AN EXAMINATION OF PREFERENCES FOR SOCIAL PRESENCE IN ONLINE COURSES WITH REGARD TO PERSONALITY TYPE

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The purpose of this research was to examine the connections between personality types as illustrated by the Myers Briggs Type Indicator and the desire for social presence components within a technology based learning environment. Participants in the study were undergraduate and graduate students enrolled in an educational technology program at a public university in the State of Texas. The study employed a mixed-method qualitative approach that utilized a paired comparison evaluation, a personality assessment, and semi-structured interviews. Results showed that the components of organization and feedback were thought to best foster social presence in technology based learning environments and that there was no real difference between the personality types of introverts versus extroverts and judgers versus perceivers.
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This dissertation is dedicated to my father: Daniel A. Rose, Ed.D.
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CHAPTER 1
INTRODUCTION

The purpose of this chapter is to introduce the research topic along with a brief overview of online education for which to frame the study. The chapter will conclude with a short summary of the relevance of the study as it relates to the existing body of knowledge regarding online course design.

Background

Online learning can be conducted via technologies that range from such modern innovations as computer communications, television broadcast, and audio or video conferencing (US Department of Education, 1998; McKee, 2010). In a 2010 report, The U.S. Department of Education defines online learning as:

... learning that takes place partially or entirely over the Internet. This definition excludes purely print-based correspondence education, broadcast television or radio, videoconferencing, videocassettes, and stand-alone educational software programs that do not have a significant Internet-based instructional component. (Means, Toyama, Murphy, Bakia, & Jones, p. 9)

During the first half of the 20th century print, radio, and television technologies were the basis on which distance education was conducted, despite limitations that included one way communication and synchronous delivery of material (Denton, 2001). The development of videotape and cable television allowed for further flexibility and asynchronous delivery, elements which were made even more salient through the introduction of video conferencing and the personal computer (Denton, 2001).

It has been stated that one drawback to learning online was the dearth of nonverbal cues: information that is important to proper learning (Solimeno, Mebane,
Tomai, & Francescato, 2008). Immediacy, on which social presence is based (Short, Williams, & Christie, 1976) is dependent on the presence of nonverbal cues (Aragon, 2003) and when immediacy cues are affected in a technology based learning environment, social presence is also affected (Mackey & Freyberg, 2010a).

Maddix (2010) states that “the primary goal in online courses is the creation of communities of learners, where they find opportunities to be leaders and teachers” (p. 12) and reflects on the strong sense of community that comes out of students and faculty spending time together. It has been established that a technology based learning environment can have a detrimental impact with regard to proper message interpretation, a vital issue to consider with regard to online course design (Akayoğlu, Altun, & Stevens, 2009). In addition, critics point out that online courses tend to suffer from a higher than usual attrition rate (Hernandez, 2009; Kalsbeek, 1989). As was previously alluded, a solution to this problem lies in the establishment of online learning communities, a concept which provides support, interaction, and a sense of belonging as well as accountability (Moisey, Neu, & Cleveland-Innes, 2008).

From a constructivist standpoint, community plays an important role in learning (Ling, 2007). One important method of building community within a technology based learning environment is the development of dialogue, an element that plays an important role in reducing the communicative space, or transactional distance, between instructor and learner (Rovai, 2002a). In fact, frequent communication is also an important element of enhancing social presence in an online environment (Shore, 2007). Social presence, in turn, has a positive effect on affective learning, or the emotion buy-in of the student to the learning experience (Baker, 2004; Jolivette, 2006).
When a student enters a traditional classroom for the first time, there is a time of acclimation where relationships are established and the student is allowed to feel comfortable in their surroundings while in an online environment, this transition period is different (Akayoğlu et al., 2009). Research shows that social presence or immediacy, how much we feel or experience someone else, is predictor of affective learning (Christophel, 1990; Gorham, 1988; Gunawardena & Zittle, 1997; Tu & McIsaac, 2002). Despite its importance in learning, there has been little research done on this topic (Akayoğlu et al., 2009).

Research has established that different people have differing learning styles (Brownfield, 1993; Butler & Pinto-Zipp, 2005; Cooper & Miller, 1991; Davis, 2010) and that these differences should influence online course design (Butler & Pinto-Zipp, 2005; Daughenbaugh, Ensminger, Frederick, & Surry, 2002). Research has already established that social presence plays an important role with regard to affective learning (Christophel, 1990; Gorham, 1988; Gunawardena & Zittle, 1997; Tu & McIsaac, 2002) and its resulting effect on academic learning (Allen, Long, O'Mara, & Judd, 2008; Mackey & Freyberg, 2010a; Rodríguez, Plax, & Kearney, 1996; Witt & Schrodt, 2006).

Purpose of the Study

The mixed-method qualitative research study examined what connections, if any, exist between personality types and the desire for social presence in an online environment. To this end, two theoretical foundations were utilized: the Myers-Briggs Type Indicator and the community of inquiry, with emphasis placed on the social presence component of the COI model. The Myers-Briggs Type Indicator was used to
identify the personality type of the learner with primary emphasis on the introversion/extroversion and the judging/perceiving components of the type indicator. The community of inquiry approach was used to determine which components of an online course are perceived as being most conducive to fostering social presence, an important aspect of affective learning (as previously established). More in-depth examinations of these theoretical foundations, as well as the testing instrument, are found in Chapter 2.

Relevance and Value of the Study

There is a lack of research regarding the elements of social presence (Akayoğlu et al., 2009) as well as pedagogical approaches that are unique to the technology based learning environment (D. R. Garrison & Arbaugh, 2007). The inherent value of this study lies in the desire to add to the body of existing knowledge regarding online course design; more specifically to assist in making online courses more hospitable to the learner and to attempt to reduce the attrition present in online courses. Kalsbeek (1989) cites the Tinto model as stating:

... that the critical factor in retention is the degree of congruence between the needs, interests, abilities, expectations, and commitments of the students, on the one hand, and the academic and social systems of the specific college or university on the other. (p. 2)

The Tinto model points to the fact that there are a number of course design elements that can affect a student’s involvement in the course. Online courses have a problem with an attrition rate that is higher than the traditional classroom (Hernandez, 2009), and with a public that is increasingly mobile and yet increasingly connected, it is important that online course design be performed with the needs of the learner in mind.
Provost (as cited in Brownfield, 1993) states that the Myers-Briggs Type Indicator can predict what kinds of environments, behaviors, and even instructional tools can either encourage or hinder learning for a given learner.

Methods

The mixed-method qualitative research used the Myers Briggs Type Indicator (MBTI) instrument, the Technology-Based Learning Environment (TBLE) instrument, and semi-structured interviews with the participants to gain knowledge regarding patterns and connections about the research problem. The Myers Briggs Type Indicator (MBTI) instrument determines the participant’s MBTI score. The Technology-Based Learning Environment (TBLE) instrument, a non-parametric scale instrument, was used to determine the participant’s prioritization of critical design elements found in an online learning environment.

Research Question and Sub Questions

The following research question is proposed:

• What components of a technology-based learning environment are rated as best for fostering social presence as defined by the MBTI?

Proposed sub questions are:

• What components of a technology-based learning environment are rated as best for fostering social presence by learners who are typed as extraverts by the MBTI?

• What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as introverts on the MBTI?
• What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as judgers on the MBTI?

• What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as perceivers on the MBTI?

With regard to the semi-structured interviews, the following questions are proposed to start the discussion:

• Were there any elements not mentioned in the TBLE questionnaire that should have been included with regard to social presence?

• How important to you is social presence in a technology based learning environment?

• Is it important to you to be able to reach your instructor outside of the technology based learning environment?

Assumptions and Limitations of the Study

This study was designed with a number of personal and phenomenological assumptions. The following conclusions are taken from tacit knowledge and are based on personal experiences gained during previous investigations utilizing a similar strategy for discovery.

• As a researcher, I can explain the actions and point of view of the participants through my own interpretation of the data.

• As a researcher, I can use previously established methods of coding for defining explicit message functions and flow types.

• Participants in the study can provide fairly accurate accounts of their experiences with regard to the study.

• The methods used to ensure privacy for each participant will support unencumbered communication between them and the researcher while providing protection for the participant from outside interference and reprisals.
There is the possibility that the results of this study have been affected by some limitations, primarily with regard for the time available and the pool of participants. As with any study, there is always the inherent risk of premature closure due to unforeseen events. The risk of this happening was mitigated via the following measures:

- The Person as Instrument Statement (Appendix A) details my personal interest in the subject matter as well as my previous experience with the topics under examination.

- I kept a journal throughout the inquiry detailing my experiences with the study as well as any other pertinent data to provide a basis for validity, rigor, and trustworthiness.

- I utilized peer debriefing (Creswell, 2003) throughout the study to ensure that my methodology is sound.

These tools were used to mitigate credibility issues introduced by the assumptions and limitations of the study and to persuade those who read it that my motives were driven by standards of trustworthiness, validity, and reliability (Lincoln & Guba, 1985).

As a qualitative researcher, I have not attempted to predict outcomes but instead have allowed patterns and themes to emerge from the data on their own as the study progressed. As a researcher, my responsibility is to report my findings with as much richness and detail as possible. It is the responsibility of the readers of this study to judge the applicability of the findings and to base their opinion upon their own personal beliefs and experiences. It is also their responsibility of the reader to determine how to best use the information contained in this study with regard to their own personal educational contexts.
Summary

In this chapter, a brief background on distance learning was presented. The problem statement and purpose of the study were offered so as to provide both a framework and justification for the research to be conducted. The research question was presented as well as sub questions that are relevant to the study.
CHAPTER 2
REVIEW OF RELATED LITERATURE AND THEORY

This chapter presents an overview of existing knowledge in fields that are directly relevant to this study. This chapter starts with a brief overview of the history of distance education followed by a look at community in the classroom. Benefits and criticisms of online education follow along with the topics of immediacy, social presence, and media richness. Next are the topics of community and collaboration along with the community of inquiry approach which contains the elements of social presence, teaching presence and cognitive presence. Following is an examination of the methods that were used to gather and analyze quantitative data. These included the Myers-Briggs Type Indicator with a look at learning styles as they relate to teaching styles, the TBLE questionnaire and a look at paired comparisons. Following this is an examination of methods that were used to gather and analyze qualitative data which will consist of an overview of semi structured interviews as well as looks at mixed method analysis and the topics of validity and triangulation.

History of Distance Education

Sumner (2000) cites Willis as stating that early distance educators were simply wanderers who delivered information by word of mouth but goes on to establish that distance education did not really exist until the “rise of industrial society”: a society that was in need of an educated workforce (p. 273). Distance education was seen as a cost effective solution to this problem and was used in the 1970s and 1980s as a means of providing education to populations where it had previously been inaccessible (Calvert,
The earliest forays into distance education were print based courses conducted via mail (T. Anderson, 2009; Sumner, 2000) with the first offering being a stenographic training course that was administered entirely by mailed correspondence (Casey, 2008). This started a movement which proved popular enough to warrant the creation of a “Correspondence University” in Ithaca, New York in 1883 (Erazo & Derlin, 1995). The movement gained even more legitimacy when William Rainey Harper, the first president of the University of Chicago, established a “home studies” department at the university shortly after his appointment in 1892 (Hansen, 2001).

Authors such as Larry Cuban (1986b) and Cliff Stoll (1999) have cited Thomas Edison as signaling the introduction of technology into the educational realm. In the 1922 issue of *McClure’s Magazine*, writer Hugo Weir (1922) interviewed Edison regarding the kinetoscope, his latest invention. In this interview, Edison made the following statement:

I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of text-books in our schools. Books are clumsy methods of instruction at best, and often even the words of explanation in them have to be explained. I should say that on the average we get about two percent efficiency out of schoolbooks as they are written today. The education of the future, as I see it, will be conducted through the medium of the motion picture, a visualized education, where it should be possible to obtain one hundred percent efficiency. (p. 85)

In his book *Teachers and Machines: The Classroom Use of Technology Since 1920*, Cuban shows how educational technology has evolved through the use of Edison’s kinetoscope, radio, television, and even computers (1986b) in an attempt to cure the perceived ills of classroom.

Cuban also speaks of the rise of Progressivism in education in the early part of the 20th century and the resultant use of technology to not only enhance the learning
process but also to economize it (1986a). The end of the 20th century was marked by a proliferation of interest in computer use in education (Rourke & Kanuka, 2009). A natural offshoot of this interest in the computer was the development of online delivery methods that allowed both synchronous and asynchronous methods of instruction (D. R. Garrison, Anderson, & Archer, 2000; Rourke & Kanuka, 2009) and enabled instruction without the location based limitations present in traditional face-to-face methods (Mackey & Freyberg, 2010a). Despite the popularity of this movement, there have been a dearth of theoretical frameworks unique to the online learning environment (D. R. Garrison & Arbaugh, 2007). Because of this, there is a resulting need for new theories of instructional design and pedagogies to allow proper use of the new opportunities afforded by use of the Internet and other new technologies in instruction (Mackey & Freyberg, 2010a; M. M. Snyder, 2009).

Communication in the Classroom

Computer mediated communication (CMC) has become increasingly common within higher education (D. R. Garrison et al., 2000) and research shows that the disembodied nature of modern electronic communication has created an environment that has had a permanent change on us with regard to social interaction (Tanis & Postmes, 2007). Face-to-face interaction has long been standard procedure in the classroom (Marra, Moore, & Klimczak, 2004). This type of contact has been described as being more fast paced, more spontaneous, and containing less structure than traditional written communication and, when properly moderated, can assist in the development of critical thinking skills (D. R. Garrison, Anderson, & Archer, 2001). CMC
is known for its ability to support high levels of intelligent interaction among learners and instructors while providing flexibility in terms of place and time (Rourke, Anderson, Garrison, & Archer, 1999). With the introduction of a technological intermediary, there is usually a shift in the nature of the interaction (D. R. Garrison & Cleveland-Innes, 2005), especially with courses that utilize text based media (Arbaugh, 2005). This effect can be a positive one when looking at social interactions, but it does not necessarily assist in the adoption of active learning strategies (M. Wang, 2010). Along this same line of reasoning, Marra, Moore, and Klimczack (2004) offer Harasim’s assertion that interactivity is the most striking characteristic of CMC and is the factor that has the potential to affect learning. Other research shows that salience is also altered with the introduction of a technological intermediary into the equation (J. D. Johnson, 1990; Weisband, Schneider, & Connolly, 1995).

CMC is often perceived as a very communicatively lean medium (Arbaugh, 2005; D. R. Garrison et al., 2001). Delfino and Manca (2007) state that CMC is low in social presence. A study by Sproull and Keisler (1986) indicates that the context cues that are present in face-to-face communication are absent in CMC and can lead to situations such as hostile language known as flaming, increased self absorption, and unmoderated exchanges between participants.

Despite the previous assertions, Marra et al. (2004) cite McCreary in stating that the value of written communication as it exists in online forums lies in “the necessity of exactness, organization of thought, and clear expression” (p. 24). Despite the limitations mentioned, users have been known to compensate for this lack of richness (Rourke et al., 1999; Swan, 2002) with the use of emoticons and other devices to ensure that the
meaning is communicated as intended (Delfino & Manca, 2007; Gunawardena & Zittle, 1997; Kuehn, 1993). Empirical evidence is also emerging which shows higher order critical thinking occurring in computer conferencing using simple text-based communication (Marra et al., 2004) and at least one additional study has shown that although CMC participants in a course produced fewer messages than a traditional face-to-face class, the messages were more task related than their face-to-face peers (Jonassen & Kwon, 2001).

Benefits of Online Education

Online technologies have had a definite impact on the areas of learning and instruction (DeNeui & Dodge, 2006). Online education has grown tremendously over the years (Harrington-Lueker, 1997; Li & Irby, 2008). There is research showing that online (or distributed) learning compares favorably to learning in the traditional classroom (Appana, 2008). With use of the virtual learning environment, instruction is no longer confined to a particular time and place but can occur anywhere a network connection is present (Deal III, 2002; Hammonds, 2003; Karber, 2001; Li & Irby, 2008). The asynchronous nature of communication within an online course allows the student time to deliberate, reflect, and then engage the discussion once they have organized their response (D. R. Garrison et al., 2000). This asynchronous method of communication can also generate interactions that in turn can lead to the formation of much deeper ideas. These ideas can then be linked with other similar concepts when possible (Newman, Johnson, Webb, & Cochrane, 1997). With geographic location relative to an institution of higher learning no longer an issue, learning can take place at the
convenience of the learner (Coyner & McCann, 2004) in a virtual classroom that gives equal voice to those who might be hesitant to participate in a face-to-face classroom (Rudestam, 2004). Still other research takes this assertion a step further in establishing that interaction in an online environment is actually increased between students, the instructor, and the material (A. Y. Wang & Newlin, 2000), even to the point of being superior to face-to-face learning since much of the irrelevant communication is filtered out via the computer medium (Biuk-Aghai & Simoff, 2004; Kanuka & Anderson, 1998). Another advantage is that in an online setting, students from differing backgrounds and locations are able to interact and share ideas (Karber, 2001). Online learning can improve computer and writing skills provided that the structure and commitment are present (Weiner, 2003). Havard, Du, and Xu (2008) cite both Vygotsky and Harasim in stating that the very act of converting oral ideas into written communication assists in learning effectiveness by forcing the learner to properly articulate abstract notions as concrete expressions.

Online delivery allows institutions the ability to a) access additional markets and learners (Appana, 2008; Maddix, 2010), b) update learning materials easily and inexpensively (Appana, 2008), c) offer learners the option of classes in a completely asynchronous environment, d) provide learning for those who do not have the time or resources to attend classes taught at certain times (Picciano, 2002) or in locations that were previously impractical (Barnett, 2006). Casey (2008) states that distance education flourished in the United States for three reasons: the immense distances, geographically and socio-economically, between learners and learning institutions, the thirst for education, and the rapid march of technological development. Some say that
online learning is a cost effective option for institutions seeking to expand their learner base (Bartley & Golek, 2004), while at least one other study says otherwise (Kolowich, 2009). Other research shows that though initial entry can be expensive, economies of scale can lower the overall cost over time (Ojo & Olakulehin, 2006). The inherent anonymity in an online course has been cited as a definite asset, especially for students that tend to be communicatively averse (Appana, 2008). Havard, Du, and Xu (2008) take this concept a little further by citing Harasim’s assertion that students who are communicatively averse in the classroom can be very active online due to the lack of time restrictions, interruptions, and competition.

Criticisms of Online Education

It is worth noting at this point that the definition of “distance education” has always been determined by the technologies available at the time (T. Anderson, 2009). Anderson (2009) goes on to state that with the introduction of the Internet as a learning intermediary, “online education” gave way to “distance education.” As with any new development, online education has had its share of criticisms. Some state that the quality of education often suffers under the restrictions imposed by an online environment (Akayoglu et al., 2009; Lavooy & Newlin, 2003). Rudestam (2004) states “In some quarters, distance education is regarded as the disreputable stepchild within the family of higher education, viewed with a suspicion reserved for the degrees offered by correspondence for a flat fee” (p. 427).

Massey (2003) reports the results of a European study which showed that over 60% of respondents had a negative view of e-learning. Barbera (2004) states that “The
promise of distance education through virtual environments being able to provide high quality education has yet to be realized” (p. 13). McKee (2010) characterizes distance education in general as a field with “a constant identity crisis, defined by a developmental deluge of pedagogies and technologies depending on the favored course delivery methods of the day” (p. 100).

Opponents of virtual education cite interpersonal and communicative deficiencies such as the absence of nonverbal (Solimeno et al., 2008) and social presence cues (Campbell, 2006), elements that are so vital aspects in proper message interpretation (Campbell, 2006; Solimeno et al., 2008). Campbell (2006) cites clarity as an issue present in some online courses while McKee (2010) states that proper communication can be an issue, especially when questions arise in an online format that could easily be answered in a face-to-face format.

The lack of academic rigor has also been cited as a major drawback of degrees earned in online environments (Ghezzi, 2007). Another criticism of online learning is the validity of online exams which are usually open book and computer graded; a practice considered by some to be counterintuitive to standard learning objectives (Khare & Lam, 2008).

Technological obstacles such as occasional technical glitch (Mackey & Freyberg, 2010a), access to modern computers, the dynamic nature of technology, the inherent complexity of networked systems, the amount of knowledge required to properly utilize computer aided instruction, and the instability of online learning environments are all barriers to proper online learning (Brandt, 1996; Li & Irby, 2008; Weiner, 2003). Mackey and Freyberg (2010a) state that audio difficulties tend to have a greater impact on
student satisfaction than do video difficulties. Communicating through a traditional audio/visual based videoconferencing system is said to be a comparatively artificial experience due to a lack of a shared social context, a lack of eye contact, and a limited possibility for informal communication (Bozkaya, 2008). Other research shows that face-to-face instruction is superior to video conferencing in terms of the quality of communication (Umphrey, Wickersham, & Sherblom, 2008), especially if the users are not experienced in the use of CMC (Walther & Anderson, 1994). The threat of instructional commercialization, isolation of faculty and students, and the dilution of standards are also cited as drawbacks to taking the classroom online (Gallick & Faculty Association of the Univ. of California-Las Angeles, 1998).

Others cite pedagogical concerns. Conlon (1997) states that the Internet is simply not the answer to problems facing today’s classroom. Many administrators assume that teaching in a distance learning environment is no different than teaching in a standard classroom, an assumption that is patently incorrect (Cyrs, 1997). Some researchers have shown that online learning only presents the learner with a lonely, desolate learning environment devoid of any real meaning and that there is no real advantage to distance education (Flaherty & Pearce, 1998; Noble, 1998). Other criticisms levied at online education include the existence of poorly organized courses that feature poorly produced multimedia elements (McKee, 2010). Baggaley (2010) states concerns ranging from a newer is always better mentality to accessibility and infrastructure as being concerns in certain situations. Howell, Laws, and Lindsay (2004) cite several studies showing completion rates that vary widely in distance education courses.
Despite these assertions, there is research showing that there is typically no significant difference between learning online and learning in a face-to-face environment (Denton, 2001) and other research showing that there may be a slight improvement in learning compared to traditional face-to-face instruction (Means et al., 2010) and despite these perceived limitations, learners are able to adapt (Walther, Loh, & Granka, 2005).

Immediacy

With regard to the concept of immediacy in a technology based learning environment, Jo Anne Whiteman (2002) provides two quotes that summarize these two topics quite well. She states that “When we engage in communication with another individual, we can gain knowledge about the other person so that we can interact more effectively” (p. 4). Later she states that “Communication is the essence of the cyberspace environment” (p. 7). By knowing the other party, we can attempt to predict how they will feel, act, and think (M. Snyder & Stukas Jr, 1999). People who exhibit these traits are using what is commonly defined as “immediacy,” a mannerism defined as the amount of perceived closeness between two people, be it either physical and/or psychological (Richmond, McCroskey, & Hickson, 2008). The term was first introduced into literature by Albert Mehrabian in 1966 with the following: .” . . the pairs of statements differed in terms of degree of communicator-referent Immediacy – a dimension which measures the degree of directness and intensity of interaction between the communicator and the referent of communication” (p. 34). In a later study, Mehrabian (1967a) offers an identical definition as he describes immediacy as the
“degree of directness and intensity of interaction between a communicator and the object of his communication” (p. 414).

In day-to-day situations, immediacy is usually exhibited in two forms: verbal and nonverbal (Bozkaya, 2008). Immediacy has been studied extensively with regard to the college classroom (Richmond et al., 2008). Verbal immediacy entails the use of things such as inclusive language while nonverbal immediacy is the use of things other than language, such as space, eye contact, and facial expressions to either increase or decrease immediacy in a situation (Richmond et al., 2008). Havard, Du, and Xu (2008) cite Heilbronn and Libby in delineating immediacy into two categories: technological immediacy, an element inherent to the medium, and social immediacy, an element that can be changed by the user.

Student/teacher interaction is a key component in any instructional system design (Hackman & Walker, 1990) and research shows that self disclosure (Cutler, 1995), interactions outside of class (Mackey & Freyberg, 2010a), and even humor play a key role in immediacy and learning (Christensen & Menzel, 1998; Christophel, 1990; Gorham, 1988; Gorham & Zakahi, 1990; J. A. Sanders & Wiseman, 1990). There has been extensive research that shows the correlation between increased immediacy in the classroom and an increase in both cognitive and affective learning in the classroom (Arbaugh, 2001; Baker, 2004; Bozkaya, 2008; Christophel, 1990; Gendrin & Rucker, 2004; Ice, Curtis, Phillips, & Wells, 2007; Titsworth, 2001). Nonverbal immediacy has been shown to have a greater impact on student learning than verbal immediacy (Gorham, 1988). Other research shows that the instructors who use immediacy behaviors are perceived by students as being more attractive and likeable (Allen et al.,
2008; Rocca & McCroskey, 1999) and tend to be more effective instructors (Rocca & McCroskey, 1999). Teacher immediacy behaviors reduce both the physiological and psychological distance between learner and instructor and can also enhance the learner’s perception of social presence in the distance education environment (Bozkaya, 2008). In one study, the instructor was encouraged to address experiences occurring outside the classroom, address students by name, and even use praise for work or other similar actions as results suggested that these behaviors had a significant contribution to affective learning (Gorham, 1988). Another study showed that instructors exhibiting both verbally and nonverbally immediate behaviors in the classroom were perceived as being more credible while those who did not exhibit these behaviors were perceived negatively by their students (Teven & Hanson, 2004).

As one would assume, students who exhibit more immediacy traits are often perceived more positively by their instructors (Baringer & McCroskey, 2000). It is worth noting here that like other traits, immediacy behaviors can be modified through training (Rocca & McCroskey, 1999). Titsworth (2001) asserts that it is worthwhile to train teachers to use specific communication behaviors such as immediacy for the purpose of achieving specific outcomes. Improved instructor immediacy can lead to improved student attendance (Rocca, 2004; Romer, 1993) as well as an increase in positive student evaluations (A. Moore & Masterson, 1996).

Social Presence

“Social presence is a significant factor in improving instructional effectiveness” (Tu, 2002, p. 35). Mehrabian’s work suggests that nonverbal cues such as body
movement and eye contact can ultimately lead to an increase in affective interactions (Rourke et al., 1999). This work gave way to additional studies involving a variety of technologies such as fax machines, voice mail, and even audio-teleconferencing with regard to how they affect interpersonal communication (Rourke et al., 1999). It was from this body of research that the term “social presence” was introduced as the “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships . . .” (Short et al., 1976, p. 65). Havard et al. (2008) succinctly describes social presence as: “. . . how much one believes the other party is present” (p. 38) while Whiteman (2002) defines it as: “. . . the feeling that others are involved in the communication process” and that it is the “. . . quality of the communications medium”(p. 7): in essence, the introduction of a technological intermediary can diminish the number of social cues present thereby distorting the message. Because of the link between social presence and immediacy behaviors, any alterations caused by a technology based learning environment with regard to immediacy behaviors will have an effect on social presence (Campbell, 2006; Mackey & Freyberg, 2010a; Solimeno et al., 2008). The reduction of social presence can lead to less emotionality in the message, ultimately leading to a weakening of the “interpersonal function of communication” (Baghestan, Zavareh, & Hassan, 2009, p. 169). Despite this, participants can view computer mediated communication as active, interesting, and event stimulating (Whiteman, 2002). Establishing a high degree of social presence in an online class can mimic learning strategies that are usually present in a traditional classroom environment (Mackey & Freyberg, 2010a). Immediacy is not only regarded as a part of social presence (Bozkaya, 2008) but can, through social presence, have a
positive effect on interactions. Tu (2002) shows evidence that social presence consists of three dimensions: social context, online privacy, and online communication and interactivity.

Interaction between students is also important in creating social presence (Hackman & Walker, 1990). It is these interactions that can impact social interaction in an online course (Tu & McIsaac, 2002) and can create the sense of community that ultimately impacts the participants’ perception of the learning environment as a social medium (Gunawardena, 1995). Social presence is vital in establishing trust as well as addressing conflict in online communities (Havard et al., 2008) in addition to being a strong predictor of satisfaction within a computer based environment (Mackey & Freyberg, 2010a; Tu, 2002). Despite technological advances, students still sometimes prefer more social presence than can be provided by distance education courses, social presence that is easily provided by one to one conversations with the instructor either after class or during breaks (Mackey & Freyberg, 2010b).

It also warrants mention that different communicative tasks require various degrees of social presence (King & Xia, 1997; Short et al., 1976). Some tasks, such as conflict resolution, require a high degree of social presence (Havard et al., 2008; King & Xia, 1997) and are better suited for face-to-face meetings or similar approaches while other tasks, such as exchanging data, can be easily accomplished with low presence methods such as email or a phone call (King & Xia, 1997). Another study shows that even email has merit in the creation of interpersonal relationships (Tu, 2002). Regardless of the situation, research shows that choice of communication media tends
to be made not based upon the merits of the channel selected, but on the user’s comfort level with said communication media (King & Xia, 1997).

Finally, it needs to be said that there has been some criticism leveled at the modern application of social presence theory due to it being originally studied solely within the context of face-to-face, audio, and closed circuit television technologies and that it was not created to explain characteristics particular to CMC such as anonymity and multiple identities (Tu, 2002). Tu (2002) cites Rafaeli in stating that modern social presence theory lacks a clear definition and warrants further study.

Media Richness

The concept of media richness is an outcome of research on social presence (Witt & Schrodt, 2006). Also known as information richness, media richness was introduced by Richard Daft and Robert Lengel (1984) and is defined as:

. . . the potential information-carrying capacity of data. If the communication of an item of data, such as a wink, provides substantial new understanding it would be considered rich. If the datum provides little understanding, it would be low in richness. (p. 196)

Whiteman (2002) says that media richness “. . . pertains to the learning capacity of a communication “ (p. 5) while Witt and Schrodt (2006) describe media richness as the ability of a given communication channel to carry a variety of different interpersonal cues.

Communication channels are described as being “rich” or “lean” based upon a number of criteria: the availability of feedback channels; the ability to transmit multiple cues to assist in message interpretation; the ability of the medium to convey natural language instead of numbers so that any subtleties can be properly used in message
interpretation, and the ability of the medium to convey personal feelings and emotions (Baghestan et al., 2009; Daft & Lengel, 1984; Trevino, Lengel, & Daft, 1987). Different media have varied capacities to reduce misunderstandings that can occasionally occur (Daft & Lengel, 1984). As stated earlier, critics state that text based communication is simply inadequate in its ability to transmit items that are important to proper message interpretation such as body language, facial expressions, and vocal intonations (Rourke et al., 1999; Whiteman, 2002) and that it hinders the formation of social relationships that are important in the construction of new knowledge (Ice et al., 2007). Media richness theory views various communication media as existing on a continuum (Baghestan et al., 2009) with “rich” communication channels such as traditional face-to-face communication existing on one end and telephone, email, and written communication, being comparatively lean, existing on the other end (Daft & Lengel, 1984; Daft, Lengel, & Trevino, 1987; Rice, 1992). With regard to technological “leaness,” Walter states that traditional CMC is capable of conveying the same information as face-to-face communication at the expense of a lower transfer rate (1996, 1997). Interestingly enough these groups tend to have greater social depth and intimacy, with regard to discussion groups, than face-to-face groups (Walther, 1995, 1996, 1997). In the “forming stage” where information is being sought out, a richer communication medium allows for better detection and processing of said information (Havard et al., 2008, p. 47).

Community and Collaboration

The very concept of peer learning is not a new one as the quintessential one-
room schoolhouse prevalent during the pioneer era of our country provided a very early test bed for this type of learning with one person having to be janitor, nurse, principal, IT director, curriculum designer, and instructor to upwards of nine different grade levels of students in a single room (T. Anderson, Rourke, L., Garrison, D.R., & Archer, W., 2001). To make this learning model work, the instructor had to rely upon establishing a sense of community within the classroom, a sense of community that empowered older students to assist younger students with the material as the situation warranted (T. Anderson, Rourke, L., Garrison, D.R., & Archer, W., 2001). The very concept of collaborative learning that we know today is, in essence, a form of interaction between two learners (So & Brush, 2008). “Community” as defined by Conrad (2005) is a “general sense of connection, belonging, and comfort that develops over time among members of a group who share purpose or commitment to a common goal” (p. 2). The author goes on to say that:

The creation of community simulates for online learners the comforts of home, providing a safe climate, an atmosphere of trust and respect, an invitation for intellectual exchange, and a gathering place for like-minded individuals who are sharing a journey that includes similar activities, purpose, and goals. (p. 2)

Mackey and Freyberg (2010a) state that interaction between students and their instructor has a positive effect on student satisfaction within distance learning environments but that this component has no real effect on students who are not accustomed to in class participation.

Community relates to presence (Picciano, 2002) and can also be defined as a group of people who belong to a social unit, such as students in a class (Picciano, 2002), students who share commonalities such as a place, background, or interest (Conrad, 2005). It has been established that community is important for collaborative
learning and that it is indeed possible to create such a community in an online environment (Conrad, 2005; D. R. Garrison & Arbaugh, 2007; Rovai, 2002b; Thompson & MacDonald, 2005; Weiner, 2003) with face-to-face contact actually enhancing the experience for the students (Conrad, 2005). Research also shows a significant relationship to exist between a sense of community and perceived learning (Richardson & Swan, 2003; Rovai, 2002c; Shea, Li, & Pickett, 2006) and to the overall success of the online learner (Conrad, 2005). Socio-cultural theory tells us that learning is both a social and a dynamic entity (Pomerantz, 1998). Students tend to benefit from this model as research shows that there are gains to be had from leading discussions among their peers in addition to it being easier to ask questions among their peers than in the presence of an instructor (Rourke & Anderson, 2002). Something as simple as being able to converse with one’s classmates over material is a basic, but important, learning activity (Picciano, 2002). Logic would dictate that in an online environment the term “interaction” would need to be redefined. So and Brush (2008) state that interaction can be defined as a reciprocal communication process between human and human, or human and machine. Moore takes this a step further by offering three types of interaction: between learner and content; between learner and instructor; and between learner and learner (M. G. Moore, 1989). Beaudoin (2002) quotes Fulford and Zhang in stating that a high level of interaction is an important aspect of community as it increases the effectiveness of distance education as well as traditional face-to-face courses. In addition, research also shows that interaction is an important element of both web based and distance education courses and that there are numerous correlations between interaction and student satisfaction in the course (Picciano, 2002).
It is worth noting here that at least one study shows that interaction between the student and the material (i.e. lurking) can also show cognitive results, although not to the same degree as interaction between the learner and instructor and/or other students (Beaudoin, 2002). Surprisingly enough, research also shows that the most important activity for building community is in fact, lurking, or reading postings from other users (Moisey et al., 2008).

In essence, it is the goal of the designer to personalize the learning environment as much as possible and that a vital component of this should be the creation of a sense of connectedness, or community, within the course (Harrington-Lueker, 1997). It should be noted here that collaboration does not happen automatically in an online environment nor does it simplify the learning process (Thorpe, 2002); that misunderstanding and miscommunication are characteristic of the medium; that strong written communication skills from all parties are vital to clear communication; and that collaborative groups must choose the appropriate media for the task at hand (Havard et al., 2008). Most importantly, the learner must be willing to adapt to the technology as needed (Carey & Dorn, 1998; Miller & Mei-Yan, 2003). Immediacy is an important aspect of building community within an online course (Shu-Fang & Aust, 2008) and building community is an essential component in any online course (Moisey et al., 2008).

Community of Inquiry

As alluded to earlier, there is a shortage of development, acceptance, and verification of theoretical frameworks in the field of online learning (D. R. Garrison & Arbaugh, 2007). As in classroom based courses, it is vital that that a strong theoretical
foundation be present so as to guide the development of online courses despite the fact that linking practice with theory in this area can be a challenge (Herie, 2005). The community of inquiry framework was developed by Garrison, Anderson, and Archer in 2000 as a solution to this problem (2000). It is comprised of three core elements: teaching presence, cognitive presence, and social presence (D. R. Garrison et al., 2000; D. R. Garrison & Arbaugh, 2007; Rourke & Kanuka, 2009) each of which will be addressed in subsequent paragraphs. According to Garrison, Anderson, and Archer (2000):

> . . . a worthwhile educational experience is embedded within a Community of Inquiry that is composed of teachers and students – the key participants in the educational process. The model of this Community of Inquiry assumes that learning occurs within the Community through the interaction of . . . three core elements: cognitive presence, social presence, and teaching presence. (p. 88)

Of these three, the teaching presence is researched the least while social presence has garnered the most attention from academia (Arbaugh & Hwang, 2006).

John Dewey’s *How We Think* has been cited as a theoretical foundation for the community of inquiry framework with his concepts of collaboration and free intercourse among the important concepts (Cleveland-Innes, Garrison, & Kinsel, 2007) while Arbaugh and Hwang (2006) cite Chickering and Gamson as well as a publication by the National Research Council’s Commission on Behavioral and Social Sciences and Education as providing a foundation for the community of inquiry framework.

As with any pedagogical approach, the community of inquiry has borne its share of criticism. Rourke and Kanuka (2009) state that, with over 200 studies that have been performed utilizing the COI framework, only five examine the issue of deep and meaningful learning. According to the authors these five studies all had methodological
weaknesses such as relying upon self reporting to determine the level of learning achieved. Based upon this assertion, the authors concluded that the community of inquiry approach does not guarantee “deep and meaningful learning” (p. 43) and that more meaningful studies need to be conducted in this area. Response to this criticism agrees with the assertion that more research needs to be done with regard to the COI model and higher level learning, but that to declare it a failure at this early stage is unwarranted and that the model itself . . . has been a catalyst and guide to important research in online and blended learning” (Akyol et al., 2009, p. 131).

Social Presence

Social presence was covered earlier in this chapter, but is revisited here again within the context of the community of inquiry model. In this context social presence is commonly defined as “as the ability of learners to project themselves socially and affectively into a community of inquiry” (Rourke et al., 1999, p. 52). Similarly, Garrison, Anderson, and Archer (2000) define social presence as “the ability of participants in a community of inquiry to project themselves socially and emotionally, as `real' people (their full personality), through the medium of communication being used” (p. 94).

Social presence is broken down further to include three types of communicative action: emotional, cohesive, and open (Cleveland-Innes et al., 2007; Rourke & Kanuka, 2009). Social presence should be used to support cognitive objectives by encouraging critical thinking within a community of learners (Delfino & Manca, 2007; Rourke et al., 1999). Rourke et al. (1999) take this further by citing Tinto in that social presence can also support affective learning objectives by making the experience stimulating and
rewarding for the learner as well as reducing the attrition normally associated with online courses (Rourke et al., 1999). The expression of feelings, mood, and emotion is considered to be a defining characteristic of social presence (D. R. Garrison et al., 2000). Garrison and Arbaugh end their 2007 study with the following mandate: “Understanding the role of social presence is essential in creating a community of inquiry and in designing, directing, and facilitating higher-order learning” (p. 168).

Teaching Presence

Teaching presence is defined as: “the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes.” (T. Anderson, Rourke, L., Garrison, D.R., & Archer, W., 2001, p. 5) As one would surmise, both cognitive and social presence within a community of inquiry are dependent upon the presence of a teacher (D. R. Garrison et al., 2000). Teaching presence is further defined as bearing the responsibilities of instructional design, discourse facilitation, and direct instruction (Rourke & Kanuka, 2009). Garrison et al. (2000) shows that in addition to current literature, their research shows that teaching presence breaks down into three discrete areas: instructional management which addresses issues such as proper utilization of the medium, setting assessment goals, and addressing structural concerns such as setting the curriculum; building understanding which addresses such things as setting the learning environment and maintaining a proper learning relationship with the students, even those that may be communicatively averse; and direct instruction, which focuses on the actual teaching duties.
Research shows that teaching presence actually consists of two factors: one related to course design and organization while another is related to instructor behavior while teaching the course (Arbaugh et al., 2008). There is a significant relationship between teaching presence as well as cognitive presence and perceived learning in the classroom (Akyol & Garrison, 2008) with teaching presence posing as a “binding element” among the three presences in the classroom (D. R. Garrison et al., 2000). An instructor who relates to the students and seeks to actively engage them in the course is critical to the student developing higher order thinking skills in a computer mediated environment (Fabro & Garrison, 1998). Despite the criticism that the absence of nonverbal cues in a computer mediated environment hinders proper communication, Garrison et al. (2000) state that teaching presence can be sustained in an online learning environment and is important for promoting discourse and active knowledge construction.

Cognitive Presence

Cognitive presence is defined by Garrison et al. (2000) to mean “the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication” (p. 89) an issue that is not a problem in face-to-face communication, but can be problematic when adding a technological intermediary to the communication process (D. R. Garrison et al., 2000). Cognitive presence is broken down into four different types of discourse: triggering events, exploration, integration, and resolution (D. R. Garrison et al., 2000; Rourke & Kanuka, 2009). Cognitive presence is regarded by Garrison et al. (2000) as being the
singular of the three elements that is “basic to success in higher education” (p. 89). Garrison et al. (2001) further refine their definition of cognitive presence as “the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse” (p. 11). One study shows that while all three presences (social, teaching, and cognitive) are associated with student satisfaction in an online course, only cognitive and teaching presence show a significant relationship with perceived learning, as previously stated (Akyol & Garrison, 2008). With regard to critical thinking, research does show that there are differences between those in a live classroom and those utilizing CMC as a means of instruction. Students utilizing CMC tended to bring in more outside ideas into a discussion while those in a face-to-face environment tended to be slightly better at bringing in new ideas (Newman et al., 1997). Overall, research shows that using CMC can create learning communities and foster critical inquiry, however we still have far to go with regards to developing a cogent pedagogy for online learning (D. R. Garrison et al., 2000).

The Myers Briggs Type Indicator

The Myers-Briggs Type Indicator is a popular personality test (Bishop-Clark, Dietz-Uhler, & Fisher, 2007) that has been in use since World War II (Shuit, 2003). It has seen use in a variety of applications ranging from Fortune 500 companies (Shuit, 2003) to counseling, educational, and industrial environments (Bokoros, Goldstein, & Sweeney, 1992) and has been called both “uncannily accurate” and unsophisticated (Shuit, 2003). The initial concept, that people are born with differing temperaments and dispositions, is actually a very old one with origins as far back as the writings of
Hippocrates in 370 B.C. (Kiersey, 1998) Galen, a Roman physician, expanded on this same concept around 190 A.D. with the idea continuing as a part of mainstream of thought in philosophy, literature, and medicine up through the 19th century (Kiersey, 1998). Ironically, around this time behaviorists John Watson and Ivan Pavlov began to backtrack along this line of thinking, stating that people are all basically alike and possess a single motive (Kiersey, 1998). This motive varied among researchers of the time, with Freud stating that this single motive was lust, Adler stating it was superiority, Sullivan stating that it was solidarity, and both Rogers and Maslow stating that this single motive that drove all of us was self-actualization (Kiersey, 1998). It was Swiss psychologist Carl Jung who disagreed with this trend and stated that we are all different (Jung, 1921; Kiersey, 1998) in spite of social class, gender, or family (Jung, 1921).

Shortly after this point, this approach lay dormant again until it was resurrected a few decades later. Inspired by the suffering and tragedies of World War II, Katherine Cook Briggs and her daughter Isabell Briggs Myers set out to try and establish a means of understanding one another (Briggs Meyers & Myers, 1995; Brownfield, 1993; Opt & Loffredo, 2000; Shuit, 2003). They based their research upon the work of Jung and his theory of personality types (Bokoros et al., 1992; Borg & Shapiro, 1996; Briggs Meyers & Myers, 1995; Brownfield, 1993; Harrington & Loffredo, 2010; McCaulley, 1974; Opt & Loffredo, 2000; Pittenger, 2005). It should be noted here that the word “type” is being used as a dynamic and not a static concept as it “denotes the consequences of developing one’s preferred way of using his mind.” (McCaulley, 1974, p. 2) Jung’s original theory breaks down personality types into two overarching categories:
Introversion and Extraversion (Jung, 1921) and adds four basic psychological functions: thinking, feeling, sensation, and intuition (Jung, 1921; Kiersey, 1998).

The Myers-Briggs Type Indicator measures personality along four discrete bipolar dimensions (Briggs Meyers & Myers, 1995; Rushton, Morgan, & Richard, 2007) which are delineated as:

- Introvert (I) - someone who prefers the outside world
- Extravert (E) - someone who prefers the inside world
- Sensing (S) - Gathering data by means of the five senses
- Intuition (N) – Focus on implications and inferences
- Thinking (T) – someone who uses logic to make decisions
- Feeling (F) – someone who makes decisions based on what is perceived as being correct
- Judging (J) – someone who lives in an orderly world
- Perceiving (P) – someone who lives in a spontaneous or flexible world (Briggs Meyers & Myers, 1995; Cooper & Miller, 1991; Herbster & et al., 1996; Herbster, Price, & Johnson, 1996; Pittenger, 2005).

When taking a Myers-Briggs assessment, the results are usually reported as a four letter sequence with one letter from each subgroup being assigned, such as INFJ being interpreted as Introvert, Intuition, Feeling, and Judging. This method of reporting is utilized since research has shown that predication is improved if subjects are clustered into subgroups that share a common response pattern (McCaulley, 1974).

Initially, Jung classified all mental activity into just four mental processes: two that perceive information (i.e. sensing versus intuition) and two that relate to the way that people make judgments (i.e. thinking versus feeling) (Borg & Shapiro, 1996). It was later in his research that Jung added the elements of introversion and extraversion (Borg &
Shapiro, 1996). When Myers and Briggs adapted Jung’s research they added a fourth dimension with the inclusion of judgment versus perception (Bokoros et al., 1992; Borg & Shapiro, 1996).

The extravert / introvert scale examines the focal point of the student’s attention and where their energy is directed (Brownfield, 1993; McCaulley, 1974). Extraverts tend to focus on the world and people around them (Rushton et al., 2007) and tend to become bored with long term projects (Brownfield, 1993; McCaulley, 1974). They like to proceed at their own pace and prefer learning situations that are dynamic such as class discussions and hands-on activities (Brownfield, 1993). Introverts focus on their respective “inner worlds” and focus their energy accordingly (Brownfield, 1993). They also prefer to organize their thoughts before speaking out loud and have fewer close friends (Rushton et al., 2007). Not unexpectedly, Introverts tend to have more cases of communication apprehension than extraverts (Opt & Loffredo, 2000).

Sensing and Intuition looks at how the learner acquires information from the outside world (Brownfield, 1993; Rushton et al., 2007). Sensing is “the term used for the perception of the observable by way of the senses” (Lawrence, 1993, p. 7). Intuition is information gathering “by way of insight” (Lawrence, 1993, p. 7). Sensors are primarily concerned with facts and details and possess a great capacity for seeing the world around them as it actually is (Brownfield, 1993; McCaulley, 1974; Rushton et al., 2007). They like to utilize the knowledge that they currently have rather than learning new things and tend to do well in areas which deal in concrete facts and concepts rather than abstract concepts and big picture ideas (Brownfield, 1993; Lawrence, 1993). On the other end of the spectrum, those who lean towards intuition are not fact minded at
all and tend to be drawn towards “big picture” ideas and relationship based concepts (Brownfield, 1993; McCaulley, 1974; Rushton et al., 2007), sometimes at the expense of details. They use both sensing and intuition in their decision making, but are drawn more towards intuition (Lawrence, 1993). They rely in inspiration instead of past experience, and view intelligence as including creative and imaginative solutions (Lawrence, 1993).

The thinking and feeling category examines the way in which the person makes decisions (Brownfield, 1993) Jung considered both of these to be “rational processes used in decision making”(McCaulley, 1974, p. 3). According to Lawrence (1993), thinking:

... is the term used for a logical decision making process, aimed at an impersonal finding. Feeling is a term used for a process of appreciation, making judgments in terms of a system of subjective, personal values. Both thinking and feeling are considered to be rational processes because they use reasoning to arrive at conclusions or decisions. (p. 8)

Thinkers do best when given clear directions and do well both giving and receiving critical analysis. They are often blunt and speak using very clearly outlined thoughts (Brownfield, 1993). Feelers focus on their own feelings as well as the feeling of those around them and real world application of new knowledge is important (Brownfield, 1993).

Judging and Perceiving looks at how the person prefers the world around them: either orderly with a means of controlling what happens, or dynamic with a go-with-the-flow approach (Brownfield, 1993; McCaulley, 1974). Of the four scales presented, this one is the most useful in determining the type of learning environment that a student usually prefers (Provost as cited in Brownfield, 1993). Brownfield (1993) states that:
the environment is very important part of the learning style, in that most students have or develop very definite preferences as to where they learn best. Often, when they are not comfortable with their environment, they will not learn, or they will not learn as effectively as possible. (p. 12)

With regard to learning, judging students gravitate towards a very structured environment where deadlines are set and the expectations are clearly stated. They seldom complete assignments late and enjoy the satisfaction gained from completing class work. They fear failure and are known to put pressure on themselves to succeed accordingly, while perceiving students tend to prefer less structure and more dynamic learning environments (Meyers as cited in Brownfield, 1993).

Learning Styles and Personality

The MBTI has been used by educators to understand the relationship between student achievement and student behavior (Bishop-Clark et al., 2007). Lawrence (as cited in Kalsbeek, 1989) states that:

learning style can be understood as a person’s preferred approach to information processing, idea formation, and decision making; the attitudes that influence what is attended to in a learning situation; and a disposition to seek learning environments compatible with these personal profiles. (pp. 1-2)

In addition to the Myers-Briggs Type Indicator, other type indicators used in educational research include the Herrman Brain Dominance Model, Kolb’s Learning Style Model, the Canfield Learning Style Inventory, and the Felder-Solomon Learning Style Model (Henry, 2004). Learning styles are unique as some learn visually, some learn aurally, and some learn via a combination of the two. However there are many factors in addition to one’s learning style (e.g. parental influence, learning environment, motivation, etc . . .) that influence learning behavior, ergo a complete correlation
between one’s learning style and personality type is not completely possible (Bishop-Clark et al., 2007; Brownfield, 1993). Personality does, however, affect student satisfaction with an online course (Bishop-Clark et al., 2007). Provost (as cited in Brownfield, 1993) states that the value inherent in the MBTI lies in its ability to predict what types of environments, instructional tools, and even behaviors can make for a hospitable environment for the learner.

Kiersey (1998) suggests that each of the sixteen Myers Briggs types has a specific learning style that can be derived from the sensing/intuitive and thinking/feeling aspects of the scale. At least one study shows that those possessing the ST and NT type are best equipped for online courses as they are more analytical, task oriented, organized and have the proclivity for self paced assignments (Rogers & McNeil, 2009). This same study states that those typed as SFs and NFs are more likely to have problems with online courses due to their preference for constant contact with the instructor, class participation, and the need to bounce ideas off of their classmates and the instructor; traits for which online courses are not known (Rogers & McNeil, 2009, p. 10).

Introverts gravitate toward quiet learning environments that are conducive to concentration and tend to work better alone than with a group (Sakamoto and Woodruff as cited in Brownfield, 1993). Unlike the extravert, they are comfortable with a lecture based format but can perform poorly in a discussion based setting (Brownfield, 1993). As one would suspect, the current lecture-based classroom structure is set to favor the Introvert (Brownfield, 1993; Davis, 2010). Extraverts tend to be prominent participants in
face-to-face classroom discussions as they tend to act first and think afterwards (Davis, 2010).

With regard to the sensing/intuition student, the traditional classroom structure tends to favor the sensing student as most times curriculum is limited to facts and details and does not include much in the way of imagination (Brownfield, 1993; Ellis, 2003). Ironically primary level classrooms and science classrooms, due to their hands-on nature, favor sensing learners (Davis, 2010) who prefer to explore possibilities (Ellis, 2003). Traditional paper and pencil tests, because of their rigidity, tend to favor intuitive learners (Davis, 2010).

In a classroom setting, feelers do not do well with criticism or rigid classroom environments, but take encouragement well and make for wonderful peer tutors and mediators (Brownfield, 1993). Thinkers tend to gravitate towards leadership roles in the classroom but tend to disregard the feelings of others around them (Brownfield, 1993). Perceiving students prefer a dynamic learning environment. Structure and due dates do not hold any allure for them as they tend to postpone tasks until the very end. For this reason they are often perceived as being underachievers and irresponsible. They like open ended assignments and learning situations where discussion is common and encouraged (Brownfield, 1993). Because of its structure, such as strict due dates and standardized curriculum, the standard classroom environment strongly favors the judging student over the perceiving student. Judging students actually do well with learning situations that involve tight structure with set schedules and usually meet or beat deadlines. They fear failure and enjoy the feeling of completing a project (Brownfield, 1993).
Realizing that not all students learn in the same way can empower the instructor to create a learning environment that can accommodate a variety of learning styles (Bishop-Clark et al., 2007; Rogers & McNeil, 2009). By having an understanding of a student’s learning style, the instructor is aware of how information is processed by various personality types, a fact which can empower the instructor to tailor the course to meet the myriad of learning styles that can be present in a classroom (Bishop-Clark et al., 2007; Brownfield, 1993; Rogers & McNeil, 2009). This task can be accomplished by utilizing a mixture of approaches and teaching methods in an online class such as using discussion boards and other forms of collaboration to make the course more conducive to an NF or SF learner (Rogers & McNeil, 2009). Since expectations and responsibilities are important in an online class, allowing the students to assist in developing these criteria can appease a variety of personality types as can the use of both synchronous and asynchronous forms of communication (Ellis, 2003). Making the student aware of their learning style can also give them a better idea of what type of learning environment best complements their skill set (Rogers & McNeil, 2009).

As one would suspect, the most important element in regards to determining student academic success is the classroom teacher (W. L. Sanders & Rivers, 1996), especially one who possesses a similar learning style and uses that style to govern how she or he teaches the course (Henry, 2004). Clark and Guest (1995) recommend that those possessing the personality types of ISFJ, ESFJ, ESTJ, and ISTJ make for the best teachers in the classroom of the future as they are known as “traditionalists” or “stabilizers.” They also recommend that the changing role of the teacher will require traits such as risk taking and troubleshooting to be successful. Sears, Kennedy and
Kaye (1997) state that the current teacher profile of sensing, feeling, judging will not be practical for tomorrow’s teachers due to their aversion to change. The preferred profile for the teacher of the future would be one that is intuitive, thinking, and judging (NTJ) as they are oriented to the theoretical, tend to gravitate towards complexity or innovation, and are naturally driven to seek solutions to complex problems (Sears et al., 1997). Sears et al. (1997) also state that those possessing the traits of sensing, thinking, and perceiving are best suited as implementers of newer pedagogical approaches due to their ability to be firm minded, flexible, dynamic, and able to work without harmony.

The Technology Based Learning Environment Assessment

The second questionnaire, the Technology Based Learning Environments (TBLE) Assessment was developed by a Ph.D. class on designing technology based learning environments at the University of North Texas taught by Dr. Greg Jones. Students in the course were asked to compile a list of what they considered to be the most important aspects of a technology based learning environment. This questionnaire was designed with more generalized terminology (e.g. Feedback, Homework) so as to enable it to be used with future technologies as they develop. Out of this list, thirteen discrete components were listed as important elements. These are:

1. Archivability (can the students download the material and review it on their own time)
2. Assessment/evaluation (tests)
3. Assignments (homework assignments)
4. Collaboration (the course requires classmates to work together on a project)
5. Context (the lessons are applicable in real life)
6. Equity in regards to disabilities as well as learning styles
7. Feedback (the student knows how well they are doing in the course)
8. Information/content (the quality of the content in the course)
9. Organization (how well organized is the course)
10. Pedagogy (is there a solid theoretical framework for the course)
11. Rapport (how close is the student/teacher relationship)
12. Reflection (the course is designed to let the students see the material from a big picture perspective)
13. Simulation/model (students are allowed to test out the material in the learning environment)

As of this writing, the assessment (G. Jones, Evans, Lin, Wright, & Rose, 2012) is still undergoing development and is being used in three different research studies including this one. An article by Jones, Lin, Wright, and Rose (2008) that uses the assessment is currently undergoing refinement.

**TABLE Short Form**

The ease of survey administration via the Internet, the corresponding reduction in cost, and the continued rise in the use of surveys for institutional research makes the issue of survey fatigue an important issue to consider (Porter, Whitcomb, & Weitzer, 2004) with many campuses implementing policies regarding the frequency and content of surveys and even regulating which methodologies can be employed (Porter, 2005). Surveys conducted back to back may suffer the most noticeable effects of survey fatigue (Porter et al., 2004). Using the standard version of the TBLE, offering every possible combination of pairs to each participant will require responding to a total of 78 discreet paired combinations \([(n(n-1))/2\]. In order to reduce survey fatigue (Porter et al.,
2004), the TBLE questionnaire for this research was pared back from its normal 13 elements to approximately six, a move that reduced the number of pairs in this particular questionnaire from 78 to 15. Items that were clearly not related to the study and issues of social presence were deleted. The revised survey contained the following six items:

1. Collaboration (the course requires classmates to work together on a project)
2. Equity (with regard to disabilities as well as learning styles)
3. Feedback (the student knows how well they are doing in the course)
4. Organization (how well organized is the course)
5. Pedagogy (is there a solid theoretical framework for the course)
6. Rapport (how close is the student/teacher relationship)

**Paired Comparison**

Thurston (as cited in Robertson, 2009) states that preference choices for an individual can vary under conditions that are difficult to distinguish and that imprecise results can occur when assigning a value to certain items using subjective criteria. To avoid this problem, pair wise comparisons can be used (Dunn-Rankin, Knezek, Wallace, & Zhang, 2004). Originally devised for the study of psychophysics, the pair wise (or paired) comparison method presents objects in pairs and asks the respondent to choose one against the other. Modern applications of this technique include the fields of psychology, sensory analysis, and economics (Grasshoff, Grossmann, Holling, & Schwabe, 2003).
Shephard (as cited in Dunn-Rankin et al., 2004) states that ordinal tasks involve the ranking of objects so as to produce data where one item dominates another. Ranking can be accomplished either by a direct approach or via pairing the objects into all possible combinations and counting the votes, a method known as rank values (Dunn-Rankin et al., 2004). Thurstone (as cited in Robertson, 2009) suggests that preference choices by a participant can vary at times which can lead to imprecise results. This issue can be avoided by using a pair-wise approach to data evaluation (Dunn-Rankin et al., 2004).

The total number of discreet pairs possible is calculated via the formula \(\frac{n(n-1)}{2}\), so for a three components test the number of possible pairs would equal three: \(\frac{3(3-1)}{2} = 3\). Total pairs presented to each participant would look like this:

A/B
A/C
B/C

Hypothetically, if the preferences for a certain participant were that A was preferred over B, and that B was preferred over C, the data set might look like this with preferences highlighted:

A/B
A/C
B/C

With a large number of elements being presented to the participant in pairs, one would correctly assume that there might be some difficulty in keeping the priorities in their correct order. An example of a circular triad would be a decision that prefers A over
B, B over C, but C over A instead of A over C as one would expect (Knezek, Wallace, & Dunn-Rankin, 1998). This method presents the number of circular triads for each participant, allowing one to isolate particular participants that might be providing less than valid responses to the questionnaire.

Semi-Structured Interviews

Interviews are a commonly used data collection method (DiCicco-Bloom & Crabtree, 2006) as they can provide a rich body of diverse information as well as a variety of opinions (Diefenbach, 2009; Rossman & Rallis, 1998). Generally there are three types of interviews: structured interviews, semi-structured interviews, and unstructured interviews (Whiting, 2008) although others simplify the breakdown as being either structured and unstructured (Denzin & Lincoln, 2003; Lincoln & Guba, 1985). Structured interviews typically use a fairly rigid questionnaire with set responses and are good for respondents that have a communicative impairment (Whiting, 2008). By design they are typically best used to generate quantitative over qualitative data (Whiting, 2008). As the name implies, unstructured interviews are much more dynamic and do not necessarily use the same set of questions between respondents nor do they require that all responses be recorded, a task, and judgment call, left to the interviewer (K. D. Jones, 2010). They can also use guided conversations where candidates are initially observed and deliberately selected for their ability to provide the needed information to the researcher (DiCicco-Bloom & Crabtree, 2006).

Semi-structured interviews are a data gathering method by which all the participants are asked the same question, or set of questions, within a flexible
framework which allows for open ended questions, the reordering of questions as needed by the interviewer (Dearnley, 2005) and additional questions as concepts emerge from the dialogue (DiCicco-Bloom & Crabtree, 2006; Whiting, 2008). They are generally less spontaneous as they are scheduled in advance and the interviews are organized around a predetermined set of questions (DiCicco-Bloom & Crabtree, 2006).

Some considerations with regard to conducting semi-structured interviews are providing: a) enough time so that enough data can be collected without inconveniencing either party, b) a venue that allows for the desired privacy and formality while allowing the respondent to feel comfortable enough to respond appropriately, c) the appropriate technology to properly archive the material, and d) accurate and detailed transcriptions (Dearnley, 2005). Interviews can be done via face-to-face, over the telephone, or in a group setting (Creswell, 2003; Denzin & Lincoln, 2003). Interviews can last from 30 minutes to several hours in some cases (Whiting, 2008). With the interview process come the issues of privacy and the well-being of the interviewee (Whiting, 2008).

Mixed Method Analysis

As the name infers, the mixed method approach is simply the collection and analysis of both qualitative, as in text or image, and quantitative, as in numeric, data (Fidel, 2008). The mixed method approach has been a mainstay in the social sciences (Al-Hamdan & Anthony, 2010; Erzberger & Prein, 1997) as well as nursing (Al-Hamdan & Anthony, 2010) and has been recommended as a research paradigm (Thurston, Cove, & Meadows, 2008). Teddlie and Tashakkori (as cited in Symonds & Gorard, 2010) state that mixed method research should reside as a third major approach to research in the
social sciences, alongside quantitative and qualitative research, a view also shared by Johnson and Onwuegbuzie (2004).

The mixed method approach has also garnered some controversy since both quantitative and qualitative sides believe that their respective discipline is the one ideally suited for research (R. B. Johnson & Onwuegbuzie, 2004). Both approaches are anchored in a philosophical paradigm: positivism for quantitative and post-positivism for qualitative (Al-Hamdan & Anthony, 2010). The focus of qualitative research is to “capture authentically the lived experiences of people” (Onwuegbuzie & Johnson, 2006, p. 49) and its advocates believe that interpretation, idealism, and involvement of the investigator with the components renders the qualitative approach superior, while advocates of the quantitative school of thought believe that proper results can only be achieved by completely removing bias from the equation (R. B. Johnson & Onwuegbuzie, 2004). Qualitative research has been criticized from a methodological perspective due to the perceived influence of the researcher on the design, the selection of units for investigation, and the perceived lack of both internal and external validity (Diefenbach, 2009).

Salehi and Golafshani (2010) state that combining approaches can be tricky due to each paradigm possessing different philosophical and epistemological frameworks and that there is no real agreement in regards of stance on mixing methods. Barton and Lazarsfeld (as cited in Erzberger & Prein, 1997) offer a strategy for combining both approaches by using the qualitative approach with its perceived ability to explore “research fields and discover surprising aspects of reality” (p. 142) to actually generate the hypothesis and using the quantitative approach to test the hypothesis due to its
“elaborate sampling techniques, methods of index building and error theory” (p. 142).
Ultimately, it is established that a mixed method approach should only be used if warranted by the research question or questions (Niaz, 2008; Thurston et al., 2008) and should not just reflect the preference of the researcher (Al-Hamdan & Anthony, 2010). If done correctly, the mixed method approach can provide for a methodologically sound and yet rigorous approach design for a study (DiCicco-Bloom & Crabtree, 2006).

Validity and Triangulation

Gall, Gall, and Borg (2003) state that: “Questionnaires must meet the same standards of validity and reliability that apply to other data-collection measures in educational research” (p. 223). Validity is an important component in any scholarly research as it lends credibility to the study. In some circles, such as the social sciences, it has attained an almost mythical status (Kvale, 1995). Validity can be achieved via a variety of means, one of which is triangulation (Robertson, 2009). Validity differs from reliability in that validity is a characteristic of the way that the instrument is utilized (Sushil & Verma, 2010) while reliability refers to: “the consistency of measurement” and defines an assessment that “produces a consistent, although not necessarily identical, result” (Schaubhut, Herk, & Thompson, 2009, p. 4). Unlike validity, reliability is: . . .generally understood to be the extent to which a measure is stable or consistent and produces similar results when administered repeatedly ”(Sushil & Verma, 2010, p. 174), is a characteristic of the instrument itself, and is vital to validity within a questionnaire (Sushil & Verma, 2010).
Triangulation is a term borrowed from land surveying and is, by definition, a process where three measurements are taken to precisely locate a point on a landscape (Meijer, Nico, & Beijaard, 2002). Stripped to its basics, triangulation is supposed to support a finding by showing that independent measures of it agree with it or, at least, do not contradict it” (p. 266). In essence, triangulation is a process that can involve the collection of data via a variety of methods and from a variety of data sources/researchers (Camburn & Barnes, 2004). Triangulation can be used to ensure reliability between multiple data sources (Sandelowski, 1995), especially between quantitative and qualitative data sets (Salehi & Golafshani, 2010; Tobin & Begley, 2004). This is due to the perception that different research methodologies possess differing strengths and weaknesses and that by using triangulation, these weaknesses can be overcome (Erzberger & Prein, 1997). Thurston, Cove, and Meadows (2008) offer Denzin’s expansion of the triangulation approach to include four categories: a) use the same approach to gather data from different parts of an organization; b) use multiple researchers or observers; c) use different theoretical “lenses” to interpret the data; and d) and use a variety of tools or methods to explore the phenomenon. Triangulation can be used to isolate data collection methods that can lead to a misinterpretation of results, especially within the realm of qualitative research (Oliver-Hoyo & Allen, 2006) as well as provide a more holistic understanding of certain measurement approaches (Camburn & Barnes, 2004). By using triangulation, greater confidence can be gained from the conclusions drawn via the study (Johnstone, 2007). It should be stated that the inherent assumption is that two types of data will be collected for analysis by each approach as
there currently is no established method that allows analysis of the same data via both quantitative and qualitative methods (Erzberger & Prein, 1997).

Summary

This chapter started out with a look at communication in the classroom. Benefits and criticisms of online education were covered as well as the related topics of immediacy, social presence (as defined by Short, Williams, and Christie), and media richness. Community and collaboration as well as both of the theoretical approaches governing this study were also addressed: Community of Inquiry and the Myers-Briggs Type Indicator. Learning styles as they relate to the MBTI was covered, as were the Technology Based Learning Environment Assessments, the paired comparison approach to data analysis, mixed method analysis, and semi-structured interview and the topics of validity and triangulation in data analysis.
CHAPTER 3

METHODOLOGY

This chapter discusses the methods and procedures that were used to generate, collect, and analyze data as well as report the research findings. The paradigm for the research design for this study is non-positivistic and interpretivist in nature. This focus lends itself more readily to the topic under study. The chapter also covers the measures that were taken to ensure data validity and reliability.

Strategy for Inquiry

This mixed-method qualitative study was conducted in three stages. The first stage (TBLE) used the Technology-Based Learning Environments (TBLE) survey, a non-parametric scaling instrument, to determine the participant’s prioritization of critical design elements found in technology-based learning environments. This instrument was also used to gather some basic demographic data for the purposes of describing the population. Upon completion of the TBLE, the participant was sent an email requesting their participation in the second stage (TBLE+MBTI) of the study where Form M version of the Myers-Briggs Type Indicator was used to determine the participant’s personality type. Upon completion of this part of the study the participant was sent another email with a question regarding their preferences in technology based learning environments. This third stage (interviews) used semi-structured interviews with the participants of the study to further clarify the results. Results were handled in accordance with IRB regulations.
Participants

The students participating in this study were from a public university in the North Texas area and were recruited from both undergraduate and graduate courses during fall 2011. Instructors were asked to recruit participants from their classes and provide extra credit for participating in the research study. Information on participants was provided back to the instructors for the purpose of providing extra credit. The minimum age to participate in the study was 18 years of age and all participants electronically consented to participate in this research as defined by the IRB consent form which is available in Appendix E. Participants were allowed to withdraw from the research at any stage during the process and students were told that participating, not participating, or withdrawing from the research once started would not impact the student’s grade in their course. A total of 50 students participated in the study. Sixteen students were the threshold for the object scalability in the TBLE instrument (Dunn-Rankin et al., 2004), thus setting the lower limit of the research sample. Participants were asked to self-identify basic demographic data such as gender, age, and academic status (undergraduate versus graduate/postgraduate). From this initial 50 who completed the TBLE, a total of 34 students completed the Myers-Briggs Type Indicator, and a total of 16 students participated in the interview process. One of these 16 was not coded in case it was needed for later for checking validity of the data.

Methods and Procedures for Data Generation, Collection, and Analysis

The selection of methods and procedures explained below reflect the study’s goals. Three research strategies were combined in this study, each requiring a different
data collection or generation and analysis. The first method was the technology-based learning environments instrument that used nonparametric scaling to determine rank order and preferences between different TBLE elements. The second method was the Myers-Briggs Type Indicator (MBTI) instrument which was used to determine personality indicators that measure among four pairs of discrete traits, among which are introversion, extroversion, intuition, and thinking. The third method was the use of semi-structured interviews with the participants (Creswell, 2003). Each method is now described and explained.

***Method 1: Technology Based Learning Environments (TBLE) Short Form***

**Data Collection – TBLE**

The first questionnaire, the Technology Based Learning Environments (TBLE) Assessment, was covered earlier. The version used in this study uses the TBLE Short Form which consists of only six items and is covered in more detail later. Students were provided a URL which took them to an online version of the TBLE Assessment which collected some basic demographic data as well as their preferences according to the elements in the assessment. Once the assessment was completed, the student was contacted with information about continuing to the next part of the study.

**Data Analysis - TBLE**

Analysis for the TBLE was performed using two methods: one to examine the data for logical inconsistencies and a second to actually rank the responses. Circular triad analysis is an evaluation of the data received from the questionnaire and looks
specifically for “tied votes,” a situation where the subject likes A over B, B over C, and C over A (Dunn-Rankin et al., 2004, p. 12), an outcome that results in a logical inconsistency. Rank-sum scaling is a common method of assessing participants’ preferences when these votes are arranged in all possible pairs (Dunn-Rankin et al., 2004). Due to the fact that the data being collected is ordinal in nature, this type of data requires non-parametric analysis and is therefore assumption free and does not allow for generalization to the general population (Robertson, 2009). At this point, data from the MBTI and TBLE questionnaires were used to generate questions for the qualitative portion of the study.

*Method 2: Myers Briggs Type Indicator (MBTI)*

Data Collection - MBTI

Following completion of the TBLE assessment, participants were asked to complete the Myers Briggs Type Indicator (MBTI) Form M. This assessment has been used in previous research regarding personality types (Cohen, Cohen, & Cross, 1981; Harrington & Loffredo, 2009; Lucas, 2007; Roberts, Mowen, Edgar, Harlin, & Briers, 2007) and shows a high construct validity compared to other personality assessments (Cohen et al., 1981). The Form M consists of 93 questions in addition to requesting some basic identification data and was administered online. With regard to internal consistency the Form M, according to a report published by Consulting Psychologists Press (CPP) who administers the Myers-Briggs Type Indicator, rates consistently high, .80 and up, depending on the value being measured (e.g. ethnicity, employment status, and age group) and test-retest reliability of the Form M ranges from .57 to .81
Schaubhut et al. (2009) shows that the MBTI Form M, with regard to the Cronbach’s Alpha, compares favorable to other personality assessments like the NEO Scale and the Birkman Method Scale. Buros’ Mental Measurements (Plake & Impara, 2001) gives the MBTI form M a mixed grade. The test itself receives high marks for using item response theory for increased accuracy while also receiving low marks for claims of reliability that are based upon continuous scores, a concept which is contrary to the authors’ claims that the test is not designed to measure personality traits on a continuous scale. Plake and Impara (2001) also state that the exam should not be used for hiring decisions but simply for the process of self-understanding. Since the MBTI is a known element and is only one component of this study, these limitations are deemed acceptable.

Upon completion of the MBTI instrument, participants were sent an e-mail message thanking them for taking time in completing both the MBTI and TBLE surveys. Participants also had the opportunity to receive their MBTI score upon request.

Data Analysis - MBTI

Data analysis was conducted via the CPP website. Once each assessment was completed, the researcher received an email stating this and was able to log on to download the results via a PDF file that was generated for each participant. Upon completion of the data collection, results were broken down to determine the overall spectrum of personality types for the study group. Data provided by CPP included the MBTI score for each participant with associated numerical values. These values were keyed into a spreadsheet, averages for each value were calculated, and the higher
number of each pair was used to generate the composite MBTI score for the population. This information is available in Chapter 4. Further analysis focused on the specific pairs of Introversion versus Extroversion and Judging versus Perceiving.

**Method 3: Semi-structured Interviews**

Data Collection - Interviews

At the end of the questionnaire, the participants were given the option to self-select for possible participation for interviews. It was expected that only a small number of the participants who completed the questionnaires would self-select for involvement in this part, but that this number would suffice in getting the necessary feedback to properly triangulate the data. Participants that indicated their interest in being interviewed were contacted via email. They were informed that participation in the interviews was voluntary. Participants who volunteered for this were asked to provide appropriate contact information that would be used to set up the interview. Interviews were conducted via both telephone and Skype, depending on the participant’s preference, and lasted anywhere from approximately twenty minutes to almost an hour. Interviews were recorded with the participant’s permission for later analysis and will be archived as MP3 files with the rest of the data upon completion of the study. As suggested by Fontana and Frey, notes were taken frequently, inconspicuously, and completely (Denzin & Lincoln, 2003).

Data Analysis - Interviews

Creswell (2003) illustrates five strategies associated with qualitative research that
include Ethnographies, Grounded Theory, Case Studies, Phenomenological Research, and Narrative Research. For the purposes of this study, Grounded Theory was used for the analysis of the interviews as it allows the researcher to “derive a general, abstract theory of a process, action, or interaction grounded in the views of participants in a study” (Creswell, 2003, p. 14). According to Glaser (2009), this approach also works well within the grasp of the novice researcher as they tend to be more open to new trends in the data that may fall outside the confines of existing research and are not hindered by an established research agenda. Interview transcripts were generated by the researcher, a process which included frequently reviewing the notes and recordings of said interviews (Denzin & Lincoln, 2003).

From these transcriptions, open coding allowed potential themes to be developed. Three different peer reviewers were used to analyze the data at two different levels, two reviewers analyzing the overall data from those who completed the interviews as well as one additional one to analyze the interview data as broken down by personality types using the pairs of Extravert versus Introvert and Judger versus Perceiver. With regard to this study, several strategies were utilized to ensure the validity of the data that included triangulation, this was covered earlier; stating one’s own perspective and biases in light of the data; and stating the findings within the context that they were gained (Rossman & Rallis, 1998).

Study Report

The study report in Chapter 4 presents the analysis of the TBLE, analysis of the MBTI, and the comparison of participants between the MBTI and TBLE. The interview
data was used to add depth to the MBTI and TBLE analysis. In this way, a holistic view of the perspectives of the participants with regards to their perception of TBLE based on their MBTI outcomes can be presented.

Rigor and Trustworthiness

Rigor and trustworthiness are vital elements to any study and were demonstrated by defining, establishing, and showing credibility, transferability, dependability, and confirmability both during and at the conclusion of the study (Lincoln & Guba, 1985). One of the more important methods of establishing trustworthiness of nonpositivist research findings is credibility (Erlandson, Harris, Skipper, & Allen, 1993) which deals with the degree of confidence in, and accuracy of, the results within a given study. Pursuant to this study, Lincoln and Guba (1985) and Erlandson et al. (1993) propose the following methods to be used to help both attain and maintain the credibility relevant to this study:

- Prolonged and persistent engagement with participants, data, and analysis and a sufficient investment of time by the researcher to achieve immersion in the contexts being examined
- Triangulation of sources of information gathered
- Peer debriefing to check summaries, analyses, and reporting of materials gathered
- Referential adequacy by archiving a small part of the data uncoded, to be available at a future date to check comprehensiveness of analysis

With regard to these criteria, the following answers are presented.

- Prolonged and persistent engagement with participants, data, and analysis and a sufficient investment of time by the researcher to achieve immersion in the contexts being examined
Time was spent on this study so that the required degree of control was maintained. Due to the number of participants required for proper quantitative analysis, data collection took just two months to accomplish. Data analysis took another month to allow for proper formulation of questions for the semi-structured interviews. Interviewing candidates took upwards of two months with a final month devoted to analysis of the entire data set. Since pattern emergence is important in a study such as this, taking the proper time to analyze the data was vital to a successful outcome.

- Peer debriefing to check summaries, analyses, and reporting of materials gathered

   Peer debriefing was performed with a total of three different individuals. They were given access to the qualitative data from both the email responses and the interview transcripts. This information was used to shore up existing conclusions about the data as well as identify new themes that were missed in the initial analysis.

- Referential adequacy by archiving a small part of the data uncoded, to be available at a future date to check comprehensiveness of analysis

   With regard to referential adequacy, this step was contingent on the amount of data that was gathered. With a study such as this, there is always the hope of a large turnout from the students, especially if the participating instructors offer an incentive to participate (within IRB guidelines). Despite the limited number of participants, one interview was not included with the data analysis and will be available for coding should the need arise. As previously stated, the data has been archived according to IRB regulations.

   In addition to the previous measures illustrated, rigor and trustworthiness were accomplished with some additional elements as illustrated by Creswell (2003). Rich,
thick descriptions were used to allow the reader to relate to the outcomes present in the study. The presentation of any relevant negative or discrepant information is important as this type of data best reflects the myriad of opinions that comprise the lived experience. Finally, any biases that the researcher brought to the study were noted. This helps to frame the narrative as it relates to the results of the study.

Triangulation of Sources of Information Gathered

Triangulation is vital to establishing credibility in qualitative research (Rossman & Rallis, 1998). In this study it was accomplished via three different methods that included two quantitative measures the MBTI and the TBLE and a qualitative measure of semi-structured interviews to confirm themes in the data and to check for trends that may not be visible in the quantitative approaches. Triangulation was also accomplished with the use of two theoretical foundations, which included Community of Inquiry with an emphasis on Social Presence, and the Myers Briggs Type Indicator with an emphasis on two pairs of elements: Introversion versus Extroversion and Judging versus Perceiving.

Authenticity

With regard to authenticity in this study, the data acquisition was conducted with fairness and accuracy by the researcher. The researcher has made known his personal biases and constantly re-evaluated these biases in light during the study. The study methods used provided for the privacy and integrity of those who participated in the
study. All data collected and analyzed were done so using accepted measures of rigor, trust, and validity.

Summary

This chapter detailed the study that involved elements of technology-based online courses, the need for social presence, and personality types. Data was collected and triangulated using the Myers Briggs Type Indicator and the Technology-Based Learning Environment assessments and triangulated with interviews to discover what TBLE elements are perceived to best foster social presence. Analysis consisted of a mixed method approach that used a rank order for quantitative analysis and semi-structured interviews for a qualitative approach to the data. In the next chapter, the results of the data collection will be presented.
CHAPTER 4
DATA ANALYSIS

This chapter starts with an overview of the demographics of the study population. Following this, the data from the various TBLE populations as well as the MBTI assessment will be shown. This chapter will conclude with an overall analysis and presentation of emergent themes gathered from the interviews.

Demographics

Of the 50 participants who completed the TBLE, the population consisted of 27 female respondents (54%), 22 male respondents (44%), and one student who elected not to self-identify their gender. The average age of undergraduate respondents was 31 years of age and the average age of graduate/post graduate respondents was 39.6 years of age. With regard to education, 34 of the respondents self-identified as undergraduate students (68%), 15 self-identified as graduate or post-graduate students (30%), and one student not providing this information. Finally, 13 of the respondents indicated that they had taken 2-5 online courses (26%), 19 indicated having taken 6-10 online courses (38%), 17 indicated having taken 11 or more online courses (34%), and one student not providing a response to the question. Educational and online course data is shown in Figure 1.

The Technology Based Learning Environment Assessment (All Participants)

An initial run was made of all the participants who completed TBLE portion of the study. Of the 50 participants, the mean number of circular triads was 1.78 per judge.
Two participants (4%) had the maximum possible number of eight circular triads for this study. According to Kendall (as cited in Edwards, 1974) the maximum number of circular triads for a survey with an even number of stimuli is determined via the following formula: \((n^3 - 4n) / 24\). Upon review, it was decided to include these two participants in the data analysis due to the desire to incorporate as many participants as possible in the study and that any impact of the data would be negated by the semi-structured interviews. One of these two candidates did participate in the interview process.
With regard to consensus between judges, the Kendall’s coefficient of concordance is a value that shows the amount of agreement among judges and runs from a value of 0 for no agreement to 1 for complete agreement (Siegel as cited in Dunn-Rankin et al., 2004; Edwards, 1974). The coefficient of concordance for the initial data run (n = 50) was .2191 that shows that there is a fair amount of disagreement between judges. Rank totals and scale scores for the TBLE (n = 50) portion of the study were generated using Ranko. Data from this run is available in Appendix B.

Technology Based Learning Environments and the Myers-Briggs Type Indicator

A second run of the data with those who had completed both the TBLE and MBTI components (n = 34) was performed to generate the overall results for the study. The analysis of 34 participants who completed both the TBLE and MBTI surveys is shown in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Rank Total</th>
<th>Scale Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>34</td>
<td>0</td>
</tr>
<tr>
<td>1 Collaboration</td>
<td>89</td>
<td>32</td>
</tr>
<tr>
<td>2 Equity</td>
<td>85</td>
<td>30</td>
</tr>
<tr>
<td>3 Feedback</td>
<td>154</td>
<td>71</td>
</tr>
<tr>
<td>4 Organization</td>
<td>137</td>
<td>61</td>
</tr>
<tr>
<td>5 Pedagogy</td>
<td>110</td>
<td>45</td>
</tr>
<tr>
<td>6 Rapport</td>
<td>139</td>
<td>62</td>
</tr>
<tr>
<td>Max</td>
<td>204</td>
<td>100</td>
</tr>
</tbody>
</table>
For comparison, rank scores for the TBLE + MBTI participants are presented on a uni-dimensional scale in Figure 2.

![Figure 2](image)

**Figure 2.** Uni-dimensional scale for TBLE+MBTI respondents (n = 34).

The Kendall's coefficient of concordance with this group was $W = .2471$, a number which signifies that there was a good amount of disagreement between the
participants in the study. As can be seen from the data, feedback ranks very high followed by the elements of rapport and organization, the latter two of being closely aligned. Pedagogy, collaboration, and equity round out the bottom three with regard to which elements best foster social presence in a technology based learning environment.

For this study, the researcher used the individual MBTI scores generated by CPP to generate an overall MBTI score. To generate an overall MBTI score for those who completed the MBTI survey, scores for each respondent were logged on a spreadsheet and average scores for each type were calculated. By taking the average highest MBTI score from each pair (introvert versus extravert, sensing versus intuition, thinking versus feeling, and judging versus perceiving) a composite score was generated for the 34 participants who completed the MBTI survey as a whole as mandated by the primary research question. As Table 2 illustrates, the composite MBTI score for this population would be ENFJ. An overall breakdown of those who completed the MBTI is available in Appendix D.

Table 2

*MBTI Average Values for n = 34*

<table>
<thead>
<tr>
<th>Type</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introvert</td>
<td>10.4</td>
</tr>
<tr>
<td><strong>Extravert</strong></td>
<td><strong>11.3</strong></td>
</tr>
<tr>
<td>Sensing</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>Intuition</strong></td>
<td><strong>15.5</strong></td>
</tr>
<tr>
<td>Thinking</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Feeling</strong></td>
<td><strong>13.0</strong></td>
</tr>
<tr>
<td>Judging</td>
<td>17.4</td>
</tr>
<tr>
<td>Perceiving</td>
<td>16.1</td>
</tr>
</tbody>
</table>
Further analysis of the data set was performed by breaking down the 34 responses to the MBTI into two discrete pairs according to four personality elements present in the Myers-Briggs typology: Extraverts versus introverts and judgers versus perceivers. The extravert versus introvert focus was chosen as this shows where the learner focuses her/his attention (Brownfield, 1993). The judger versus perceiver focus was chosen as this illustrates how much structure is preferred in the participants learning environment (Brownfield, 1993). For the first data analysis 15 participants were rated as introverts and 19 were rated as extraverts by the MBTI. For the second data analysis this same population was broken down into judgers and perceivers with 17 participants falling into each category.

**Introverts**

Figure 3 shows the TBLE rankings of those who rated as Introverts with regard to the MBTI. The Kendall’s coefficient of concordance on this population was $W = .2145$, a value which shows that there was a fair amount of disagreement among the judges. One can easily tell that feedback and rapport rated very highly and very closely together with organization and rapport similarly paired and coming in close behind. Equity and collaboration rounded out the bottom with regard to fostering social presence in a technology based learning environment. One might also notice a rather clean break between these last two elements as compared to the first four.
Figure 3. Introverts.

Extraverts

Figure 4 shows the TBLE rankings of those who were rated as extraverts by the MBTI. The Kendall’s coefficient of concordance for this population was $W = .3295$, a value which again shows a certain amount of disagreement among the participants. Feedback appears as a leading element with organization and rapport. Overall, one can see here that feedback is an important component, but that the data breaks cleanly between the top three elements (feedback, organization, and rapport) and the bottom three elements (pedagogy, collaboration, and equity).
Figure 5 shows the results as generated by analyzing only the judgers from the TBLE data. The Kendall’s coefficient of concordance on this population was $W = .3235$, an indicator that all judges were not in complete agreement with the results. With regard to this data set, the data breaks down with feedback once again appearing at the top of the scale followed by rapport and organization. Pedagogy ranked squarely in the middle with equity and collaboration rounding out the bottom. Visual analysis shows that data is somewhat evenly distributed along the scale.
The final TBLE data breakdown was done with those who were ranked as Perceivers by the TBLE. These results are shown in Figure 6. The Kendall's coefficient of concordance on this population was $W = .2195$, an indicator that there was little in the way of agreement between participants. Once again, feedback appears at the top of the scale with organization and rapport ranking second and third. The bottom three elements are pedagogy, collaboration, and equity. It should be noted that there is a clean break between the elements of feedback, organization, and rapport and the elements of pedagogy, collaboration, and equity.
Interviews

Semi-structured interviews were used to gather additional data to compare with the results gathered via the two assessments. An email containing the following question was sent as a discussion starter to all 34 participants who completed the TBLE and MBTI surveys and partly read as follows:

I'd like to get your response on the following question:

In the course(s) you are taking this semester, was there a function/component (i.e. equity, organization, or pedagogy) or quality (i.e. collaboration, feedback, or rapport) that improved the course for you the most?

The complete email as sent is posted in Appendix C. From this initial group of 34, there were 15 participants who responded to the e-mail query. From this group, 11 interviews were successfully conducted over a two-month period. Analysis of the
material was an ongoing, reflective process (Creswell, 2003) which utilized a constant
comparative approach to the data in which material from previous interviews was used
along with material from the previous surveys to further refine questions. During the
analysis of interviews emergent themes were triangulated with the results from the
TBLE and MBTI survey analyses.

Interviews ran from a minimum of 11 minutes to just over 30 minutes and were
driven by material from the interviewer, the interviewee, and the data. Since the
interviews were voluntary there was the attempt by the interviewer to honor the
participant’s time commitment but time was spent in informal conversation whenever
possible. This was done so that the participant felt comfortable with the interview
process, and to allow the interviewer to assess the participant’s background and
relationship to the subject of the study. All participants were willing to be contacted in
the future when follow up questions were needed. All interviews were recorded with the
participant’s permission with the recordings being encoded to MP3 files and stored on a
password protected flash drive in accordance with IRB regulations. These recordings
were used later to augment interview notes for analysis.

Since emailed responses were received from those who did not participate in the
interviews, these were also analyzed for key words and emerging themes along with the
interview data. All interviews were recorded with participant permission should further
analysis be required. Since all who were interviewed were familiar with online courses,
the conversation tended to focus on this area with respect to what elements of an online
course were most important to them. The interview usually started with the interviewer
listing their TBLE assessment results as well as volunteering their MBTI results. The
participant’s MBTI results were emailed to them upon request. Once the interview was underway, the research question was brought up and used as a sounding board for elements of online courses that the participants liked as well as disliked.

The researcher transcribed the interviews and these transcripts were provided to three reviewers for examination. Analysis of the data from the semi-structured interviews was done on two levels that included a) two of the reviewers who evaluated the overall data from all 15 interviews at once to get a feel for what themes were prevalent with the overall population and b) a third reviewer who evaluated the interview data as it was grouped according to Introverts versus Extraverts and Judgers versus Perceivers. This third reviewer analyzed the interview by highlighting passages of the transcripts and relating these passages back to the six elements of the TBLE short form. These results are reflected in Tables 3-6.

Results from the first two reviewers were compared and two themes that emerged as a consensus between them were organization and feedback. One of these first two reviewers identified communication as an overarching theme while another identified collaboration as an emerging theme in the data. Since these two were not agreed upon between the two, it was left out of the findings. The two themes of organization and feedback were also present in the results from the third reviewer who analyzed the grouped data.

Interview Data Analysis – MBTI Breakdown

In the final stage of the interview analysis, transcripts were broken down into individual Myers-Briggs types with Introverts being compared against extraverts and
judgers being compared against perceivers. These transcripts were evaluated by a third reviewer who took individual sentences from the transcripts and referencing them back to the applicable element or elements in the TBLE, in essence performing a key word analysis of the data. From this a tally of each element was generated and ranked according to the number of votes, generating something akin to the data generated by the TBLE earlier in the study. Tables 3-6 show the breakdown between the various data sets.

Interview data from the Introverts in Table 3 shows feedback to be the most highly rated element in technology based learning environments with organization and rapport tied for the second spot in the ranking. Collaboration, equity, and pedagogy round out the bottom three of the six elements with this Myers-Briggs personality type. Table 3

*Introverts*

<table>
<thead>
<tr>
<th>Element</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>15</td>
</tr>
<tr>
<td>Organization</td>
<td>10</td>
</tr>
<tr>
<td>Rapport</td>
<td>10</td>
</tr>
<tr>
<td>Collaboration</td>
<td>7</td>
</tr>
<tr>
<td>Equity</td>
<td>5</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4 shows interview data from those classified as extraverts according to the MBTI. This data shows organization to be a very popular element compared with equity a distant second and feedback, rapport, and collaboration receiving the same number of votes. In this particular study, no real mention was made with regard to pedagogy in these interviews.
Table 4

**Extraverts**

<table>
<thead>
<tr>
<th>Element</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>11</td>
</tr>
<tr>
<td>Equity</td>
<td>4</td>
</tr>
<tr>
<td>Feedback</td>
<td>3</td>
</tr>
<tr>
<td>Rapport</td>
<td>3</td>
</tr>
<tr>
<td>Collaboration</td>
<td>3</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5 shows interview data that was gathered from those rated as judgers by the MBTI. Feedback was the most highly rated element with this group followed by organization and collaboration, pedagogy, rapport, and equity.

Table 5

**Judgers**

<table>
<thead>
<tr>
<th>Element</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>11</td>
</tr>
<tr>
<td>Organization</td>
<td>8</td>
</tr>
<tr>
<td>Collaboration</td>
<td>5</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>4</td>
</tr>
<tr>
<td>Rapport</td>
<td>3</td>
</tr>
<tr>
<td>Equity</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 6 shows the interview data from those rated as perceivers by the MBTI. Feedback is rated highly here with organization and rapport receiving the same number of votes for second place. Equity, collaboration, and pedagogy round out the bottom three elements.
Table 6

Perceivers

<table>
<thead>
<tr>
<th>Element</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>9</td>
</tr>
<tr>
<td>Organization</td>
<td>7</td>
</tr>
<tr>
<td>Rapport</td>
<td>7</td>
</tr>
<tr>
<td>Equity</td>
<td>5</td>
</tr>
<tr>
<td>Collaboration</td>
<td>3</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>1</td>
</tr>
</tbody>
</table>

Emergent Themes in the Interviews

Out of the interviews, the following themes appeared 1) that organization is perceived as a vital component for course design in a technology based learning environment and 2) that communication is an important element and can include components such as feedback and rapport.

Organization

Organization is stated in the TBLE (J. G. Jones et al., 2008) as “how well organized is the course” and appears to be a popular theme in many of the interviews. One participant stated in an email that: “Though many aspects make a class great, I’ve discovered that three qualities make or break a class for me: organization, collaboration, and feedback.” This participant went on to say that “When I was working on my Master’s, I designed content for classes and quickly realized that the more places that a piece of information is found, the more easily students can navigate the class.” In a later telephone interview, this participant stated that they loved organization and clear navigation in a technology based learning environment. Another participant listed three
things that most improved a course for them. The first was “a structured syllabus” and
the third was “clear expectations (rubric).” Another participant stated in an emailed
response their satisfaction with the organization of the course. This person stated that
“It is organized according to units, on each unit I have the dates and due dates for the
assignment, and of course, I can post my assignment.” This person goes on to say how
they like the fact that all the information needed for the course is centrally located, a
feature that is not present with a second course that they are taking via a different
system. Still another participant spoke of three elements that helped them the most in
their courses were the ability to chat with the professor or TA, the ability to email
instructors with questions, and “the thing that mostly kept me in line was the amazing
organization of the courses and the syllabus that outlined what needed to be done, what
was expected and when I had to turn it in.” This assertion was reinforced in a telephone
interview with this person when they said that “organization helps” and that “the class
needs to be set up correctly.”

This same participant was asked in the telephone interview: If you had two
sections of the same course from which to choose: one from an instructor who was not
organized but was easy to contact while the other was very organized but was known
for being difficult to contact, which section would the participant choose? This
participant said that they would gravitate towards an online course since they “could not
deal with disorganization.” It should be noted here that this participant rated as a Judger
on the MBTI and that one trait common amongjudgers is the preference for a heavily
structured learning environment (Brownfield, 1993). Another participant, when offered
the same question, offered the following response: “If a course is organized, social
presence will come.” The response is an interesting look at the perceived importance of organization as an element in technology based learning environments. Another participant stated that they loved proper organization in a course and that clear navigation in a technology based learning environment was important to them. Despite organization being lower on the uni-dimensional scale of the TBLE, it proved to be a recurring item in many of the interviews.

Feedback

The second theme present in the interview data is feedback. This term was mentioned by one of the reviewers as an overarching theme while the second reviewer stated that their interpretation of the data showed that collaboration and feedback were important elements. According to the TBLE (J. G. Jones et al., 2008), feedback is defined as “the student knows how well they are doing in the course.” One participant that was quoted in an earlier paragraph stated that feedback, “the ability to email instructors,” and rapport, “online chatting with the professor/TA” were most important. Another participant stated that .” . the instructor made comments to our postings and was very helpful and encouraging.” Still another participant stated that “I think that feedback and rapport have helped me the most.” In a follow up interview, this participant shared a situation involving tuition and said that the instructor was willing to work with them regarding a workaround until the situation was resolved. This person also shared that it was “Good to know that there could be good communication between student and instructor even in a web based course.” Another participant stated that:

The two courses that I am taking this semester the main quality is the feedback that course for me because it tells me where I stand with my course progress.
Had I not received any feedback from my instructors, then would [sic] have been confused and very discouraged with other assignments.

According to the interview data, courses that lack these components do not provide for positive learning experiences. In an interview one participant spoke of the worst course this person had ever taken was one where there was no contact at all with the instructor due to the instructor passing away during the term. Another participant stated that "rapport and feedback were often lacking in an online course." Still another participant stated in an emailed response:

For example, in one of the first online classes I took the professor introduced themself [sic] and that was the extent of communication between the instructor and the professor. We were to read the text book and take 4 exams. That's all there was to the class. I can honestly tell you, I retained none of the information that class covered.

This participant went on to state that: “I believe it is important for a professor to be engaged with the students, answering questions, providing feedback on assignments, and following discussions.” Still another participant stated that not being able to contact the instructor can cause a certain amount of dissatisfaction and even attrition in an online course. Another participant stated that among the most important elements to them were clear expectations and a flexible instructor when life sometimes interferes. Finally, another participant stated in their response email that in all of their classes, feedback from their fellow students and teachers in the forum discussions improved the course for them the most. As with any analysis of qualitative data, interpretation can be incredibly subjective at times. Once the primary themes were distilled from the overall data they were emailed to all who participated in Stage 3 for their comments. All who responded agreed with the themes presented to them.
Summary

This chapter provided the data gathered for the study. Demographic data was covered as well as data from the TBLE and the TBLE+MBTI portions of the study. Themes present in the interview data were presented along with regard to individual MBTI personality ratings. Finally, emergent themes with regard to the entire data set were presented.
CHAPTER 5

CONCLUSIONS AND DISCUSSION

In this chapter, emergent themes in the research are covered based upon the data presented in Chapter 4 as well as the importance of these themes as they relate to current pedagogy related to course design. From these conclusions the research question and sub questions are answered. Following this, avenues for future research are presented followed by a conclusion with regard for the study as a whole.

Emergent Themes in the Research

Initial examination of the study results tells us a few things regarding the participants’ experiences with technology based learning environments: a) all had previous experience with technology based learning environments and b) most were advocates of the affordances offered by the associated technologies. Those who were interviewed had stories to share with regard to their experiences and had definite opinions as to what made the experience worthwhile for them as well as elements that, in their opinion, undermined the learning experience.

In light of the data as a whole, two themes will be presented to the reader for further analysis with regard to the design of technology based learning environments: a) the need for organization in the design of a technology based learning environment and b) feedback, which is indicative of the need for strong communication within the course itself.
Organization

Even though it was not as highly rated as feedback in the TBLE results, the element of organization warrants consideration in this study due to its consistently high ranking across all of the data and all personality types, especially in the interviews where it emerged as a very salient topic. As stated in Chapter 4, organization was an important element in the TBLE+MBTI group and across each of the individual TBLE analyses based up on individual personality types. Organization was especially popular with extraverts in the interview analysis where it rated 11 mentions, almost three times that of the next most popular topic. Since the introversion / extraversion scale measures where students tend to focus their attention and extraverts tend to concern themselves with the outside world (Briggs Meyers & Myers, 1995; Brownfield, 1993), it would make sense to believe that the “outside world” of the technology based learning environment would be the course design itself, especially as said course design would relate to the virtual world of online courses. As mentioned in the interview data presented in Chapter 4 two students, when queried as to their preference for an organized course or a socially present instructor, preferred the organized course over said socially present instructor. Also, as previously stated, the interview data shows that organization assists in engaging the learner since, in an online course, they are usually working by themselves (Flaherty & Pearce, 1998; Noble, 1998). The participants were very clear in that having an organized learning environment was a key element as to their satisfaction in a technology based learning environment. No one likes to go searching for information, or worse, have to access the course content on separate systems with
different user interfaces: problems that at least one of the participants in this study has encountered in their learning experience.


Feedback

The second theme that emerged from this data was the element of feedback. Save for one data run, this element was consistently rated the most important element of the TBLE in all of the data analyzed. The one data run that did not show this as a top rated priority is shown in Table 4 in Chapter 4 which shows the interview data from those rated as extraverts by the MBTI. In this data, which was covered earlier in this chapter, feedback was rated third behind organization and equity. One might attribute this to the extraverts’ concern with the outer world and their desire to interact with it (Briggs Meyers & Myers, 1995; Brownfield, 1993). Brownfield (1993) cites Sakamoto and Woodruff when stating that “These students think and learn best when talking, they like cooperative learning groups, and they rely more on trial-and-error than on forethought when solving problems” (p. 8). Their preference for “action and variety” (Brownfield, 1993, p. 8) may be a reason that the concept of asynchronous communication present in technology based learning environments might not appeal to them.

On a broader scale, one might consider the element of feedback as being a part of a much larger continuum that could be defined as communication within a course. One of the reviewers of the interview transcripts stated that “I see your communication theme as more than just feedback . . . it’s also to some extent the communication over technology and the way that course materials are communicated.” Although not as
highly rated in the TBLE data as feedback, rapport made a respectable showing across the TBLE data rating in the upper half of the rankings along with organization and feedback. Among the interview data that was broken down according to MBTI rating, only the Introverts and Perceivers rated rapport as being an important element where it tied with organization for second place as can be seen in Tables 3 and 6 as well as much of the interview data.

Research Questions and Answers

This study was based around one overarching research question and four sub questions. To answer the research question:

What components of a technology-based learning environment are rated as best for fostering social presence as defined by the MBTI?

Judging by the data from this study, the components of a technology based learning environment considered best for fostering social presence with regard for personality types as defined by the MBTI are organization and feedback. As stated earlier in this study, proper organization in a technology based learning environment is vital due to the distinct possibility of misinformation (Campbell, 2006; Solimeno et al., 2008). Consideration should be made to designing a technology based learning environment that is both organized and conducive to not just feedback, but communication of all types within a course be it feedback between learner and instructor, collaboration between learners, or even relationship building between the instructor and learner as this is a vital element of learning in a technology based learning environment (Appana, 2008). This is especially important to introverted
learners who tend not to favor face-to-face encounters (Cheung & Hew, 2004; Vonderwell, 2003).

With regard to the proposed sub questions:

- What components of a technology-based learning environment are rated as best for fostering social presence by learners who are typed as extraverts by the MBTI?
- What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as introverts on the MBTI?
- What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as judgers on the MBTI?
- What components of a technology-based learning environment are rated as best fostering social presence by learners who rate as perceivers on the MBTI?

Judging by the similarity of the data present in this study, there appears to be no real difference with regard to the needs of each personality type mentioned in the sub-questions with regard to this particular study population. An organized course is important to a successful and engaging learning environment in addition to having a course design that encourages open and free communication. Feedback is also a vital component and serves to communicate to the learner that they are indeed important and, above all else, not alone. These results are similar to the assertion made by M. G. Moore (1989) of the importance of engaging the student on multiple levels in a learning environment: these levels being student to student; student to instructor; and student to material. In light of the results presented here, student-to-student interaction would include collaboration; student to instructor interaction would include rapport and feedback; and student to material interaction would include course organization.
Areas for Future Research

With regard to areas of future research, there are a few things that would warrant further investigation. Replication of this study would be worthwhile to see if the results were consistent with the same or even a slightly different, maybe even a larger, population. A larger population would also make it worthwhile to use a software package such as NVivo to check for additional themes in the interview data. In the interview analysis, one reviewer mentioned “communication” as being an overarching theme present in the data. It would be interesting to see if another version of the TBLE Assessment could be generated using elements that are communicative in nature and see which of those elements were perceived as being most important in a technology based learning environment. Another modification might be to use the original version of the TBLE Assessment to see what elements overall were viewed as important with regard to improving a technology based learning environment.

Conclusions

One interview participant ended the interview with the admonition that “Digital natives need to be kept in mind as they do not tolerate any fluff.” It’s important that we not succumb to the same trap that claimed Edison (Weir, 1922) and others (Cuban, 1986b) by proclaiming that the next greatest invention will be the salvation of the educational process. What is needed is a method of assessing educational innovations that are not time or technology sensitive: assessment methods, such as the TBLE, that can be applied across a variety of technologies both present and future. Robert Slavin (1989) states that: “If education is ever to stop the swinging of the pendulum and make
significant progress in increasing student achievement, it must first change the ground rules under which innovations are selected, implemented, evaluated, and institutionalized” (p. 753). It is to this end that the Technology Based Learning Environment Instrument was generated. Unlike a traditional classroom, in a technology based learning environment the student usually spends more time interacting with the course material than with the instructor. It would stand to reason that there should be more time spent in making sure that the material reflects the attitude of the instructor toward the course material.
APPENDIX A

PERSON AS INSTRUMENT
This section reviews my background relevant to computer technologies, communication studies, online learning, and learning technologies with regard to their impact on me and my approach to this study.

Like any other gadget, I’ve been attracted to computers almost all my life. My first recollection of a real personal computer was a friend who had an Apple II and was trying to save enough money for a new peripheral called a floppy disk drive. My first real experience with computers never really started until college. My freshman year at Dallas Baptist University was marked by the university’s requirement that all incoming students take a course in computer science, a class which required each student to either lease or own a Tandy TRS-80 Model 100 laptop. This was a popular laptop at the time that came with a minimum of 8k and maximum 32k of RAM, an eight line black and white LCD screen, and a 300 baud MODEM. With this laptop, I not only learned BASIC programming but spent many nights contacting BBSs (Bulletin Board Systems) from my dorm room telephone line with its comparatively slow modem. After a few years and several papers, I sold it for my first desktop computer: a 10 Mhz Packard Bell PC clone complete with 640k of RAM, a CGA Monitor, and an external 1200-baud modem.

In retrospect, one could say that it was the modem on the computer that piqued my interest in working online. I recall telling friends that I thought the modem was the most important aspect of a home computer and that it should be standard equipment. I was fascinated at the things I could do on a computer once the carrier tones merged and the handshaking was complete. In this world I could communicate with others, see what was going on, and access content that was otherwise unavailable. As technology marched on I tried to keep pace. My next computer was an off the shelf PC-AT clone
and a 2400 baud modem. It was at this time that I started “getting under the hood” and playing with settings, installing chips, and finding out whom to contact when I got in over my head. Later on I would start building my own computers, a skill set which helped immensely with my ability to perform my own tech support.

In May 1989 I graduated with my bachelor of arts in communication with an emphasis in radio and television. It was around this time that the areas of broadcast communication and computers began to merge. In August 1989 I started my first job at Dallas Baptist University as Coordinator of Media Services, taking a job that a close friend of mine had left in order to get married and attend seminary. I initially took the job for the short term, not realizing the impact that it would have on me later in life. My responsibilities for my new position included handling classroom technology and making sure that it was operational and up to date. During the next few years, several events would collude to put me where I am today. In the mid 1990s I was able to build my first video editing system using two industrial grade Panasonic S-Video decks, a Sony Edit Controller, and a Newtek Video Toaster running on an Amiga 4000. This system was built at the request of the College of Business as they were in the process of videotaping many of their courses as a home brew distance-learning program. In 1993 I completed my MBA at DBU with an emphasis in international business and marketing. I earned the degree primarily to see if I could do it and also to see how I could perform in a degree field that was not related to my bachelors. In 1996 I began teaching my first course in the communication department at DBU. The course was one that I had written myself and was called Technology in Communication, a course that I still teach as of this writing. In 1998, DBU underwent its ten year SACS accreditation visit. During this
visit, our head of corporate education at the time was invited by Tom Russell, the head of distance education at North Carolina State University to come out and see their distance learning setup. In spring 1999, I accompanied our head of corporate education on this trip. At NCSU, my eyes were opened as to what could be done with comparatively little money. Upon return, I began building a crude, but effective video duplication system, mimicking what I had seen at NCSU. Mr. Russell was also very forthcoming with advice for dealing with copyright issues and other operational items.

In the spring 2003, I began working on my Ph.D. at the encouragement of the Provost and President at DBU along with several friends. I chose UNT as DBU did not have a doctoral program at the time, but I also wanted to see if I could “cut it” outside of DBU. The CECS program at UNT came highly recommended so I started the program with a close friend, Dr. Kaye Shelton. In addition to being a close friend Kaye was in the process of running, and growing, the distance education program at DBU. My natural curiosity over anything involving a computer got the best of me, and shortly thereafter I wrote my very first online course. Ironically it was entitled Nonverbal Communication.

My teaching duties as an adjunct began to increase as I was asked to write and teach a film history course. This afforded me a creative outlet and allowed me to explore two additional areas in which I’d held a fascination: film history and film production, the latter of which is currently very computer oriented. My background in digital video came in handy a few years later when I assisted a friend of mine in converting student speeches for an online speech course, a course that I eventually started teaching. It
was around this point that I was also able to take my Technology in Communication course and convert it into a hybrid course as well as a fully online course.

While in the CECS program at UNT, I was told that our next SACS visit was coming up in a few years and that my not having the needed graduate hours in communication could cause a problem as I was teaching in the field. I took a year off from my studies in CECS and began taking courses in the communication program at UNT. In the year and a half it took to complete the needed 18 hours, I also experienced a paradigm shift that would permanently change the way that I viewed communication theory. I took courses in Health Communication and Communication and Change under Dr. Prathiba Shukla. In the Communication and Change course I was exposed to the Diffusion of Innovations Theory, a meta-theory that has impacted many areas, including my studies in Learning Technologies. Dr. Shukla had studied under Dr. Everett Rogers, the author of *Diffusion of Innovations*. In a qualitative methods course, I was exposed to ethnographic studies and other qualitative methods. A communication theory course turned out to be a philosophy course; something that was out of my comfort zone but ended up stretching me in way that I did not expect. In my time in the communication program, I was re-introduced to the concept of immediacy. It was this topic that gave me my first co-authored paper and my first to be presented at a nationwide conference, the National Communications Conference in 2007. It was also a topic on which I would write in the future and one that would find a place in my doctoral dissertation.

In my studies at UNT, I was shown that my area of research interest was not necessarily just immediacy, computers, or learning technologies: it lay in a combination of these three topics. In March 2010 I did presentation at DBU over Abraham Lincoln
and his use of the telegraph during the Civil War. Although a historically based topic may be a little off the beaten path, my studies in communication as well as my studies in learning technologies provided me with a framework for applying a technology based topic in a historical context, mainly notating the fact that the struggles we often have with technology based communication are not new and that things such as miscommunication and e-courage have been around much longer than one might expect.

In spring 2011, I was asked to write and teach my first graduate course for a new masters program at DBU. This course is called Social Media in Communication and deals with issues relevant to this study such as community, computers, and learning. On August 1, 2011 I was able to leave my position as Coordinator of Media Services, a position that I had held for 22 years, and move into a new position as Assistant Professor of Communication.

To close, the last twenty-two years have been a source of both frustration and excitement and can best be summed via a quote from British author Douglas Adams: *I may not have gone where I intended to go, but I think I have ended up where I intended to be.*
APPENDIX B

STAGE 1 DATA
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Rank totals and scale scores for Stage 1 respondents (N=50)
The previously mentioned rank scores are displayed in Figure 1 on a 100 point uni-dimensional scale.

Uni-dimensional scale for Stage 1 respondents (N=50)
APPENDIX C

STAGE 3 DATA COLLECTION EMAIL
Greetings y’all,

First off, if you are getting this email, then you have completed Stage 2 of my data collection, and for that I am greatly appreciative. I am almost finished with the data collection stage of the dissertation.

For Stage 3 data collection, I'd like to get your response on the following question:

*In the course(s) you are taking this semester, was there a function/component (i.e. equity, organization, or pedagogy) or quality (i.e. collaboration, feedback, or rapport) that improved the course for you the most?*

If needed, I would like to contact some of you for a one on one followup interview. If you consent to this, then please include your preferred method(s) of me contacting you in your return email. I can do this portion via email, but would like to get as many of you as I can to do a one on one interview. I can do these in person, via telephone, or even Skype/Face Time.

As usual, if you have any questions, please let me know.

I am grateful
APPENDIX D

MBTI BREAKDOWN
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APPENDIX E

IRB CONSENT FORM
An Examination of Preferences for Social Presence Elements in Online Courses with Regard to Personality Types

I do hereby consent to participate in this research study being conducted at the University of North Texas. The purpose of this study is to identify what connections, if any, exist between personality types and the preference of social presence tools used in online learning environment. Greg Jones, Associate Professor and Danny Rose Doctoral Candidate in Educational Computing at the University of North Texas (UNT) in the Department of Learning Technologies are conducting this study.

I understand that participation in this study is completely voluntary. I acknowledge that there are no foreseeable risks involved in this study; however, if I decide to withdraw my participation, I may do so at any time by contacting the investigators. I understand that my participation or withdrawing from the study will have no effect on my standing in the course or my course grade.

I understand that I will be asked to

1. Complete an online assessment survey of my preferences for critical design elements used in an online learning environment (20 minute).
2. Complete an online assessment of my personality using the Myers-Briggs Type Indicator (MBTI) (15 mins).
3. Participate in a telephone/internet interview after the surveys are taken (30 minutes).

I understand that the Principal Investigators will keep all research records confidential. No individual responses will be disclosed to anyone because all data will be reported on a group basis. I am to contact the principal investigator Dr. Greg Jones in the Dept. of Learning Technologies at the University of North Texas at (940) 565-2571, if I have questions about this study. This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

I understand that any interviews conducted will be recorded and transcribed for analysis and that these recordings and transcripts will be archived as data files (MP3 files for audio recordings, Word documents for transcripts). These files will be stored on a password protected device and will be archived with the Principle Investigator on the UNT campus for up to three years after the end of the study.

I agree to participate, and may print this document for my records.
By completing the assessment survey of my preferences for critical design elements, I am confirming that I am at least 18 years old and giving informed consent to participate in this study.
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