigned week. You will also have met with your co-facilitators and with me to determine your plan of action, including the four stimulus questions. By Monday morning of the first week, post three stimulus questions for generating participants' responses.

Beginning as soon as you see participants' responses to the stimulus questions, comment on the responses, promote further discussion, and weave the discussion. As a co-facilitator, you will be responsible for leading the unit's activity and providing relevant information or links. By Friday of the second week, wrap up the discussion. By Sunday at midnight, develop and post with your co-facilitators an overview of the discussion.
Peer Participation Evaluation
Each facilitation group is to assign participation points (0-4) to their peers who are taking part in the discussion. The participation points are to be based on the quality and quantity of each student's contributions to the discussions, according to the rubric above. The facilitators' point assignment will be used as an aid to help us assign final participation points for student contributions.

Participant Responsibilities
The contributions that you post to discussions must be quality ones in order to earn participation points. First, we'll define what we mean by quality. Quality of participation is determined on the basis of your demonstration of the following two criteria:
1) *what you have learned from the readings* by responding to a portion of a post by using two of the following approaches:

- a personal experience relevant to the question
- a personal opinion relevant to the question
- a scholarly response based in academic thought and presented in an appropriate academic manner (e.g., citing course text; citing journal articles that you have read but were not introduced or required by the course; cite personal conversations that were conducted as scholarly discourse you had with faculty or other learners).

2) *your ability to promote the discussion with in-depth responses* that may lead the discussion into new and/or related areas by responding substantively to postings that will result in deepening the current thread or beginning a new thread (beginning a new thread will be the responsibility of the facilitators; however, learners may contact the facilitators and suggest new threads).

Participation Requirements
You must make a minimum of 5 postings during the unit (again, quality postings!) to earn 4 participation points for that unit. Here is the way we will figure the point distribution: The total quality replies will range within each unit from 0 - 5+. The range of participation points for each unit is 0 - 4. To receive the full 4 points for participation, you must comply with all of the requirements listed above, at a minimum. Then, whether you receive 0, 1, 2, or 3 points depends upon the number of your quality replies. The Participation Points Rubric is below:

0 replies = 0 points
1 reply = 1 point
2 replies = 2 points
3 - 4 replies = 3 points
5 or more replies = 4 points

Peer Participation Evaluation

Each group of facilitators is to assign participation points (0-4) to their peers for taking part in the discussions. Members of each facilitating group should make decisions together and send a single evaluation of their peer participants to the instructors. The participation points are to be based on the quality and quantity of each student's contributions to the discussions, according to the rubric above. The facilitators' point assignments will be used as an aid to help us assign final participation points for student participation.

APPENDIX I

LETTER OF IRB APPROVAL

TEXAS A&M UNIVERSITY
Office of the Vice President for Research
1112 TAMU • College Station, Texas 77843-1112
(979) 845-8585
FAX (979) 845-1855

July 31, 2001

MEMORANDUM

TO: Shannon Diane Fite
Educational Psychology
MS 4225

SUBJECT: Review of Exempt IRB Protocol Entitled "Field Dependence/Independence as a Predictor of Successful Interaction in Online Classes" 22001-138E

The above referenced protocol has been:

   X   Approved July 31 – July 30, 2002
        Conditionally Approved (see remarks below)
        Disapproved (see remarks below)
        Tabled (see remarks below)

by the Institutional Review Board - Human Subjects in Research.

The study has been approved for one year. Your protocol must be re-approved each year. If you desire to make any changes in your research protocol, the changes must be approved by the IRB before they are initiated. Any adverse reactions or events must be reported immediately to the Board.

E. Murl Bailey, Chair
Institutional Review Board -
Human Subjects in Research

VITA

Name:	Shannon Diane Fite
Permanent Address:	26050 Andy Lane Magnolia, TX 77354
Education:	Ph.D., Educational Psychology, Texas A&M University, May 2003
	M.Ed., Educational Technology, Texas A&M University, December 1997
	B.S., Biomedical Science, Texas A&M University, December 1995
Experience:	Network Administrator, College of Education, Texas A&M University, January 1998 – Present.
	Graduate Assistant, Educational Technology Program, Texas A&M University, September 1997 – December 1997.
	Graduate Assistant, Agricultural Engineering Department, Texas A&M University, January 1997 – September 1997.
Presentations:	Gazi, Y., Murphy, K., Fite, S., Chen, L., Yang, S.X., & Mendoza, N. (2003, February). *Qualitative Research on Online Learning.* Presented at the Educational Research Exchange, College Station, Texas.
	Fite, S. & Murphy, K. (2003, February). *Influences on Learner-Learner Interaction in Online Classes.* Presented at the Educational Research Exchange, College Station, Texas
	Fite, S. (2002, November). *Influences on Learner-Learner Interaction in Online Classes*. Annual Convention of the Association for Educational Communications and Technology, Dallas, Texas.
	Fite, S. & Demirci, Y. (2000, November). *Making technology training fun*. Presented at the Annual Convention of the Texas Association of Educational Technologists, San Antonio, Texas.