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The Effectiveness of Creating a Sense of Community in Online Learning with Social Awareness Information

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THE EFFECTIVENESS OF CREATING A SENSE OF COMMUNITY IN ONLINE

LEARNING WITH SOCIAL AWARENESS INFORMATION

A Dissertation

Submitted to the School of Education

Duquesne University

In partial fulfillment of the requirements for

The degree of Doctor of Education

By

Darren G. Mariano

May 2012

DUQUESNE UNIVERSITY
SCHOOL OF EDUCATION
Department of Instruction and Leadership

Dissertation

Submitted in Partial Fulfillment of the Requirements

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Instructional Leadership Excellence at Duquesne

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TITLE: THE EFFECTIVENESS OF CREATING A SENSE OF COMMUNITY IN
ONLINE LEARNING WITH SOCIAL AWARENESS INFORMATION

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ABSTRACT

THE EFFECTIVENESS OF CREATING A SENSE OF COMMUNITY IN ONLINE

LEARNING WITH SOCIAL AWARENESS INFORMATION

By

Darren G. Mariano

May 2012

Dissertation supervised by Misook Heo, Ph.D.

Online social interactions differ from face to face interactions and lack the non-verbal cues leading a learner to procrastinate, decreased motivation, feelings of isolation and high drop out rates. Existing research illustrates a need for social awareness information in online education, and this research studied the impact of the visual presence of social information on a learner's sense of connectedness and learning using Rovai's (2002) classroom community scale (CCS). Specifically, the study examined if a learners' sense of connectedness is improved with the exposure to others' social awareness information; and if and to what degree learning advanced due to the improved sense of connectedness.

Two, 5 X 1 between-subjects one-way analyses of covariances compared connectedness and learning scores of five social awareness information disclosure groups (appearance, educational, contact and personal information disclosure groups and control

group). Although the study did not find evidence of exposure to social awareness information having an impact on learning, the findings confirm the claim that social awareness provides a sense of connectedness. The type of social information presented in the educational category (last degree earned, major and educational year) provided a strong relationship compared to other categories studied.

Educators, course designers and content management companies will benefit in recognizing that social awareness information positively impacts online educational participants by providing a sense of connectedness when presented with educational related materials. The development of social awareness support within a learning management system can improve an online learner's experience and enhance the quality of online education. This social awareness support in a learning management systems infrastructure is thus recommended.

DEDICATION

I dedicate this doctoral dissertation to the Mariano family. Beginning with my father, Daniel, who has led by example in his hard work and devotion to his children and my mother, Carol, whom supported me in any endeavor I chose to explore. But most importantly, to my wife, Alexandra Lee, who has endured the journey of me in school since 2000. I thank you from the bottom of my heart.

Seven years ago I began my degree and ironically I finish on my seventh year wedding anniversary. I can remember beginning the doctoral program and hoping to finish, knowing that someday, if I would have children, they too could see me graduate. That day has come! Since first meeting my wife and having two children, Christopher and Matthew Gene, the sacrifices made for me to reach my goal have been extraordinary. Having a husband and father always in school has not been easy but thank you 'buddies' for permitting me to pursue my dreams and accomplishing my goals. Without you three, I would not be the person I am. I love you!

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Throughout history, teaching and learning has taken place in traditional

classrooms. Recently, the boundaries of the lecture hall have moved beyond the four

walls known as the classroom, to an open communication gateway delivering access with

virtually no restrictions on time and space. The Internet has given a new meaning to the

word 'classroom' and is changing the teaching and learning process as well as the world

around us. New technologies have permitted classrooms to transform into online

educational programs that have ultimately altered the quality of online education to a

degree not previously possible (Hiltz & Turoff, 2005). It is with this new beginning that

we forge ahead through unknown territory and fully develop online education.

Online education expands the range of possibilities in education by supplementing

or replacing traditional face-to-face educational programs. Content Management

Software, such as Blackboard, Elluminate and Moodle have been developed in order to

support the teaching and learning process that is utilized in online education. Moreover a

learning environment located within a computer-mediated communication system,

developed to improve the educational experience by permitting students and instructors

to participate in remote learning communities, is established with online education.

Although the initial concept of online education was first accepted by and used

primarily in corporate America (Roberts, 1996), educational institutions found that

content management software is valuable in extending the classroom. The wealth of

information made available to students and teachers alike through online education is

astounding. The accessibility of information allows students to play a more active role in

learning, while teachers can shift from the role of information providers to one of knowledge facilitators (Ngu, 2004). The initial allure of online education may prove to be the most powerful benefit of such an endeavor, the absence of structured meeting times and physical space (Peters, 2001). This classroom without boundaries allows students to learn at their own pace, on their own time while managing their lives according to individual needs.

The absence of structured meeting times may be powerful in accommodating a learner schedule. A learners' self discipline and motivation, however, prove to play a great role in a learners success within online education (Rovai, 2003). Donlevy (2004) warns that maintaining course participation has proven to be a challenge with online students, and consistent involvement poses an even greater struggle with students who experience low reading and motivation levels. Self paced courses, although ideal in accommodating schedules, leave much room for procrastination. In traditional face-to-face classrooms, students may be prompted to complete work as they engage in conversation and receive reinforcement from the physical presence of the instructor. In online education, encounters are diminished to characters on a computer screen and may not provide the support that students need in order to advance during the learning process (Ko & Rossen, 2001). The social and emotional aspects are not yet fully accounted for in online education and are regarded by some as the most important factors in learning (Donlevy, 2004). This lack of social and emotional support may explain the number of students that express discontent with online education (Carr, 2000; Roblyer & Elbaum, 2000).

The challenge online education presents is reiterated by Watts (2003), and demonstrates that the topic of interpersonal involvement or social awareness has not been addressed as it pertains to evaluating the close relationship between students online. In a traditional face-to-face educational program, a student's relationship with their peers and instructors may lead to intimate associations. The lack of physical contacts in online education, however, restricts intimate associations. Students viewing the online coursework, comments made through asynchronous discussion forums and e-mail communications between students, glean limited social awareness. This lack of interpersonal enrichment, social awareness and personal knowledge between students leaves many to wonder if online education is comparable to the traditional face-to-face classroom. Vonderwell (2002) agrees that social interaction among learners plays an important role in the learning process and can have a significant impact on learning outcomes. It is sometimes assumed that social awareness among students is secondary to the learning in a course but with the emergence of online education, many are questioning the emphasis on this area of development and the impact on student achievement.

Problem Statement

With the evolutionary shift in education, areas of weakness have surfaced in the online arena. One particular concern is the finding that students of online education characteristically do not have face-to-face contact, rarely engage in informal discussions, and therefore lack the social information typically acquired in the traditional face-to-face classrooms (Karsten, 2003).

Online social interactions differ from face to face interactions. Online social interactions lack the non-verbal cues that are a component of face-to-face contact, and this may reduce the extent of communication that occurs (Curtis & Lawson, 2001). An online learner's social interaction is therefore limited and is most often acquired only through formal discussion forums, leading a learner to procrastination, decreased motivation, a feeling of isolation and subsequently, high drop out rates (Heo, 2005).

Research Goal

The primary goal of this study is to facilitate online learning by introducing social information support to learners. The research goal of this study is to examine the impact of social awareness information on an online learner's sense of community within an online learning environment. Specifically, the study will investigate to what extent learners' sense of connectedness is improved with the exposure to social awareness information; and if and to what degree learning advances due to the improved sense of connectedness. The ideal aim of this study is to discover the positive impact of social information on online learners' sense of connectedness and learning.

Significance of the Study

Existing research illustrates the need for social awareness information in online education and studies the impact of the visual presence of the information on student learning. It is hypothesized that the quality of student learning will be higher with the improved social awareness. Results from this study will benefit educators, course designers and content management companies in discovering to what degree the use of social awareness information may positively impact online education whereby this information should be included in online education experiences. Ultimately, this research

will provide support for the importance of social awareness in an online educational environment.

Research Questions

This study seeks the answers to the following research questions:

1. Does exposure to the experimental social awareness information system have an impact on the online learners' perceived connectedness?

2. Do different categories of social awareness information have a different effect on the online learners' perceived connectedness?

3. Does exposure to the experimental social awareness information system have an impact on learning?

4. Do different categories of social awareness information have a different effect on learning?

Definition of Terms

To improve the understanding and effectiveness of this inquiry, the following definitions are presented:

Connectedness – The feeling of students regarding their cohesion, community spirit, trust, cohesion and interdependence in online education.

Digital Immigrant – A student not raised or grown up in the digital world; students that must adapt to the digital language of computers, video games, mobile phones, mp3 players and/or the Internet.

Digital Native – A student raised or grown up in the digital age; fluent in the digital language of computers, video games, mobile phones, mp3 players, and/or the Internet.

Face-to-face – This is an umbrella term encompassing all learning that takes place within the physical defines of brick and mortar classrooms. Also used to reference the traditional classroom or the traditional setting.

Learning –Within this dissertation, this term is specific to a subscale measurement of Rovai's (2002) Classroom Community Scale (CCS). The term represents the feelings of participants regarding the degree to which they shared educational goals and experienced educational benefits by interacting with other members within the online lesson.

Online Education – An umbrella term used to describe any education or training that occurs online. Also referred to as distance education, distance learning, online programs, online platform or an online setting. The term encompasses an array of media and technologies including printed materials; telephone and audio recordings; television and video communication; computer assisted instruction; multimedia, simulations, and gaming; synchronous and asynchronous electronic communication; asynchronous learning networks (ALNs); collaborative knowledge systems; and wireless and handheld gadgets (Hiltz & Turoff, 2005).

Peripheral Awareness – Information presented to a participant that does not require their direct attention.

Social Awareness – A learner's sense of awareness of the social situation of the interacting classmates and the learner's ability to project herself or himself socially in the learning community.

Social Integration – The extent to which a participant feels a part of a class. Any inter-

 personal communication that relate to the cognitive or socio-emotional processes

 with peers.

Limitations and Delimitations of the Study

There are a few factors that might have affected the study but was not under the control of the researcher. First, the study will be conducted at a small private university from Western Pennsylvania, where its students are from predominantly middle to upper class Caucasian families. Caution should be used in relation to other groups.

Second, previous online experiences of the participants may have an impact on their participation behaviors and perceptions. The impact of a participant's prior knowledge, skills, and attitudes in their experience with online education will be quantified to understand this magnitude.

Third, although the survey questions are designed to obtain honest responses, it is impossible to guarantee that the responses will be true and accurate. Differing interpretation of questions may influence the response to some survey items.

Last, participants will self-select to participate in the study. In order to account for the lack of randomization, the study will employ a control group when participants are assigned into one of four system groups.

This study is delimited in order to ensure that it could be completed within the constraints of time, resources and finances. The experimental social awareness system is designed specifically to use with students in a college or university. The reader is cautioned regarding the generalizability of the results to populations that differ from this one.

CHAPTER II

LITERATURE REVIEW

Introduction and Background

From a historical standpoint, online education represents the latest evolution of learning, which began with correspondence courses offered by mail. The most dramatic developments in online education have occurred within the last decade. In January 1998, the California Virtual University (CVU) debuted as a "clearing house" for online educational programs offered by the state's public colleges and universities (McCallister & Matthews, 2001). Within a few months course offerings doubled, and by the year's end, the *Chronicle of Higher Education* announced that 25,000 students were enrolled in online courses in California, both within and outside of CVU (McCallister & Matthews, 2001).

The rapid growth of online education in California stands as a microcosm of an inexorable global phenomenon. Current literature is replete with accounts of Internet-based distance education programs in Australia, Canada, Germany, Hong Kong, Israel, Japan, the United Kingdom, and other countries, as testimony to the advanced technologies that make it possible for educators and students to transcend time and distance through asynchronous communication. While critics questioned the validity of online courses, increasing numbers of colleges and universities began to perceive their future in terms of providing quality online educational courses (Allen & Seaman, 2004). Underscoring the powerful trend are "high profile online universities" that "attract students by providing educational opportunities outside of the traditional institution of higher education" (Huett, Moller, & Young, 2004, p. 253). The expansion of student

enrollments in online universities, which can average 500 new students per month, can best be called exponential. The acceptance of online education within post-secondary institutions lured students to take advantage of this unique learning opportunity.

The majority of online education studies have occurred at the post-secondary level given they were early adopters of this technology (Rice, 2006). K-12 education lags behind post-secondary in using the Internet to teach (Cavanaugh et al., 2001; Cavanaugh, 2004; Rice, 2006; Watson, 2005, 2007). In fact, development at the K-12 level was slower and faces many challenges about whether online education is an appropriate way to teach, learn and use public education funds (Cavanaugh, 2001; Watson, 2005, 2007). Many k-12 institutions, however, have recently realized the potential of online education and have implemented online education to expand learning opportunities. (Cavanaugh et al., 2001; Cavanaugh, 2004; Rice, 2006; Watson, 2005, 2007).

In 2006/07, the National Center for Educational Statistics (NCES) reported that 66% of colleges and universities offer online courses, an increase of 10% from the 2000/01 data (NCES, 2008). Furthermore, the 2010 Sloan survey of online education illustrated that enrollment among 2,500 college and university students rose by almost one million students from the previous year (Allen & Seaman, 2010). Elaine Allen, the study co-author remarks, "This represents the largest ever year to year increase in the number of students studying online. Nearly thirty percent of all college and university students now take at least one course online" (Allen & Seaman, 2010, P. 2). Similarly, data from K-12 educational institutions supports this dramatic expansion of online education. In 2002/03, only 33% of K-12 public schools had students enrolled in online education courses versus 2005/06 data that reports 63% (NCES, 2008). This dramatic

growth will continue according to Christensen and Horn (2008) as they predict 'Sunny Skies Ahead' with current growth trends indicating that 50 percent of all courses in grades 9-12 will be taken online by 2019. Approximately 1 million children, nearly 2 percent of the K-12 population, are participating in some form of online education.

McCallister and Matthews (2001) attribute the entry of "prestigious schools such as Duke and MIT" into the realm of online education by "increasing the legitimacy of distance education by investing significant resources to provide courses to distant students in the U.S. and abroad" (p. 42). The acceptance of online education by officials of higher learning institutions is documented in two successive reports issued by the Sloan Consortium in an ambitious project entitled *Entering the Mainstream: The Quality and Extent of Online Education in the United States, 2003 and 2004* (Allen & Seaman, 2004). According to the first report, *Sizing the Opportunity*, in the fall of 2002, more than 1.6 million students were enrolled in online courses (Allen & Seaman, 2004). The second report, *Entering the Mainstream*, stated that by fall 2003, the number had soared to more than 1.9 million. The growth rate of nearly 20% included associate, baccalaureate, masters, and doctoral programs, and greatly exceeded the rise in enrollments in undergraduate and graduate education in general. The majority of institutions view the advancement of online coursework as an integral part of their long-range strategic plans.

The Sloan Consortium devised a set of standards for denoting the extent to which course material was delivered online. An online course was defined as a course where 80% or more of the course content is delivered over the Internet (Allen & Seaman, 2004). A blended or hybrid course synthesizes online and face-to-face delivery. Most hybrid courses offer a sizable chunk of course content online and supplement online discussions

with onsite meetings. Depending upon the format, 30% to 79% of the course content is presented online. A Web-facilitated course provides up to 29% of the course content online. Some courses make use of a course management system while others merely use web pages for posting the syllabus and assignments. Course design and delivery vary substantially within each category.

The most significant findings of the Sloan Consortium are the outstanding growth in Internet-based instruction and the high level of satisfaction associated with it (Allen & Seaman, 2004). A majority of academic officials rated the quality of online instruction as equal or superior to onsite instruction. Three-quarters of the officials predicted that online learning would equal if not surpass on campus instruction within three years. Their perspectives are already shared by professors who teach the same courses online and in-person and perceive their online sections to be at least as effective as those taught onsite (Hiltz & Turoff, 2005). Most studies comparing online and traditional classroom instruction conclude that the virtual classroom produces results that equal or exceed the conventional classroom (Zhao, Lei, Yan, & Tan, 2004).

A major distinction between the distance education programs of the past and those in the 21st century is that new technologies have the potential to transform the quality of education to a degree previously impossible (Hiltz & Turoff, 2005). McCallister and Matthews (2001) envision that, "Swift acquisition of knowledge, rich communication mediums, diversity, and lower costs will produce a power shift in our educational institutions" (p. 41). To Hiltz and Turoff (2005), the key to realizing that vision lies in maximizing the potential of technology to facilitate communication and collaboration among diverse learners. These authors and other advocates of online learning emphasize

the unique characteristics of advanced technologies to customize learning, promote learner autonomy, and facilitate teamwork and collaborative learning on a global scale.

Most college and university administrators view the development of quality online courses as an essential component of their strategies for long-range growth (Allen & Seaman, 2004). Hiltz and Turoff (2005) take the issue further, asserting that the incorporation of new technologies is not simply a matter of growth but of institutional survival. From the dual perspectives of technological advancement and consumer choice, Hiltz and Turoff (2005) predict that institutions that will survive and continue to thrive will be those that encourage faculty to play a role in the process of providing a high quality education using the latest technology available. Furthermore, in order to do so, educational administrators must be cognizant of the fact that technology changes rapidly and providing optimal quality distance programs is contingent on exploring and exploiting new technologies and vending sources (Hiltz & Turoff, 2005).

Johnston, Killion, and Oomen (2005) conducted a comprehensive research review for the purpose of identifying specific elements that are desirable in the design of an online course. Based on educational outcomes and student satisfaction with online courses, they demarcated several features of an effective online course. The most notable feature was that courses should be designed in the way that requires the students to take responsibility for their own learning experience. In order to achieve this aim, instructors need to create learning models to help students navigate the course material.

The course components outlined by Johnston et al. (2005) are congruent with the recommendations of Hiltz and Turoff (2002). For example, as were emphasized by numerous sources (Conaway et al., 2005; Hiltz & Turoff, 2002; Hutchins, 2003; Oren,

Mioduser, & Nachmias, 2002; Woods & Ebersole, 2003a), Johnston et al. (2005) stressed the importance of prompt, informative feedback; in addition, they advise against perfunctory feedback and recommend that instructors devote adequate time to provide students with meaningful, comprehensive feedback on assignments. They also propose that instructors personalize their email comments and feedback, a strategy recommended by other authors (Conaway et al., 2005; Woods & Ebersole, 2003a).

While acknowledging the advantages of Internet-based education, numerous sources agree that the integration of mechanisms for promoting student interaction online poses a challenge for educators accustomed to the face-to-face classroom (Bennett 2002; Boyer, 2003; Conaway, Easton, & Schmidt, 2005; Falvo & Solloway, 2004; Hentea, Shea, & Pennington, 2003; Hutchins, 2003; Huett et al., 2004; Woods & Ebersole, 2003a, 2003b). Moreover, a persistent problem in the development of an online course is the absence of a proven framework for facilitating online communication (Roblyer & Wiencke, 2003).

Recent literature reveals many channels for innovative online course design. While the selection of pedagogical approaches best suited for creating and maintaining a community of learners in online is critical to expanding quality online educational programs, the unifying objective among designs has been on the use of technology in order to diminish the barriers of time and space (Hentea et al., 2003). The current explosion in online education takes place in conjunction with a shift in interest within the educational world from objectivist to constructivist pedagogies.

Pedagogy, Interaction, and Design

Constructivist Theories

There are several theoretical and philosophical conceptions of constructivist learning. The two most notable paradigms are cognitive constructivism, often associated with Jean Piaget, and social constructivism, frequently associated with Lev Semionovich Vygotsky. One of the main distinctions between the two is that the focus of cognitive constructivism is the individual construction of knowledge whereas social constructivism, as the term implies, emphasizes the social context in which learning takes place (Felix, 2005; Moll, 2001).

Piaget is credited with articulating cognitive constructivist theory. The theory maintains that learners acquire new knowledge based on a preexisting framework (Discroll, 2000; Fosnot, 1996; Montangero & Maurice-Naville, 1997; Schunk, 2000). New knowledge is constructed through the process of assimilation and accommodation (Duncan, 1995; Montangero & Maurice-Naville, 1997; Wadsworth, 1984). Learners classify new information based on previous experiences. Previous knowledge is modified (accommodated) or broadened (assimilated) based on new knowledge (Montangero & Maurice-Naville, 1997). Constructivist theory states that learners construct knowledge out of their own experiences (Woolfork, 1987). It is not a teaching strategy but rather a process that learners work through as they acquire new knowledge (Woolfork, 1987).

Piaget's cognitive constructivist theory states that intelligence is born from action (Montangero & Maurice-Naville, 1997). It is within the learner that knowledge is constructed, and little emphasis is placed on the learner's surroundings. Similarly, social constructivist theory maintains that new knowledge is constructed by manipulating

previous experiences. The difference in the theories lies in the emphasis on the importance of the influence of others on individual learning.

Vygotsky believed that children learn from the input of others as well as their surroundings (Daniels, 2005; Kozulin et al., 2003). Vygotsky noted that students' achievement varied based on the social influences in their lives including parents, teachers and other more skilled persons (Daniels, 2005; Kozulin et al., 2003). Cognitive development, according to Vygotsky, required social interaction. Interpersonal communications within specific cultures greatly impact the development of higher mental functions (Daniels, 2005; Kozulin et al., 2003). Skilled students and adults guide the advancement of the learner with questions and explanations that aid the learner in completing tasks that they would not be able to complete alone. The zone of proximal development is the difference between current knowledge the learner holds and is able to manipulate compared to their potential with the influences of and interactions with a more knowledgeable person (Daniels, 2005; Kozulin et al., 2003). It is noted that the skilled person offering guidance to the learner should assist in a progression that permits the learner to slowly advance. This tiered guidance is known as scaffolding (Daniels, 2005; Kozulin et al., 2003). It is with this guidance that the learner can develop to a level that they would not attain alone. Social interaction is imperative as the learner constructs knowledge.

Social and Cognitive Constructivism in Online Education

Constructivism is frequently mentioned in the context of online education (Felix, 2005). The idea of fostering community among learners is especially relevant to the tenets of Vygotsky's social constructivism. According to Vygotsky (1978), knowledge is

not objective but is constructed in the context of social interaction. A learning

environment that fosters student autonomy and self-motivation, with mechanisms for

synchronous and asynchronous communication, is the ideal venue for the adoption of a

constructivist, collaborative, student-centered pedagogy (Hiltz & Turoff, 2005).

Felix (2005) notes that current trends favor a synthesis of the two perspectives, an

assumption supported ironically by some of the ambiguity that surrounds the term

"constructivism" in educational literature. Proponents of combining the two schools of

constructivism believe that "knowledge is constructed individually but mediated socially"

(Felix, 2005, p. 86). According to Moll (2001), "the concept of the mediation of human

actions" is the "defining characteristic" of Vygotsky's thinking (p. 113). Felix (2005)

argues that social and cognitive constructivist paradigms play complementary roles in

creating a favorable online educational experience.

In social constructivist theory, the scaffolding process enables the learner to

navigate the *zone of proximal development,* the space between the learner's current state

of knowledge and his or her potential for cognitive growth (Vygotsky, 1978). The

instructor creates scaffolds to advance learning, gradually withdrawing support as

students gain knowledge, confidence, and proficiency. The learning process involves

activity on three levels: the learner, the teacher, and their mutual environment (Moll,

2001). The dynamic interaction in learning of these three elements is a common theme in

the literature of online education (Arbaugh, 2000; Arbaugh & Benbunan-Fich, 2003;

Conaway et al., 2005; Hutchins, 2003; Russo & Campbell, 2004; Schrum & Hong, 2002;

Thomas, Jones, Peckham, & Miller, 2004).

Boyer (2003) specifically identifies the use of scaffolds for promoting the learning, social, and motivational processes of an online masters course in Educational Leadership. Boyer (2003) describes the purposeful infusion of this supported pedagogy as providing a "collective focus into the instructional design and learning experience that can reinforce the walls of the virtual classroom" (p. 370). The positive implications of the adoption of a social constructivist framework for an online education course are two-fold. First, it takes advantage of the ideal fit between social constructivism and the online learning environment. Second, the theoretical assumption is that educators taught by constructivist methods will transport their pedagogical knowledge to their own learning contexts. Felix (2005) finds it unsurprising "that social constructivism has gained momentum as the obvious pedagogical paradigm" (p. 87) noting that "third millennium thinking" is dominated by concepts such as "acquisition of meta-skills and knowledge; relevant/negotiated curricula; lifelong learning; global learning and access to real-life tutors and informants [original emphasis]."

Reflecting Felix (2005), Garrison's (1997) concept of self-direction combines social and cognitive elements. Garrison favors a collaborative constructivist paradigm that "has the individual taking responsibility for constructing meaning while including the participation of others in confirming worthwhile knowledge" (p. 19). The collaborative constructivist model of self-directed learning has three overlapping dimensions: self-management (task control), self-monitoring (cognitive responsibility), and motivation. Gaining competence in self-management leads to the assumption of more responsibility for learning, which in turn, stimulates motivation to actively construct meaning.

Informational Technology and Constructivism

Research supports the notion that effective online course design entails a blend of objectivist and constructivist pedagogies (Arbaugh & Benbunan-Fich, 2003). Benbunan-Fich (2002) details how technology can be deployed to support both pedagogical paradigms. From an objectivist perspective, Information Technology (IT) applications can be used to complement or substitute for the traditional didactic role of professors or print materials. Also consistent with the objectivist mode, IT can be used for presentation purposes or as an archive of course materials on the Internet (Benbunan-Fich, 2002). From a constructivist perspective, technology enables the creation of collaborative learning environments that provide participants with ongoing access to peers, experts, and a vast wealth of information irrespective of time or geography. Creating a collaborative online educational environment entails surmounting barriers ranging from redefining classroom dynamics and culture to dealing with practical issues of time and technology. Technologies that merge constructivist pedagogy and online education do currently exist.

Redfern and Naughton (2002) view Collaborative Virtual Environments (CVE) as venues for advancing constructivist pedagogy. CVEs refer to "computer-enabled, distributed virtual spaces or places in which people can meet and interact with others, with agents and with virtual objects" (p. 204). CVEs range in representational quality from elaborate virtual reality to simple text-based environments. CVEs have the advantage of offering "a space that contains or encompasses data representations and users" (p. 205). Used primarily for military and industrial team training, design and engineering teamwork, and gaming, Redfern and Naughton argue that CVEs have great

18

potential to enrich the quality of distance education by fostering online educational communities. Of particular relevance, they maintain that CVEs should include mechanisms for promoting social activity, an issue that is rarely explored in CVE research. Hiltz and Turoff (2002) argue that the development of a collaborative learning community hinges on three key aspects of interactivity: between student and instructor, among class members as they engage in discussion and collaborative work, and between the learners and the software. Essentially, these conditions reflect the adaptation of the principles of good teaching to the online educational environment (Hutchins, 2003).

To achieve a state of sustained motivation, the learner needs support, effort, and feedback from the instructor and appropriate learning materials, which as Felix (2005) contends, may include a blend of static and dynamic technologies. Felix advocates the use of a system such as Intelligent Call (ICALL) that individualizes learning, providing users with prompt feedback and ample opportunities to practice skills and apply acquired knowledge to similar situations. Interestingly, this type of system has been the core of computer-assisted learning since its inception in the 1970s. Effective online courses have feedback built into the course design (Hutchins, 2003; Woods & Ebersole, 2003a, 2003b).

Felix's (2005) overall perspective is that a system like ICALL has the potential to integrate the technologies of past generations of computer facilitated learning with the network technologies of the 21st century. Following this approach, both static and dynamic technologies would be utilized in order to fully integrate autonomous and collaborative learning.

Methodology Supporting Social Constructivism in the Online Environment

Hiltz and Turoff (2002) present three key recommendations for the purpose of maximizing collaboration in the online classroom. First, they call on instructors to establish swift trust. Accomplishing this entails attending to changes in cognitive, affective, and managerial activities necessitated by the medium of instruction. The cognitive role "shifts to one of deeper cognitive complexity for the virtual professor" (p. 57). The affective role, which encompasses the relationship between students and the instructor and the classroom atmosphere, demands that instructors explore new systems for expression in the absence of nonverbal cues such as facial expression and gestures. In terms of managerial activities, instructors must pay more attention to detail, course and activity structure, and monitoring student activities. The second recommendation is to develop collaborative learning activities (Hiltz & Turoff, 2002). The third recommendation is to generate active participation with appropriate software. Software systems for multimedia simulations and diagnostic feedback fall into this category. In addition, the creation of a learning community requires software that supports large-scale collaborative communication with mechanisms for soliciting input and feedback as well as qualitative (text) narratives from participants.

In a similar albeit less technical vein, Hutchins (2003) proposes several techniques instructors can use to foster a sense of community in the virtual classroom: 1) encourage students to use communication technologies to share ideas and insights, review assignments, and work collaboratively with the instructor and other learners; 2) provide prompt feedback and use online quizzes as a system for performance feedback; and 3) use a repertoire of instructional techniques. Hutchins (2003) believes that good teaching

has the same characteristics regardless of the educational setting. Nonetheless, in online education, instructors must recognize that the critical role of students' interactions with software in producing learning outcomes.

There are few references in the literature to the integration of static and dynamic technologies. Danis, Lee, & Karadkar (2003) discuss how simple websites that provide static social information promote integration in the workplace compared to Liechti's (2000) dynamic research on the benefits of collaborative web browsing and sharing the workplace Activities provided in a combined model would uniquely foster individual cognitive experiences nestled in a networked system encouraging psychosocial processes (Felix, 2005). Developing materials that support this shared methodology has proven to be a challenging endeavor.

Cognitive Load Theory

Reference to suitable learning materials that aid the student in fostering both individual and networked learning invokes the concept of cognitive load. Grappling with technology (particularly for novices) and negotiating the intricacies of online communication heighten cognitive demands on students engaged in the process of mastering complex concepts and subject content (Hron & Friedrich, 2003).

Cognitive load refers to "the total amount of mental activity imposed on working memory at an instance in time" (Cooper, 1998, p. 11). The key contributor to cognitive load is "the number of elements that need to be attended to" (p. 11). The principles underlying cognitive load theory are grounded in four basic assumptions: 1) Working memory is very limited; 2) Long-term memory is basically unlimited; 3) The learning process demands the active engagement of working memory in the comprehension and

processing of instructional material for the purpose of encoding information to be learned into long-term memory; and 4) Learning will be ineffective if the resources of working memory are over taxed.

The application of cognitive load theory to instructional design involves the following three premises: 1) The instrument materials given to students may generate excessively high levels of cognitive load; 2) Redesigning instructional materials to diminish levels of extraneous cognitive load may enhance learning; and 3) Content areas that will most probably benefit from improved instructional design are those dealing with "complex" information in which interacting elements of prospective knowledge impose a high level of intrinsic cognitive load.

According to Cooper (1998), research has determined that students taught through techniques devised in accordance with cognitive load theory have superior capability to deal with unusual or unprecedented situations. This capacity was displayed on tests of knowledge transfer that required the application of principles from familiar problems to unfamiliar problems involving the same rules.

Online education poses unique challenges for instruction based on cognitive load principles. Without regard to cognitive load theory, numerous authors recommend incorporating technical and advisory supports into online course design (Bocchi, Eastman, & Swift, 2004; Boyer, 2003; Clear, Haataja, Meyer, Suhonen, & Varden, 2000; Huett et al., 2004; Hutchins, 2003; Johnston, Killion, & Oomen, 2005; Roblyer & Wiencke, 2003). Therefore, with respect to the findings of cognitive load theory and the number of elements involved in an online course versus the interactive demands in a traditional face-to-face learning environment, it is important to choose technologies and

design courses in a way that students are offered varying degrees of assistance. Hron and Friedrich (2003) emphasize the importance of providing learners with adequate supports to defuse the possibility for negative results as students are inundated with new material and technology. Furthermore, it is critical to assess the demands on the learner while using the technology systems and materials being implemented into online educational courses.

Technology Systems and Materials

Environment

Virtually all sources agree with the statement of Clear et al. (2000) that in the context of online education, "Developing materials is a tremendous job" (p. 106). The most effective online educational programs are noted as employing instructors who were involved in all phases of course development (Frederickson, Pickett, Shea, Pelz, & Swan, 2000; Huett et al., 2004). Participation in course development allows instructors to be knowledgeable of the capabilities and intricacies of the technologies being implemented. If the instructor is not a part of the initial planning and construction, systematic support becomes especially vital to successful execution of the curriculum through the specified media. This support is even more critical to faculty members who lack prior experience teaching with technology. Regardless of experience, choosing a course management system that has the features required to effectively facilitate learning in an online course is a challenge.

Hiltz and Turoff (2005) note that the focus of products supporting online course management systems tend to center around tasks required for administrative duties rather than providing innovative systems that guide online learning activities. Advancements in

technology for the purpose of improving learning systems have primarily been developed in venues outside of course management systems. Unique teaching and learning technologies have been created and many are designed to foster learning and inherently offer digital support. The available technologies range from relatively simple systemss such as Web Annotator, which allows learners to annotate browser-based course materials (Reed & John, 2003), and Java-enabled Lecturelets that substitute for live lectures (Culwin, 2000) to sophisticated systems, which strive to maximize sensory input while remaining within the bounds of cognitive load (Bartram, 1997; Heo, 2005).

Technologies specifically tailored with the purpose of cultivating learning experiences include voting, scaling, hypertext, visualization, communication protocol structuring, and content structuring (Hiltz and Turoff, 2005). Group discussions are directed with the use of voting as this feature illustrates differences identified through data collection and therefore encourages reflection on contributed material. Scaling promotes collective understanding of group views, as it graphically depicts the extent of agreement, and shared meanings among course participants on any given topic. Bi-directional linking and typing of links and nodes, labeled hypertext, allows for the construction and expressions of complex relationship structures and collective cognitive maps (Hiltz and Turoff, 2005, p.61). Similarly, visualization develops a mapping structure connecting expressed user ideas. Communication protocol structuring further contributes to learning enabling equal participation by all users by offering a specific format that formally guides learner engagement. Content structuring classifies and seriates asynchronous contributions which aides in facilitating individual problem solving within the group (Hiltz & Turoff, 2005). In addition, programs defined as "groupware"

24

such as WebDAV have also been developed specifically for the purpose of building a online educational environment (Qu, Engel, & Meinel, 2000; Qu & Nejdl, 2001).

Hiltz and Turoff (2005) emphasize the importance of educational administrators staying abreast of the best technologies on the market. The latest advances must be studied while contentment and complacency with current technologies or vendors must be avoided. Hiltz and Turoff view this proactive approach as both an ethical and practical imperative that administrators must follow in order to remain viable in the online educational market. Subsistence in the ever-changing environment of online learning hinges on the flexibility of an administrator's choice of available technology.

There is a continual proliferation of technologies that support online education. In the midst of this rapid growth, it is essential to recognize that technology itself is not the critical factor in online learning and collaboration. Benbunan-Fich (2002) emphasizes that instructional technologies have the power to do more than provide an alternative mode for transmitting educational information. With the ability to support both objectivist and constructivist modes of instruction and transcend temporal and spatial boundaries, it offers unique and seemingly limitless possibilities in the online classroom. It should be noted, however, that the key to taking advantage of the powerful technology lies in the effective integration of the information and systems. Therefore, in order to successfully design, develop and deploy technologies in the learning environment it is critical to understand and acknowledge the preferences of the learner.

Students/Learners Behavior

Along the same lines of understanding the learner, marketers recognize the vital importance of understanding the behavior of technology users (Heer & Chi, 2002). Chi,

Pirolli, and Pithow (2000), for example, developed a Scent Flow model for predicting and analyzing the usability of Internet sites. Identifying the interests and behaviors of site visitors provided marketers, administrators, sponsors, vendors, and others with information that would allow those vested in the system to tailor the information presented according to user preferences (Heer & Chi, 2002). Likewise, the similar data should be collected as learners engage in online courses because maximum exploitation of instructional technology involves applying software engineering approaches and systems to the full spectrum of issues that underlie user experience. This assessment of users should be comprehensive beginning with the identification of user needs and continuing through all phases of design, development, and delivery (Bardon, Berry, Bjerke, & Roberts, 2002). It is with this thorough research and application of the uncovered data that the full benefits of the integrated technology will be realized.

Sheard, Ceddia, Hurst, and Tuovinen (2003) advocate the use of monitoring strategies in order to examine the behavior of online learners. The authors note that without such data collection and analysis, instructors' expectations often fail to match students' actual behavior. In order to explore the issue of matching student behavior and instructor expectations, Sheard et al. monitored the behavior of 172 computer science undergraduates engaged in an industrial experience (IE) project where they designed, developed, and delivered a small computer system for a client. IT faculty created the WEIR (website interaction) website as an integrated learning environment for students involved with the IE project. Students were required to use the site, which provided them with an array of resources such as general project information, an event scheduling mechanism, project management facilities, and various communication channels

including news groups and discussion forums. During site visits, details of the students'

log-ins were stored in a database, and an internal mechanism was set up for online

surveys about the website (Sheard et al., 2003). Furthermore, the online data was

augmented with a paper survey to capture students' opinions of the utility of the WEIR

site at the end of the course.

The data collected revealed the specifics of user engagement with the site. Not

unexpectedly, there were tremendous differences in the number of visits to the website by

individual students. Although Sheard et al. (2003) noted that the highest performing

students accessed the site more often than low performers, the difference was not

significant. The data also uncovered the highest frequency of hits to the site as occurring

just before midnight, a testimony to the flexibility offered by asynchronous technology.

Furthermore, the students' utilization of different resources seemed to reflect the

demands of project events, although some resources were popular throughout the course.

For example, the Time Tracker and File Manager (respectively, the most heavily

trafficked resources) were accessed consistently, whereas students had limited need and

therefore limited engagement with Document Templates and Past Resources.

After analyzing the collected course data it was noted that the students made

minimal use of the Discussion Groups and Group Forum. Mock (2001) reported low

usage of bulletin boards and chat rooms by students who were not provided with

incentives to use them. Based on the IT students' behavior, Sheard et al. (2003)

concluded that they had negligible interest in interacting with the site beyond what was

needed for course performance. In particular, they were not concerned with collaborating

with instructors or peers or making contributions to the group. One inference that may be

gleaned from this documented behavior is that the course did not include strategies for promoting a collaborative learning environment. Therefore, students with time constraints may have viewed online discussions as extraneous to their personal goals.

With regard to either reason for low use of bulletin boards, Mock (2001) attempted to counter the limited use of bulletin boards by making it mandatory for students to introduce themselves via bulletin board postings. Most students complied with the assignment but stopped posting after one message. In a second attempt, Mock deliberately made the assignment relevant to the course. Students in an introductory programming course were required to post their source code for a specific problem online. And although they had the option to post anonymously, only 15% of the students opted to do so. The purpose of the assignment was to expose students to a variety of source code samples and generate bulletin board discussions on the strategies the students used to solve various elements of the problems. With a clear focus, the second assignment was successful in heightening the use of the discussion board feature. Of the 20 students enrolled in the course, half described the code posting assignment as "very useful" and 40% labeled it "somewhat useful." Even students who initially balked at the idea of mandatory posting responded favorably when they could see the utility of the assignment.

In the spirit of learning about the user, Bolloju and Davison (2003) collected data on the use of a "WebBoard" by students enrolled in a large class (161 students) on "Enterprise-wide Networking." The hybrid class includes lectures and laboratory work and provides incentives for students to access the WebBoard for conferencing and discussions and make use of accompanying electronic systems. The researchers contend

that the asynchronous discussions, which can last several weeks, have a major advantage over temporally limited face-to-face interactions. Students' comments made it clear that they required ongoing support, encouragement, and direction to fully exploit opportunities for online education. The need for the careful selection of appropriate communication systems and meticulous planning and organization became evident as the data was analyzed. Similar to Mock (2001), Bolloju and Davison (2003) found most students to be fairly passive in their interaction with online discussion boards. They note that while a minority of self-motivated learners enthusiastically takes advantage of online communication channels, most students require a structured, cohesive framework with systematic support.

Mock's (2001) lack of success in engaging students in non-course-specific online discussions may have been due to the laissez-faire structure and lack of follow-up. Woods and Ebersole (2003b) developed a number of non-subject matter-specific bulletin boards for the purpose of creating a sense of community among learners. Four, themed discussion folders or forums were constructed to provide students with opportunities to interact with one another. The forums were titled as autobiographies, cybercafe, prayer requests and devotionals. Autobiographies provided a space where students may post personal profiles or identities and introduce themselves to each other by sharing background and personal information, interests, and a few facts they chose to present. Cybercafé was a virtual café where students may discuss anything of personal interest that did not fit into the other folders. Prayer requests offered a ritual gathering place where students shared personal challenges, concerns, or problems, or conversely, could convey good news to others. Devotionals also provided a ritual gathering place for

students to post "thoughts of the day" for the purpose of reflection, meditation, and inspiration. Each folder contained a brief description of the purpose and students were able to post as frequently as they wished. Furthermore, the instructor's responses were to account for roughly 10% of the postings in each folder (Woods & Ebersole, 2003b).

It appears as though having an online channel for presenting personal information and learning about each other had a powerful impact on the students' sense of community and satisfaction with the course as autobiographies emerged as the most heavily trafficked discussion folder and elicited the most positive comments from students (Woods & Ebersole, 2003b). Cybercafe was the least popular folder, possibly because most of the issues that would be discussed in Cybercafe appeared in the other discussion folders. Another explanation of the limited use of the forum is that the working adults, who comprised the majority of learners, did not have the time or inclination to discuss issues that were unrelated to the course. Woods and Ebersole also suggest that they may have felt participating in Cybercafe would convey the impression "we have too much time on our hands" (p. 110). Some students suggested that Cybercafe would be more appropriate for undergraduate students as a vehicle for the type of socializing that typically takes place on campus. It was observed that the two ritual folders were trafficked regularly, although Woods and Ebersole (2003b) noted that the students gave them "mixed reviews." Some students felt intimidated by the subject matter and other suggested the folders might be more appropriately named so they did not have a religious or spiritual connotation. Students who posted regularly reported that he/she perceived the forums very positively and felt they contributed to a sense of community.

Woods and Ebersole (2003b) further documented that planned and organized discussion forums can positively enhance students' sense of belonging and satisfaction with online education. The survey results suggest that in order to maximize online communication, the discussion forums should be matched to the students' interests, maturity, and lifestyle. For example, one student suggested that two folders would probably be sufficient for adult graduate students whereas undergraduate students could benefit from a series of folders that would afford them ample opportunities to socialize with peers online and discuss personally relevant issues. This collection and analysis of data related to user preferences will aid in the development of future courses.

Jones and Rice (2000) similarly investigated the impact of Docushare, which was adopted by an MBA (Master of Business Administration) course for sharing ideas and information at various stages of project design. The knowledge sharing software was intended to make students' work available to team members, clients, and faculty independent of time and distance constraints. More than half the students reported they enjoyed having a central online location for their works-in-progress. The majority of the students also noted that sharing documents increased opportunities for communication, especially for students working on global teams, however similar proportions of students preferred e-mail and face-to-face interactions for exchanging ideas. With additional data analysis, Jones and Rice (2000) highlighted distinctions between synchronous and asynchronous communication preferences among the students. While the students seemed to prefer real-time communication for brainstorming ideas, they appreciated Docushare as a valuable repository for accumulated information. The preference for e-mail was uncovered by the comments of several students suggesting they simply felt more at ease

with the familiar technology. Among the findings, Jones and Rice argue that knowledge sharing systems should serve the dual purpose of fostering collaboration and acting as a knowledge archive. Drawing on previous research, they outlined a framework that is applicable to the successful introduction and implementation of new technologies across settings. The framework is guided by a culture and leadership that actively support and encourage the use of new technology with thorough training, incentives and active involvement by the users of the system.

From a broad perspective, Jones and Rice's (2000) conception of how a knowledge system like Docushare can be used for maximum efficiency is consistent with Benbunan-Fich's (2002) conceptual model for the application of technology to education. Arbaugh (2002) used a different method of collecting data on user preferences as courses progressed. The Technology Acceptance Model (TAM) was implemented as a basis for examining the attitudes of online MBA students over two stages of the adoption of the Blackboard software platform. In Phase 1 (Early Adoption), the participants represented 18 courses taught by 11 different instructors, and Phase 2 (Moving Toward Mainstream) involved 26 courses taught by 12 different instructors.

There were notable changes in the interplay of factors influencing student satisfaction in Phase 1 and Phase 2. Although perceived flexibility was an important predictor of satisfaction with course delivery and perceptions of usefulness of the software during Phase 1, it became less important during Phase 2 (Arbaugh, 2002). The interaction of variables in Phase 2 was much more complex. Perceived flexibility, perceived utility of the software, instructor experience, and the duration of time students'

spent using the software all combined to predict satisfaction with course delivery. Satisfaction was also significantly higher in Phase 2 than during early adoption.

In explaining the evolution of students' attitudes over time, Arbaugh (2002) proposed that while flexibility initially attracts students to online courses, the impact of such a feature declines as users begin to expect it. In the context of software acceptance, by the second stage, the courseware had been integrated into the program and both students and teachers were more comfortable with the platform and more proficient in using it. Higher satisfaction rates were reflected in the categories of ease of use of the software and the greater attention to course content and delivery. From the standpoint of cognitive load, the students were no longer preoccupied with the practical details of learning the software thus enabling them to focus attention more fully on the elements of learning (Hron & Friedrich, 2003).

Martinez (2001) investigated the use of Learning Orientations, a "whole-person learning model" to student learning on the Web. The model has four learning orientations: Transforming, Performing, Conforming, and Resistant. The profiles derived from the model reflect the ways that emotions and intentions guide, manage, or assist the development of cognitive ability. The results can be applied to individualizing the learning experience so that students can learn more successfully.

The results of the study provided a theoretical framework for customizing online education to individual needs. Martinez (2001) highlights the value of using a whole-person model for individualizing learning, particularly with reference to online learners who need to become more self-directed, self-motivated, and self-appraising. She also proposes that new instructional design and learning models should operate on four levels:

1) show the specific primary and secondary relationships between cognitive, affective, and social factors; 2) explain influences on vital performance and achievement indicators that lead to more or less successful learning; 3) support distinctions in how people prefer and intend to learn; and 4) introduce innovative strategies that can enhance online learning ability.

Regardless of which tracking system is implemented, user preference analysis is vital as courses are developed and revised. Optimal online education is contingent on the precise connection between technology, course material and activities. Understanding learner abilities and preferences for technology is critical to the continued success of online education. It is only with a unique blend of technology and information that students will successfully progress through course content. More importantly, technology must be infused in a manner that promotes collaborative learning while maintaining the value of the individual learner. Acknowledging the learner in the online context is a challenge as course demands are often flexible resulting in differences in student progress. Interaction among course participants and between the course instructor and learner is often severely limited due to the inherent design of online courses. This isolated learning structure often leads students to report dissatisfaction with the course. Acknowledging and maintaining user awareness is a component of course development that must be considered.

Social Awareness

The development of platforms and systems in order to facilitate awareness occupies a prominent place in the technical literature (Cadiz et al., 1998; Forland & Divitni, 2003; Heath, Svensson, Hindmarsh, Luff, & Lehn, 2002; Heo, 2005; Liechti,

2000; Redfern & Naughton, 2002). The phenomenon is not surprising in view of the emergence of collaborative work teams as mainstays of organizational culture. The successful achievement of team objectives demands that team members remain cognizant of each other's activities while engaged in their own.

In the educational setting, social awareness refers to "a learner's sense of awareness of the social situation of the interacting classmates and the learner's ability to project herself/himself socially in the learning community" (Heo, 2005). Social awareness is built through the input of social information, presented in the traditional classroom through formal and informal face-to-face interaction. The online educational environment requires that students gain access to social information through electronic channels such as e-mail, bulletin boards, chats, discussion forums and the like. Heo emphasizes that most research on social awareness is focused on corporate workgroups rather than online learners. These two groups of Internet users are distinguished by a number of factors. In general, online learners come from more diverse backgrounds, have more individualized achievement goals, are less obligated to engage in collaborative work, and are vulnerable to ending their education. In view of these key distinctions, it is probable that they have unique needs for social information.

One aspect of awareness is the provision of visual information. Kraut, Gergle, and Fussell (2002) noted that while recent research suggests that a shared visual environment enhances communication, the viewpoint seems to be that "the benefit of visual information comes from allowing collaborators to share the work area rather than from seeing one another" (p. 31).

35

Kraut et al. (2002) found that collaborative partners work more accurately and efficiently when they have a shared image of a common work area. To an extent, the advantage of the shared visual space was contingent on the task being performed. The shared visual space was particularly conducive to the performance of tasks that demanded temporal accuracy or were more visually complex. It was observed that overall a shared visual space enhanced task performance and conversation. It seems logical that access to a shared visual space would translate into superior task performance. Although, the accurate and efficient performance of tasks can easily take place without a sense of community among partners or work group members, the value of being able to envision a team or group member should not be downplayed.

Social information takes two forms: static and dynamic (Heo, 2005). Static information allows learners to assess whether they share common backgrounds for interaction; dynamic information accrues from observing a classmate's activities. In the learning environment, static information endows each person with an individual identity. Knowledge of classmates' identities forms a foundation for becoming acquainted, building trust, engaging in informal conversations, and developing a sense of social accountability. While static information may be irrelevant to task performance, it facilitates non-task-oriented engagement that may ultimately lead to the development of a successful online community.

Dynamic social information is a "real time" documentation of an individual's behavior that gives learners the impression of "real world" interactions in virtual learning environments (Heo, 2005). With access to dynamic social information, learners gain knowledge of each other's online presence, experience, and availability. In addition to

promoting support for one another, knowledge of other's activity may stimulate competition and drive motivation for more active engagement with the learning environment.

According to Liechti (2000), there are two ways the concept of awareness can be applied to the Internet (specifically, the World Wide Web). First, the Web can be conceptualized as a "platform for building awareness systems" (p. 3). Second, the Web can be regarded as an "activity space" that elicits users' awareness. Liechti explores these ideas through four categories of awareness: group, workspace, contextual, and peripheral, which may be combined in the design of awareness systems.

In the context of the Internet, group, workspace, and contextual awareness all relate to the interaction among users. Peripheral awareness "relates to human-computer interaction design" (Liechti, 2000, p. 6). Systems that address peripheral awareness present information to users that do not require their direct attention. As Liechti explains, "Ideally, the user interface should allow a constant and effortless monitoring of activity. But it should also allow the users, when necessary, to shift their attention and then to get more explicit information from the system" (p. 6). The author's framework for designing awareness systems integrates all four categories of awareness.

According to Heath et al. (2002), one element of awareness that has recently gained attention involves the ways individuals remain alert to changes in the immediate environment, particularly in the midst of "a diverse and shifting display of different forms of information which are more or less relevant to the activities in which participants engage" (p. 326). There is a theory that when bombarded with a high degree of environmental stimuli, people reach a point of "cognitive overload." Heath et al. observe

that this rarely occurs. Rather, individuals tend to be very selective in how they direct

their attention and their awareness of the changing scenario is grounded in within the

domain of their tasks and responsibilities. In essence, they are able to select the features

of the environment that are relevant to their activities and interactions with others.

Issues of awareness and attention drive the development of innovative

technologies. Ironically, Heath et al. (2002) observe one persistent flaw in research in the

social and cognitive sciences. Specifically, "Studies of social interaction, system use,

discourse and like provide strangely disembodied characterizations of human conduct"

(p. 345). They theorize that the development of software systems that effectively

maximize awareness may paradoxically require a reformulation of current conceptions of

awareness.

One development in the area of awareness in the online setting, the Awareness

Monitor, is a system for coordinating the activities of asynchronous, distributed work

teams (Cadiz, Fussell, Kraut, Lerch, & Scherlis, 1998). The developers of the systems

considered attention to peripheral awareness as an important consideration for presenting

users with information from multiple sources and remaining within the bounds of

cognitive load.

System development and detailed research is almost negligible on visualization

systems for supporting online learning communities. In one of the few studies, Prasolova-

Forland and Divitini (2003) described the application of Viras, which was designed to

build social awareness in educational environments. Viras is essentially a virtual world

that offers an informal atmosphere for socializing. Users navigate the virtual landscape as

they choose and are free to customize or change the structures that exist online or add

their own artifacts. They are represented by avatars and the objects they create and by their history of communication via chats, messages, discussions, etc.

Fourth year computer science students engaged in an experimental evaluation of Viras. Prasolova-Forland and Divitini (2003) described the increase in awareness as "moderate." The lack of robust results may have been due to the short period of time the students interacted with the "world" and to a possible ceiling effect from the fact that many students already knew each other. The authors also admitted that there were problems with usability. The statement by Clear et al. (2000) "Developing materials is a tremendous job" (p. 106) may be even more applicable to the development of social awareness systems.

Costigan, Johnson, and Jones (2000) conducted a study of three different types of representations for users in a online educational environment. A video representation of an instructor and a computer-generated avatar were compared with a real instructor sharing virtual space with a student. The students perceived similarities between the avatar and the instructor that were absent from their perceptions of the video image. Although the authors do not dismiss the advantages of video (which has the power to capture large areas and accurately represent physical motion), they raised the issue of whether video images of an instructor actually add to a sense of awareness in online educational environments. Video has a distinct advantage for transmitting images of a class. The avatar more effectively gained and sustained the students' attention.

According to Komis, Avouris, and Fidas (2002), "the creation of abstract representations like visualizations is a key to collective problem-solving" (p. 179). Given this premise, concept mapping systems should assist teams in problem-solving

39

capabilities. Representation-version 2.0 (R2), and educational software that supports concept mapping, provided the environment for the synchronous communication of undergraduate student teams. R2 has three basic systems: a shared activity space, a text communication system, and a key control mechanism. All three features proved to be useful for the participants who performed well in solving complex problems.

Karsten (2003) views social awareness from the perspective of interdependencies, which "are constructed when people build mutual relationships between themselves" (p. 437). Interdependencies are constructed as part of a dynamic process that entails consistent communication and feedback. In the absence of physical presence, social integration can take place by means of "situated mediated communication with sufficient social information" (p. 459). Warehoused resources containing social information enable social integration as the information is readily accessible. As the process occurs, the history of situated interaction promotes the institutionalization of interdependence by providing a foundation for comparing present to past behavior. Practices of reciprocity, surveillance, and disclosure in relation to information contribute to system integration by enabling visibility and control between groups.

An important observation was made however; the use of collaborative systems did not alter the power imbalances that frequently occur among team members who do not have prescribed roles or tasks (Komis et al., 2002). Instead, the students assumed role that "were mainly determined by their communication and interaction skills, their motivation and abilities."

The linked attributes of interdependence demarcated by Karsten (2003) correspond to static and dynamic social information (Heo, 2005). These attributes can be

applied to the development of software designed to promote virtual social integration. Komis et al. call on facilitators of collaborative learning to "define an appropriate complex protocol of interaction and a set of support systems that encourage a more balanced participation of all students involved in the problem solving and learning process" (p. 183).

Instructor Support Through Online Collaboration

The perspective of Komis et al. (2002) regarding the role of the online facilitator is analogous to the position of authors who contend that the course instructor plays a critical role in supporting and encouraging the active participation of students in online communication channels. Utilizing familiar technology and educating students on the technical software and hardware required by the course may play a vital role in building a collaborative learning environment. Schrum and Hong (2002) note that frustrations with technology are a major source of student disengagement from online education. A study revealed the more problems students had with technology, the more prone they were to drop out (Schrum & Hong, 2002). In regard to these findings, efforts on the instructor's part to override technical barriers and provide consistent technical support may prove to be beneficial in fostering an online community within courses.

Woods and Ebersole (2003a) envision the online instructor as a "communal architect" who builds a "communal scaffold" for promoting interconnectedness and shared responsibility for learning outcomes by synthesizing elements of the cognitive and affective domains. The authors have devised a set of Community Building Activities (CBAs) that are simple strategies for facilitating online communication. Many of the strategies involve the effective utilization of Web-based systems that are rarely exploited

without the active intervention of the instructor. These include personal discussion folders that serve as forums for students to create a personal profile or "electronic personality"; live chats or "virtual office hours" for providing students with course-related support; audio and/or video messages; systematic updates and feedback; group discussions; and private places for students who meet apart from general class discussions. Woods and Ebersole (2003a) also suggest augmenting online interaction with real world activities such as field trips or road trips that offer onsite-learning experiences. In this instance, students are given the opportunity to take initiative in coordinating activities with others in their area, or if they choose, through travel opportunities.

Online courses may also be supplemented by offline technology. One system recommended by Woods and Ebersole (2003a), which is often neglected in online education, is the telephone. The authors believe that instructors do not understand how much a simple phone call may enhance students' sense of belonging. Falvo and Solloway (2004) reported the story of an instructor of an online course who felt compelled to phone all students to maintain a personal degree of communication. The students welcomed the call, commenting that it made them feel more connected to the instructor. Many students were struggling with the online technology and may have been especially favorable to the opportunity to communicate via a familiar mode.

Another criteria instructors must consider as they facilitate online courses are the display of immediacy behaviors. Immediacy behaviors play a substantial role in the process of connecting with others. Verbal and nonverbal behaviors that are used to reduce social distance in interpersonal communication define the term immediacy behaviors

(Hutchins, 2003; Swan, 2002; Woods & Ebersole, 2003a). Lacking non-verbal cues such as smiles and gestures, online communicators rely on textual information to convey immediacy. There are numerous studies confirming the importance of instructor immediacy in creating a positive learning environment. In fact, instructor immediacy is an essential component of good teaching practice (Hutchins, 2003). In the online educational classroom, Woods and Ebersole (2003a) advise instructors to use techniques such as timely, personalized feedback, initiating formal and informal discussions, and even including emoticons in e-mail messages. Instructor immediacy is no less important online than in the physical classroom; it may be even more crucial to student success. Immediacy is especially relevant to creating a collaborative atmosphere. In the online community, building relationships demands resourcefulness and creativity on the part of the instructor.

Utilizing familiar technology and offering supplemental course gatherings are two defined ways that instructors build a collaborative learning environment in the online education. Literature suggests that researchers lack a clear, cohesive framework for assessing interactive learning and would benefit from a model that includes the operational variables of a virtual learning environment. Roblyer and Wiencke (2003) designed a rubric for evaluating and facilitating interactive qualities in online education. The key issue is that "identifying and assessing observable indicators of interaction in online educational courses is essential in order to encourage greater interaction and study its impact" (p. 89). To that aim, the developers relied on two types of evaluation activities: reviews by experts in the field and pilot studies of sample distance classes. The rubric encompasses five basic elements of an interactive learning environment:

1) Social/Rapport-Building Designs for Interaction; 2) Instructional Designs for Interaction; 3) Interactivity of Technology Resources; 4) Evidence of Learner Engagement, and 5) Evidence of Instructor Engagement.

A number of distance education programs have adopted the rubric developed by Roblyer and Wiencke (2003). Similar to the assessed needs of online education in the area of a defined course structure that engages the individual in rigorous learning, there is a need for a design that fosters relationships as well. Good practice in the online classroom often mimics good practice in the traditional classroom. Sound learning takes place in an environment that successfully promotes the infusion of rigor, relevancy and relationships. Online learning facilitators must develop and implement techniques that strengthen each of those areas as well. Student's perception of course experiences will be positively impacted if sound teaching practice is incorporated in to the online educational environment.

Perceptions and Experiences with Online Learning

In a study of students enrolled in a first year face-to-face computer programming course, the most decisive factor in student success was their grade expectation at the start of the class (Rountree, Rountree, & Robin, 2002). Students who stated explicitly that they expected to receive an "A" experienced the greatest success. On the other hand, students who were unprepared for the experiential and conceptual demands of a course that differed markedly from what they were accustomed to were most likely to fail. Although the study involved the teaching of technology rather than teaching through technology, the results have interesting implications for students enrolled in an online course for the first time. Rountree et al. (2002) found that students' background characteristics did not

predict their success in expected ways. For example, younger students did better than older students and intentions to continue with computer science had no marked effect.

Bocchi et al. (2004) investigated the demographic profiles of students enrolled in the Georgia WebMBA program and their relationship to their experience in the course. Offered since 1989 by five regional AACSB-accredited universities within the University System of Georgia, the WebMBA program has an impressive retention rate of 89%. The study involved students from the first four cohorts although the questions were not identical for each group. The WebMBA students cited four major reasons for their choice of the program: accreditation (unanimously given top priority), accessibility, convenience, and congruence with plans for career and personal growth (Bocchi et al., 2004). Personal learning styles had minimal impact on the decision to study online. Two-thirds of the students in the second cohort rated themselves as proficient in using the Internet and 80% had taken at least one type of Internet or blended media course. The later two cohorts were the most experienced with company intranets, CD-ROM, Web-based, asynchronous, and teleconferencing media.

With respect to communication, the students gave high marks to the "consistent faculty responsiveness and contact" (Bocchi et al., 2004, p. 249). Despite the team orientation of the WebMBA, "learning from other students" was given low priority. The result is not surprising in view of the fact that promoting online collaboration among students is more challenging than achieving positive interaction between students and faculty (Bennett, 2002; Woods & Ebersole, 2003a, 2003b). Bocchi et al. (2004) maintain that faculty and administrators should advance the team orientation through techniques such as stating realistic expectations, orienting students to cyber-based learning teams,

and facilitating a collaborative learning environment. The program's high retention rate is attributed to strategies that promote socialization, namely the team- and cohort-based approach, supported by ongoing student-faculty interaction that begins with a two-day orientation and includes telephone contact as well as online communication. An additional factor is the diligent preparation of online instructors. Bocchi et al. emphasize that faculty who teach online courses must be able to adapt their instruction to the virtual medium without compromising course quality.

In a similar study, Wyatt (2005) investigated the perceptions of a random sample of students who experienced both online and traditional courses at a Midwestern university. As with the WebMBA students (Bocchi et al., 2004), convenience was a key reason for studying online (Wyatt, 2005). Qualitative responses clearly showed that satisfaction with online coursework extended beyond practical concerns. For example, one student commented on the "the quality of instruction" adding that, "I have gotten as much (if not more) from these courses" (Wyatt, 2005, p. 466). Another student stated that the online education was better and more motivating than the traditional classroom.

Wyatt (2005) also noted that students perceived their online courses to be more academically challenging than face-to-face courses, contradictory to "critics who have raised concerns about the academic rigor of online instruction" (p. 466). Most of the students felt stimulated by the demands of the coursework and conveyed high satisfaction with the quality of their online learning experience. Ironically, a few students complained that the online courses were unduly demanding, attributing the difficulty to "perceived insecurity of online faculty" (p. 467). The majority of students welcomed the academic and technological challenges.

Both Bocchi et al. (2004) and Wyatt (2005) concluded that online education suits some students better than others. As stated by Wyatt, "While some students thrive in an online environment, others languish" (p. 467). The comments of students within and outside of the research sample suggested that some students require the social interaction of the traditional college campus, while others are ideally suited for independent learning online. Students whom are older or possibly interrupted their studies earlier life but now are returning to the classroom are classified as nontraditional. These nontraditional students with multiple responsibilities often have minimal need (or time) for socializing with other students. Additionally, Hiltz and Turoff (2005) acknowledge that some students prefer working alone to being involved with collaborative teamwork.

Research has determined that 10% to 20% of students have a decisive preference for face-to-face learning environments and feel they learn most effectively in that situation (Hiltz & Turoff, 2005). Bocchi et al. (2004) note that some students lack the self-discipline and initiative required by online learning. Similarly, "not all professors have a teaching style and personality conducive to online teaching" (p. 252). According to Bocchi et al., "A successful online program requires careful selection of both the students and faculty members and significant administrative support for the program's proper design and management" (p. 252).

Huett et al. (2004) stress the vital importance of strong support for faculty in the design and delivery of online courses. Conversely, lack of support for faculty has been implicated as a significant factor in unsuccessful online programming (Hentea et al., 2003). Hutchins (2003) states that, "if administrators expect faculty to provide quality instruction in Web-based classes, they must address the unique pedagogical,

compensatory, and support issues inherent to teaching in distance education classes" (p. 7).

In Bennett's (2002) study of online instruction in sport management, the absence of opportunities for peer interaction was a source of dissatisfaction for students who enjoyed the course in all other respects. The participants were undergraduates taking the course in a conventional classroom (n = 47) and online (n = 20). The learning outcomes were comparable for students in both course sections. The vast majority of online learners were satisfied or very satisfied with the course (90%), and satisfaction with the instructor's performance was unanimous. In addition, 80% of the online students reported learning as much or more in the online course than in a classroom setting. An identical percentage expressed the same view of their interactions with the instructor. As advantages of online education, the students enjoyed being able to work at their own pace, having more freedom and less structure, and deploying their time with greater efficiency. They also reported they felt more comfortable raising questions and expressing comments in the online class.

Clear et al. (2000), among other authors, extol these advantages of online education. With respect to ease of self-expression, Clear et al. consider electronic communication an excellent vehicle for students who are shy or hesitant about speaking out in class. Online conversations cannot be dominated by small groups of aggressive or gregarious students and quieter learners "are allowed the time and space to present themselves in careful and deliberate ways" (p. 107).

The only aspect of the online sport management course that provoked criticism was the relative absence of social interaction with other learners. Bennett (2002) noted

that the instructor expressed this concern before teaching the class, journaling that it was his task "to make sure that each of the students understands that this course is very much unlike others in regard to socializing with peers" (p. 60). The students were told at the onset that they would not have the peer interaction they were accustomed to. The overall high ratings the students awarded that class suggest it was not a significant obstacle for most. The perspective of one student, "I didn't feel as connected as I do in other classes because of the lack of interaction with other students" (p. 60), was shared by a few of the participants. Some students also commented that they missed the live lecture that was part of the campus course along with opportunities to ask questions in real time.

The online sport management course appeared to be in a fledgling state of development. Bennett (2002) acknowledged the course would have benefited from the use of communication techniques such as chat systems and bulletin board discussions, which are used extensively to facilitate communication among online learners (Conaway et al., 2005; Falvo & Solloway, 2004; Mock, 2001; Oren, Mioduser, & Nachmias, 2002; Schrum & Hong, 2002; Woods & Ebersole, 2003a, 2003b). The use of a *lecturelet* could have provided students with an adequate substitution for the live lecture (Culwin, 2000).

One factor that distinguished the sport management students is age. Most were traditional age undergraduates (Bennett, 2002). In a study of students enrolled in online courses through the State University of New York (SUNY) Learning Network (SLN), adults ranging in age from 36 to 45 reported the highest levels of learning and satisfaction, while the youngest learners (ages to 25) gave the lowest ratings to their experience (Frederickson et al., 2000). This finding is consistent with the theory that adults prefer self-directed learning (Knowles, 1990).

The SLN courses were carefully and strategically designed to be learner-centered and provide students with a sense of community (Frederickson et al., 2000). Faculty members were asked to envision themselves as online instructors, reformulating their courses for the specifics of the asynchronous learning environment. Under administrative support, the online instructors developed course formats that reflected their pedagogical preferences and included an orientation welcoming students and clarifying the aims, activities, expectations, and assessment procedures for the course. The systematic procedures and faculty involvement were consistent with the framework for distance education at the University of North Texas (Huett et al., 2004).

The student survey of the SLN was conducted in spring 1999 and involved 1,406 participants (Frederickson et al., 2000). The researchers found students' interaction with teachers to be the most important contributor to perceived learning. Students who reported they participated more online than they did in conventional classrooms also derived positive learning outcomes, as did those who had high levels of interaction with other students. Satisfaction was also high among students who chose to study online due to flexibility and convenience, a common phenomenon (Bocchi et al., 2004; Wyatt, 2005). This may have contributed to the impact of age since working adults typically cite these reasons for taking online courses. Women also reported higher perceived learning and satisfaction with online courses than men. Most studies of online education do not report gender differences. An intriguing result was that students who embarked on the online course with the least computer experience derived the highest levels of learning (Frederickson et al., 2000). Although it is speculative, it is possible that the technological expertise they acquired by taking online courses enriched the learning experience. Other

studies have found students' experience and proficiency with technology to be an important contributor to success in online learning (Bocchi et al., 2004; Clear et al., 2000; Schrum & Hong, 2002; Shin & Chan, 2004) although an interactive teaching style has the power to override technology skills in predicting learning outcomes (Arbaugh, 2000).

Shin and Chan (2004) compared the experiences of graduate and undergraduate students in their study of students enrolled in the Online Learning Environment (OLE), part of an ongoing project on distance education at the Open University of Hong Kong (OUHK). Counter to the expectations of some of the OLE coordinators, who attributed greater maturity and seriousness to the graduate students, no significant differences emerged between the two groups. Students in both groups accessed the OLE with comparable frequency, averaged the same amount of time on each visit, and expressed similar appraisals of their OLE activity and their Internet expertise. In fact, self-assessed Internet proficiency was the dominant predictor of students' achievement, satisfaction, and intention to continue with the program. To some extent, this reflects the experience of the computer science students, where self-assessed grade expectations predicted the actual grade (Rountree et al., 2002).

An additional contributor to the learning experience was the students' sense of institutional presence, or "sense of availability of, and connectedness with" the educational program (Shin & Chan, 2004, p. 286). Russo and Campbell (2004) also explored the concept of presence in online learning, noting that the degree of presence students' perceive from the instructor's behavior can be a decisive factor in satisfaction and course completion.

Research on Internet-based MBA courses supports the critical role of the instructor's behavior in producing positive learning outcomes (Arbaugh, 2000; Arbaugh & Benbunan-Fich, 2003). Although a collaborative constructivist approach is recommended to maximize online learning (Felix, 2005; Hiltz & Turoff, 2005), the application of learning theories to online coursework is rarely examined empirically. Arbaugh and Benbunan-Fich (2003) examined students' perspectives of three learning paradigms: objectivist, collaborative constructivist, and cognitive constructivist. The study involved 570 students enrolled in 40 online MBA classes.

Of the three learning models, collaborative constructivism produced the most positive results (Arbaugh & Benbunan-Fich, 2003). In essence, the students felt as if they learned best in an environment where "knowledge is created through constructive dialogue and group discussion" (p. A1). The authors noted that all of the courses contained elements of the three learning paradigms. Although the objectivist and cognitive constructivist learning approaches evoked less favorable responses when used as the dominant mode of instruction, elements of both these approaches contributed to students' learning and satisfaction with course delivery. Of particular note, the instructor's behavior had a more decisive impact on learning outcomes than the pedagogical approach.

Drennan, Pisarski, and Kennedy (2005) apply the term flexible learning to the constructivist view that students should be actively involved with learning technologies such as CD-ROMS, email, bulletin boards, and course Websites. The researchers explored the use of a flexible learning model adopted by the University of Queensland's School of Management. The hybrid course was structured to encourage students to: 1)

assume control and responsibility for their own learning, 2) engage in critical thinking, and 3) serve as a foundation for deeper learning in face-to-faces sessions. The source emphasized individualized and experiential learning and ongoing access to synchronous and asynchronous modes of communication. The participants were primarily business students with some representatives from the arts and sciences.

The main predictors of success in the course were an autonomous learning style, comfort with technology, and an internal locus of control (Drennan et al., 2005). Perceived usefulness of the flexible learning model interacted with these variables. Although self-direction and technology expertise are conducive to change, locus of control orientation is fairly stable. The results support the assumption that some students are better suited to online education or a more or less structured learning environment than others (Bocchi et al., 2004; Hiltz & Turoff, 2005; Wyatt, 2005).

Similar to the TAM study of Arbaugh (2002), ease of use declined in importance as the students became more familiar with the technology. Based on the overall results, Drennan et al. (2005) concluded that, "those students who were willing to try new approaches and take risks were more likely to view the technology favorably and perceive higher usefulness" (p. 338).

Learner Engagement

Thomas et al. (2004) explored students' perceptions of effective online facilitation, or "e-moderation," in an undergraduate offered by the E-College Wales. The students gave top priority to communication, feedback, and organization as essential skills of an effective online facilitator, and favored enthusiasm, support, encouragement, flexibility, approachability, and knowledge as important personal attributes (Thomas et

al., 2004). Conversely, the absence of these qualities was associated with ineffective e-moderation. Thomas et al. maintain that the characteristics of effective e-moderation should be synthesized into a framework for guiding online teaching and learning, a perspective shared by Roblyer and Wiencke (2003).

Mazzolini and Maddison (2003) explored the relationship between the role of the instructor in facilitating asynchronous discussions forums and the students' behavior. Depending upon the type of forum, the instructor's presence may range from the "sage on the stage" to the "guide on the side" to the essentially absent "ghost in the wings". Using a constructivist model, the researchers examined the instructor's impact in a discussion forum designed to be primarily student initiated. The postings were drawn from seven Swinburne Astronomy Online (SAO) units with 11 instructors and were analyzed periodically over the course of complete semesters.

The foremost finding was that the postings of instructors and students occurred in fairly inverse proportions (Mazzolini & Maddison, 2003). The more the instructors posted, the less effective they were in stimulating discussion among students. Mazzolini and Maddison surmised that students might respond more positively to postings from other students ("cries for help") as opposed to questions posted by the instructor that may have appeared intrusive. The most effective role appeared to be the "guide on the side." Instructors who posted fairly frequently conveyed enthusiasm and expertise to the students even if the students' active participation decreased. The findings suggest that students appreciated instructors whose presence was felt but not overwhelming. The role of the "guide on the side" is consistent with constructivist pedagogy and seems to have

the most positive impact on students. The researchers conceded that more insightful methods are needed to assess the quality of the interactions within a discussion forum.

Oren et al. (2002) observed similar behavior in their exploration of social interactions in virtual learning discussion groups. That is, as instructors' participation increased, the involvement of students decreased. A probable explanation was that despite a constructivist course orientation, instructors tended to take on the role of the "sage on the stage," providing didactic lectures as opposed to facilitating discussions. Oren et al. propose that to create a favorable virtual social climate:

- Instructors should moderate the group's work in a manner that facilitates student interactions.

- Instructors should encourage participants to be friendly with one another and create a relaxed, calm atmosphere.

- Online course moderators should be alert to participants' social needs and provide a platform for messages that contain social content as well as course-specific information.

- Instructors need to enhance the social atmosphere through supportive feedback, engaging the group in discussions about ways to promote social interaction with an emphasis on peer feedback, and by encouraging students to relate to one another during and apart from learning activities.

The recommendations of Oren et al. (2002) reflect those of Woods and Ebersole (2003a, 2003b). Of particular note, Oren et al. (2002) state that, "Course developers should pay particular attention to the creation of a varied range of virtual spaces in order to respond to different social needs evolving during the group's work" (p. 15).

Swan (2002) examined course design elements in the Student Learning Network program described by Frederickson et al. (2000). The data was derived from 73 courses offered during one spring semester. An overriding factor in students' satisfaction was "the critical importance of active, authentic, and valued discussion" (p. 35). Students participating in virtual course discussions worked to create a sense of social presence via text-based, verbal immediacy behaviors. Not unexpectedly in view of the absence of nonverbal cues, the participants relied more heavily on verbal immediacy behaviors than is typical in the conventional classroom. The results reflected an "equilibrium model" of social presence in online discussion; in an environment that reduces affective channels for communication, participants compensate through the adoption of more verbal immediacy behaviors.

Integrating more verbal immediacy behaviors into the online classroom is not without compromise. Particularly, due to the textual nature of most online courses, the addition of text-based feedback may compete with the presentation of course content. Restructuring the platform of delivery for social information may alleviate the possibility of overwhelming the learner with information.

Collaborative learning and utilizing the role of the instructor as a guide is consistent with constructivist pedagogy and has a positive impact on online learners. Collaborative learning can enhance learning and research has proven that higher levels of interaction with classmates in online classes have higher perceived learning (Fredericksen et al., 2000). Interaction, social intimacy and knowledge of a classmate's online presence help provide a learner with signs of social awareness akin to traditional educational environments (Heo, 2005). For social interaction to occur in the online environment, a

learner needs to be engaged in teaching and learning practices that support collaborative learning and this is accomplished through social awareness.

Computer Augmented System

The Social Information Viewer was designed to provide online learners with static and dynamic social information in a format that enhanced rather than detracted from the online learning environment (Heo, 2005). All of the information offered by the viewer is available in the periphery and therefore does not interrupt the delivery of course content.

Heo (2005) notes that both intuitive and aesthetic elements played a role in the design of the Social Information Viewer. Acceptance of the viewer by users is more likely and less distracting due to the attention paid to aesthetics. The Social Information Viewer presents visual and textual information through a tooltip display. Users access classmates' information by mousing over their names in the class roster or while in a discussion forum. The tool tip display presents a window containing a photograph as well as textual information reporting static and dynamic social information about the student.

Information about the student details personal, educational, presence and activity statistics in the online course. The information in the static component is provided by the user and includes location, hobbies, work, and year of study, major and online experience. This information allows other students to assess the selected student's identity. This knowledge aids in the process of students becoming acquainted. The dynamic portion of the display offers real time social information including presence, idle, number of postings, assignments and last submission date. This data gives an impression of social interaction within the online environment. The combination of the

nonintrusive, user friendly, balanced pictorial and textual display of the social information viewer designates it a possible viable system in the development of effective social awareness programs.

Summary

Creating a collaborative learning environment involves an intricate interrelationship between the instructor, the learners, and the technology. Technology takes precedence in the online setting in a sense that users must adapt their behavior to the electronic medium. At the same time, there is major agreement that the instructor plays a critical role in facilitating online communication. The most successful collaboration takes place within a structured format and most students require encouragement and incentives for participating in online discussions. Although there are some individuals who choose online education because they have minimal time or inclination for social interaction, most research demonstrates a relationship between positive social interaction and satisfaction with virtual learning.

Numerous studies confirm that while barriers exist to online communication they are not insurmountable. Satisfaction with online education has increased in conjunction with advancing technologies. The development of innovative Systems used to raise social awareness should enhance the quality of online education, providing there is an infrastructure in place, which supports the integration into course design, and instructors provide students with a framework and rewards for accessing them.

CHAPTER III

METHODOLOGY

Introduction

The primary goal of this study is to facilitate online learning by introducing social information support to adult learners. When learners become more aware of others in the online learning environment, they feel a stronger sense of belonging and integration with others, and it is more likely that they become more motivated learners (Heo, 2005). Since motivation is a critical success factor in online education, those students are more likely to continue their online education experience.

This chapter describes an experimental study examining the impact of social awareness information used in an online learning environment. Research questions, hypotheses, the research setting and an overview of the data analysis are described in the sections below.

Research Questions

This study seeks the answers to the following research questions:

1. Does exposure to the experimental social awareness information system have an impact on the online learners' perceived connectedness?

2. Do different categories of social awareness information have a different effect on the online learners' perceived connectedness?

3. Does exposure to the experimental social awareness information system have an impact on learning?

4. Do different categories of social awareness information have a different effect on learning?

Hypotheses

The following null hypotheses will be tested:

$H_{0.1}$: Exposure to the experimental social awareness information system will have no impact on participants' perceived level of connectedness.

$H_{0.2}$: Different categories of social awareness information will produce an equal degree of perceived connectedness of participants.

$H_{0.3}$: Exposure to the experimental social awareness information system will have no impact on a participants' learning.

$H_{0.4}$: Different categories of social awareness information will produce an equal learning of participants.

Research Design

Participants

Undergraduates and graduate students enrolled in a medium size university at a northeastern state will be recruited to participate in the study. A total of at least 80 participants will be recruited for the experiment to guarantee 0.95 power for statistical analysis. Participants who withdraw from the course during the experimental period, or who do not complete the pre- and post- experimental survey will be excluded when analyzing data. Participants will be accepted on a first come, first served basis.

Instrumentation

Demographic and Previous Online Learning Questionnaire

Demographic and previous online learning questionnaires will comprise the pre-survey and gather demographic information and participants' previous online learning history (Appendix C). The demographic data collected will include the following: gender

60

(male or female), what year were you born? (year selection from 1900-1991),

employment status (unemployed, employed part-time, employed full-time, self-

employed, two or more jobs), degree program (undergraduate, graduate, doctoral) and

academic major (written response). A participant's online learning history will include

previous online courses (yes or no), currently enrolled in a or any online course(s) (yes or

no), and experience using a threaded-discussion forum (yes or no). The eight question

pre-survey questionnaire will be delivered on one web page, after a participant registers

for the study, but before experimentation begins.

Classroom Community Scale

The Classroom Community Scale (CCS) developed by Rovai (2001) will be used

to measure attitudes of online Learners' use of social awareness information (Appendix

A). The CCS scale is widely used to quantify attitudes of connectedness and learning

(Dawson, 2006; Lord & Lomicka, 2008; Rovai, 2001; Rovai & Baker, 2006; Shea, 2006;

Wang, 2008). The CCS will be used to measure connectedness, learning and ultimately a

sense of community within the online environment. This instrument consisted of 20 self-

report items, such as *I feel isolated in this course* and *I feel connected to others in this

course*. Following each item is a five-point Likert scale of potential responses: *strongly

agree, agree, neutral, disagree,* and *strongly disagree*. Scores are computed by adding

points assigned to each of the 20 five-point items, with 10 items allocated to each

subscale. All items are reverse-scored where appropriate to ensure the least favorable

choice is always assigned a value of zero and the most favorable choice is assigned a

value of four. The connectedness subscale represented the feelings of students regarding

their cohesion, community spirit, trust, and interdependence. The learning subscale

61

represented the feelings of community members regarding the degree to which they shared educational goals and experienced educational benefits by interacting with other members of the course. Scores on each subscale can range from zero to 40, with higher scores reflecting a stronger sense of classroom community.

Reliability and Validity Measures of CCS

Rovai (2002) determined the CSS to be a valid and reliable measure of classroom community, specifically two interpretable factors, connectedness and learning. The 20-item CCS measured a sense of community in a university learning environment. The scale collected data from 375 students, enrolled in 28 different courses in an online learning environment. The results of a factor analysis confirmed that the two subscales of connectedness and learning were latent dimensions of the classroom community construct (Rovai, 2002). Cronbach's coefficient alpha for the full classroom community scale was .93 and the equal-length split-half coefficient by the Spearman-Brown prophecy was .91. Additionally, the internal consistency estimates for the connectedness and learning subscales were .92 and .87, respectively. The split-half coefficient was conducted for each of the subscales, and Connectedness yielded .92 and learning .90. Rovai and others (Rovai & Baker, 2005; Rovai & Jordan, 2004) all report similar measures of reliability. The validity of the scale is supported by Rovai (2002b) and Dawson (2006) who reported that results of factor analysis yielded connectedness and learning as two interpretable factors.

Experimental System

Participants will take part in a web-based activity utilizing an experimental system that asks them to disclose information about themselves. The experimental

system is a secure online software application that requires a user to register (username and password creation along with providing their first and last name with their e-mail address) before it can be configured for use in the study (Appendix D). The online software application is written in the java programming language employing the structured query language (SQL) to provide database storage. Specifically, MySQL is a relational database management system based on the American National Standards Institute (ANSI). According to Yuhanna (2009) of Forrester Research, MySQL has a "high adoption rate across several industries and is known for its reliability, ease of use, and performance." A participant's personal information (username, password, e-mail address, first and last name) will be stored within a MySQL database on a Microsoft Windows 2003 Server. The server will be housed in a secure physical location, behind a network firewall and only the researcher will have access to the server or data. During registration, the system prohibits the same login name or e-mail address from being registered more than once therefore a participants choice is on a first come first serve basis. These features aim to limit a participant from registering more than once. After a participant registers by providing a username, password, e-mail address and their first and last name, the java application will assign a participant to one of five categories (Appearance, Education, Contact, Personal and No Information).

The amount of personal information gathered after a participant registers will be regulated. A participant will only provide the personal information for the category in which they are assigned therefore once a participant registers and is placed in one of the five categories, they will be asked to provide additional personal information specific to their category (Appendix E; Appendix F; Appendix G). The personal information that

will be used in the study includes appearance information such as height, eye color and handedness; educational information such as last degree earned, major and education year; contact information such as e-mail, address, cell phone, home phone and work phone; and personal information such as age, gender, hobbies, marital status and dependents; and no information for the control category (Appendix G). Considering the online platform and limits of the cognitive capacities of the learner, the experimental system will permit the learner to receive social awareness information in the periphery and does not compete with the upfront delivery of main learning content.

The course website provides participants secure access to the web-based activity through a participants username and password. If a user forgets his or her password, a participant can employ a 'forgot password' link on the course website. This link asks a participant for their e-mail address and proceeds to e-mail the participant a new password, provided they previously registered for the study (Appendix H).

The experimental system also includes an administrative function to access the data within the MySQL database (Appendix I). Participants are assigned an identification number to track the use of their experimental system during the study. A Microsoft excel csv document is generated from the data gathered to determine the frequency and duration of system use. This provides the researcher with the ability to conduct statistical analysis on the data while archiving the personal information (first and last name, e-mail address and category data if any was stored) of all participants that was provided during the registration process and needed during experimentation, but not necessary for data analysis.

The experimental system provides learners with both a visual depiction and supporting text related to social awareness. The visual representation of social information allows a wealth of feedback to be provided to the learner in a graphical layout without requiring the learner to strictly read what is presented. By pairing written information with the illustration, there is a balance between the visual presentation and the text as to avoid cognitive overload (Heo & Hirtle, 2001). The experimental system will be programmed in a way that allows recording the time of use of each of its views for each of the participants. Figure 1 below shows a screenshot of the experimental system.

Figure 1. Experimental System. Mouse-over of participant with associated contact information displayed.

Participant Tasks

Many theorists discuss various ways tasks can be incorporated into lessons. Bloom's taxonomy of the cognitive domain supports how a participant forms one's own opinion about content after analyzing and synthesizing (Morrison, 2007). Bloom's

taxonomy is a spectrum of task difficulty. It progresses from the simple task of knowledge recall through more difficult tasks of comprehension, application, and synthesis and at the highest level, requires evaluation of an argument. The lesson presented requires participants to read an article that defines the terms digital native and digital immigrant. A digital immigrant is defined as a student not raised or grown up in the digital world; students that must adapt to the digital language of computers, video games, mobile phones, mp3 players and/or the Internet, while a digital native is a student raised or grown up in the digital age; fluent in the digital language of computers, video games, mobile phones, mp3 players, and/or the Internet. After laying this foundation of knowledge, participants will be able to apply the knowledge in order to analyze their personal situation and determine if they are a digital native or a digital immigrant. Once a determination of their status as a digital native or a digital immigrant is complete, the participants will join a discussion forum. On the discussion forum, the participants will be synthesizing and evaluating information as they respond to a five prompts that instructs him or her to provide an opinion, argument, discussion point or a question related to their experiences as a digital native or digital immigrant.

David Merrill uses a matrix based on his Component Display Theory (CDT), which provides a means to determining what instructional strategy to use to master the objective (Morrison, 2007). Merrill classifies learning into two dimensions: Content and Performance. The content will be facts within the article presented along with concepts, principles, and procedures that explain the differences between a digital native or digital immigrant. The second dimension, performance, is achieved by having the participant

66

apply the content of their findings (digital native or digital immigrant) in order to respond to a prompt and to others' postings within a discussion forum.

Similarly, Jonassen (1985) developed four generative strategies that include recall, integration, organization and elaboration to help the learner meet a lessons objective. After reading the article, a participant will process through the steps of recall, integration and organization of the information in order to analyze their personal situation and determine themselves as a member of one of two groups (digital native or digital immigrant). From there, the participant will elaborate by responding to the prompts that ask the participant to provide supporting examples of why they believe they belong to a particular group. Participants will compare and contrast their principles and examples with others within a discussion forum. Feedback from group members will foster further elaboration and encourage participants to reflect on their argument or opinion.

Vygotsky's zone of proximal development also relates to task characteristics. The zone of proximal development and motivation to work collaboratively are intertwined. When the task exceeded the ability of the student, their interest and involvement decreased compared to complex tasks that make the learner feel insecure or lose track of learning objectives (Illera, 2001; Harper, Squires, & McDougall, 2000). Schellen (2007) states that research exemplifies the need to present tasks within the 'zone' that matches the learner's ability (Schellens et al., 2007; Quinn, 1997). The article and questions presented are designed to be within the 'zone' of development for the participants and therefore will facilitate participants' responses within the discussion forum.

Jonassen's application or integration strategy, Merrill's CDT, Bloom's Taxonomy and Vygotsky's zone of proximal development all support the instructional objectives.

The lesson consists of reading an article, responding to questions and discussing ones views within an online discussion forum. The lesson for the experiment begins with participants reading an article entitled '*The Interconnected Nature of the 21st Century World*' and then responding to questions regarding whether they are digital immigrants or digital natives. A participant incorporates the content into his or her value system and discusses these beliefs with other participants within a discussion forum. The article will invoke conversation on the digital divide between digital immigrants and digital natives. The article is general and defines the terms digital immigrant and digital native, and is only used to elicit discussion and in no way will the content of the article or a participants responses be analyzed. The lesson is designed to encourage interaction among participants and stimulate conversation. 21st century students (digital natives) communicate and think differently compared to digital immigrants therefore educational practices are evolving in order to prepare students for the 21st century workplace (Learning Sciences International, 2008). As a learner, students are encountering different instructional practices utilizing technology and it is important for them to understand where they fall on the spectrum between a digital immigrant and digital native.

Thereafter, participants will be asked to respond to the following lesson prompts: 'Are you a digital immigrant or a digital native?'; 'What technologies are you using regularly or struggling with as a digital native or digital immigrant?; 'Which of the technologies that you use regularly in your free time could help you as a student and how?'; 'Do you feel that your instructors have connected with you as a digital immigrant or digital native?'; and 'Share an experience where being a digital immigrant to a specific technology resulted in frustration?' No contact by the researcher to the participants will

occur. The participants will also be informed that they should post their opinions and questions regarding the article to the online discussion forum, as many times as they wish, within two week duration. Since people do learn from each other, each participant will be encouraged to respond to others' postings to facilitate deeper discussion among all participants. Questions posed further develop the lessons conversation and encourage deeper dialogue.

Letter of consent

A letter of consent (Appendix J) will be provided to all participants, informing them about the purpose of the study. The letter of consent format will be consistent with Duquesne University's Institutional Review Board (IRB). This consent form ensures participants confidentiality, provided participants information about the investigator and the rationale for the research. The letter informed participants of the risks and benefits, their rights to withdraw the consent any time they wished and how to contact the researcher if a question should arise. This consent form is available online for all participants to access, read and understand.

Design

Two, 5 X 1 between-subjects one-way analyses of covariance (ANCOVAs) will be used for the experiment. The first ANCOVA will compare the five system groups (appearance, education, contact, personal and control) by the connectedness score of the CSS. The second ANCOVA will compare the five system groups by the learning score of the CSS. The two ANCOVA procedures will allow comparisons of five system groups to connectedness and learning while controlling or limiting the effects of two covariates in 5 levels. The first covariate is previous online experience, which is comprised of three

components: the number of previous online educational courses, if a participant is currently enrolled in a or any online course(s) and experience using a threaded discussion board forum. The second covariate is social information usage experience, which has two components, frequency and duration of system use. Four system groups (appearance information group, educational information group, contact information group, and personal information group) will be able to view one category of social information that their groups are allowed to in their systems. The control group, however, will have no access to the experimental system.

Procedure

At the time of recruitment, voluntary and informed consent will be obtained from participants. Participants then will be asked to register for the experimental system and create a personal profile, which will be used to configure an online experimental system. Registration will be open for a period of fourteen days. The participation of the online lesson will occur after all participants have registered during the two-week registration period. After the registration period ends the study begins. Participants will be given a time frame of two weeks to complete the lesson. First, participants will be asked to respond to the pre-survey. Then participants will progress through the lesson by reading the article and posting their opinions and questions regarding the article to the online discussion board throughout the allotted two-week period. At the end of the online lesson, participants will be asked to respond to the post-survey. All participants who complete the pre-survey, discussion board and post survey will be included in an incentive raffle. At the conclusion of the lesson, a random number generator utilizing the first (lower limit) and last (upper limit) participation ID will be used to determine the

winner of the raffle. The winners' participant ID number will be corresponded to their registration information (first name, last name and e-mail address) and the winner will be notified by e-mail so that he/she can claim the Apple iPad, a tablet based computer.

Recruitment of Participants

Participants will be recruited in a variety of formats. First, participants can voluntarily sign up through flyers (Appendix K) posted on kiosks or bulletin boards on campus. Each flyer will solicit both undergraduate and graduates students 18 years of age or older throughout the university. The flyer will direct participants to a URL address that will explain the rationale for the study, the personal information that will be asked to be shared, and directions for participation (Appendix K). Participation can occur at home, in a dorm room or anywhere a student has Internet access. The entire study will be conducted online consisting of one online lesson, and participants will be given two weeks time to complete the lesson. The time frame for the lesson will include two 30-minute sessions, one for reading the article and the other for posting to the discussion board.

Faculty members will also be solicited and have the opportunity to permit their students to participate in the research study. The co-investigator will first contact faculty members through e-mail to explain the study, ask for their support and permission to invite students within their class to participate (Appendix M). A mutually agreed upon date and time will be determined. The co-investigator will come to the classroom and be introduced by the faculty member. The faculty member will then leave the classroom during the time the flyer is distributed and explained so that no student feels coerced into

participating in the study due to the presence of the faculty member. At no time will faculty members know if a student participates.

The co-investigator will introduce himself, explain the study and state what types of information will be exposed. Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. The final category is no information (Appendix N).

A faculty member with an online course will be asked to post the study URL on their blackboard course websites (Appendix O). Since students will be asked to contact the co-investigator directly, faculty members will not be aware of students' participation. Only students who are above the age of 18 years of age will be allowed to participate.

Participants Course of Action

Participants will be asked to agree to an informed consent before experimentation occurs (Appendix J). All participants will be instructed that their participation is voluntary and they may opt-out at any time. It will be explained that the data collected will be confidential and analyzed cumulatively and will not affect their course grade. Participants will not be monetarily rewarded for participation in the study, however, they will be included in a raffle for a chance to win an Apple iPad, a tablet based computer.

Participants will be asked to register for the experimental system so that their individual preferences can be configured (Appendix E). During the registration, they will be asked to provide personal information for the experiment (Appendix E; Appendix F; Appendix G). Participation will not be anonymous. Once participants complete their registration, the experimental system assigns a participation identification number (ID) and automatically categorizes participants' into one of five categories: appearance (e.g., height, eye color and handedness), educational (e.g., last degree earned, major and education year), contact information (e.g., e-mail, address, cell phone, home phone and work phone), personal information (e.g., age, gender, hobbies, marital status and dependents) and control (no personal or social information). As one participant is assigned into the appearance category, the second participant would be assigned to the educational category, the next participant to the contact category and the next participant to the personal category, followed by the last category (no information) until the categorization repeats backwards over again. A counterbalancing technique is employed to ensure that as participants register for study, their selection into one of the five categories does not preclude a future participant from any other particular category. This also guarantees that all five categories are evenly distributed as participants register for the study. All participants will then be administered the pre-experimental survey (Appendix C).

Contact Information

Please complete the information requested below and click "Submit" when finished.

Email: _____
Cell Phone: _____
Home Phone: _____
Work Phone: _____

Submit   Cancel

Figure 2. Experimental System Configuration. Experimental system generated contact information from one of five categories (appearance, education, contact information, personal information and control).

An online portal created for this study provides secure access for participants to interact utilizing a threaded discussion forum (Appendix P). The experimental system configuration is integrated within the discussion forum and a participant list is provided for each group (Figure 3). A participant's online interaction frequency and duration of use is tracked as they interact with the experimental system and saved to a MySQL database (Appendix I). An administrative login to the portal will house data for the researcher and through statistical analysis provide results for the study.

Home Page

Directions: Please post your responses to the questions presented by creating a new thread and then replying to other users threads.

Group User List
Darren Mariano
Justin Turner

Group Forum
Create New Thread
📄 **Thread Topic** (Darren Mariano, 03/16/09 0:40:44 PM)
    📄 **RE: Thread Topic** (Justin Turner, 03/16/09 0:45:05 PM)

Figure 3. Lesson Forum and Group User List. Threaded discussion forum with integrated experimental system.

Educational Lesson

All participants will begin the study, either during class-time or at home by reading an article entitled, '*The Interconnected Nature of the 21st Century World*', which will invoke conversation on the digital divide between digital immigrants and digital natives. The article is general and defines the terms digital immigrant and digital native, and is only used to elicit discussion and in no way will the content of the article or a participants responses be analyzed. The lesson is designed to encourage interaction among participants and stimulate conversation. 21st century students communicate and think differently therefore educational practices are evolving in order to prepare students for the 21st century workplace (Learning Sciences International, 2008). As a learner, students are encountering different instructional practices utilizing technology and it is important for them to understand where they fall on the spectrum between a digital immigrant and digital native.

Thereafter, participants will be asked to respond to the following lesson prompts: 'Are you a digital immigrant or a digital native'?; 'What technologies are you using regularly or struggling with as a digital native or digital immigrant?; 'Which of the

75

technologies that you use regularly in your free time could help you as a student and how?'; 'Do you feel that your instructors have connected with you as a digital immigrant or digital native?'; and 'Share an experience where being a digital immigrant to a specific technology resulted in frustration?' No other contact by the researcher to the participants will occur. The participants will also be informed that they should post their opinions and questions regarding the article to the online discussion board, as many times as they wish, within a two week duration. Since people do learn from each other, each participant will be encouraged to respond to others' postings to facilitate deeper discussion among all participants. Questions posed further develop the lessons conversation and encourage deeper dialogue. During this time, participants who are assigned to one of the system groups will have access to the experimental system.

After a two-week use of the experimental system, participants will be invited to a post-survey, where they will complete the CCS. An announcement on the lesson website as well as an e-mail utilizing their registration data, will direct participants to the post-survey. Participants who withdraw from the course during the experimental period, or who do not complete the post-experimental survey will be excluded when analyzing data. All participants will be contacted through e-mail at the end of the study for their appreciation of their participation and announcement of raffle winners. The researcher will access the administrative portal and archive the necessary data to complete statistical analysis. The information stored within the MySQL database that was used in experimentation will be saved for 5 years and then destroyed. Participants can request the results of the study and such information will be provided free of charge.

Independent Variable(s)

The independent variable for this study is the exposure to the social information. The independent variable has five levels: no information, appearance information, educational information, contact information, and personal information.

Dependent Variable(s)

Connectedness. This variable will be operationalized as the Connectedness score of the CCS, and it will measure the sense of connectedness of online learners. Rovai (2002) defined connectedness as "the feelings of the community of students regarding their connectedness, cohesion, spirit, trust, and interdependence" (p. 206).

Learning. This variable will be operationalized as the Learning score of the CCS. According to Rovai (2002), this measures "the feelings of community members regarding interaction with each other as they pursue the construction of understanding and the degree to which members share values and beliefs concerning the extent to which their educational goals and expectations are being satisfied" (p. 207).

Covariates

Two covariates with 5 levels will be used in the study. The first covariate will be a participant's previous online learning experience, gathered through a pre-survey questionnaire, will account for variation resulting from one or more of these variables influencing connectedness or learning scores as reported by the CCS. Three items will measure such dependence: whether a participant has completed or taken an online course, if a participant is currently enrolled in a or any online course(s) and experience using a threaded discussion board forum. The second covariate will measure social information usage experience. The different intensity of experimental system use affects participants'

perceptions, therefore frequency and duration information of system use will be measured and comprise the second covariate. The experimental system usage data, such as frequency and duration using the experimental system and category of awareness information that was available in the system, will be collected. The duration of system use will be measured in seconds during which each of the information unit in the experimental system was viewed. To collect accurate data, mouseovers of any of the viewing item less than 0.68 seconds will be scored as no event and deemed as normal transversing between names by a participants mousing over one name to another (John & Kieras, 1996).

Data Analysis

Two types of data analyses will be conducted in this study, descriptive statistics and two 5 X 1 between-subjects one-way ANCOVAs. Descriptive statistics (mean and standard deviation) will be analyzed by data gathered in the pre-survey questionnaire (demographic and previous online history), as well as on the dependent variables *connectedness* and *learning,* as operationalized by the CCS.

A one-way ANCOVA will be conducted to evaluate the differences between the five categories of social information exposure and the connectedness score. A second one-way ANCOVA will be conducted to evaluate the differences between the five categories of social information exposure and the learning score. The independent variable will be social information exposure with 5 levels, one for each type of exposure. The dependent variable will be classroom community (connectedness and learning) as measured by the classroom community index (CCI). A homogeneity of regression test will be performed to guarantee that within each of the groups there is a linear correlation

between connectedness and learning with the covariates and that the group regression lines have similar slopes. Two covariates are included in the study. Results of this analysis will be used to determine whether there is a significant relationship at the 0.05 level between the time or frequency of use and the experimental system category and the connectedness and learning scores.

CHAPTER IV

RESULTS

The primary goal of this study was to demonstrate the relationship between an online learners' sense of community and connectedness with exposure to social awareness information as well as to determine if learning advances occurred due to the improved sense of connectedness and community. This chapter will discuss the findings related to each of the research hypotheses:

$H_{0.1}$: Exposure to the experimental social awareness information system will have no impact on participants' perceived level of connectedness.

$H_{0.2}$: Different categories of social awareness information will produce an equal degree of perceived connectedness of participants.

$H_{0.3}$: Exposure to the experimental social awareness information system will have no impact on a participants' learning.

$H_{0.4}$: Different categories of social awareness information will produce an equal learning of participants.

Descriptive Statistics

Ninety-two participants chose to register for the study however eighty-four participants completed the necessary requirements for data analysis. The majority of the participants were female and between 20 – 29 years of age. Many participants were employed part time and only three have two or more jobs. The majority of participants are in an undergraduate degree program and 46 have taken or completed an online course prior to completing this study. Several participants are not currently enrolled in an online

course, however many do have experience with a threaded discussion board. Frequencies and percentages of demographic data are presented in Table 1.

Table 1

Frequencies and Percentages of Demographic Characteristics

Variable		*n*	*%*
Gender	Male	21	25.0
	Female	63	75.0
Age	18 – 19	3	3.6
	20 – 29	72	85.7
	30 – 39	7	8.3
	40 – 49	1	1.2
	50 and over	1	1.2
Employment status	Unemployed	31	36.9
	Part time	35	41.7
	Full time	15	17.9
	Two or more jobs	3	3.6
Degree program	Undergrad	56	66.7
	Graduate	24	28.6
	Doctorate	4	4.8
Prior online courses	No	38	45.2
	Yes	46	54.8
Currently enrolled in online course	No	67	79.8
	Yes	17	20.2
Experience with threaded discussion forum	No	16	19.0
	Yes	68	81.0

Connectedness and Learning Scores

Means and standard deviations were calculated on connectedness and learning by the five groups. On connectedness, control group scores ranged from 12 – 30 with a mean of 23.25 which was the low score of a possible 40 result for all categories. The scores for appearance category ranged from 17 – 35 while the educational category scores ranged from 25 – 34 and produced the highest mean of 29.75 of all five groups. The contact category scores ranged from 16 – 36 with a mean of 26.60 while the personal category scores ranged from 10 – 36 with a mean of 25.32 which included the largest standard deviation of all categories. On learning, control group scores ranged from 18 – 31 with a mean of 25.69 and produced the lowest score among the learning category. The score for appearance ranged from 20 – 36 with a mean of 28.06. The educational category scores ranged from 23 – 34 with a mean of 29.44 which resulted in the highest mean for the learning category. The scores for the contact category ranged from 18 – 36 with a mean of 27.40 while the personal category ranged from 13 – 36 with a mean of 26.95 which included the largest standard deviation within the learning category. Means and standard deviations on the variables of interest are presented in Table 2.

Table 2

Means and Standard Deviations on Connectedness and Learning by Category

Category	Connectedness		Learning	
	M	*SD*	*M*	*SD*
Control	23.25	4.75	25.69	3.93
Appearance	27.56	4.90	28.06	4.43
Educational	29.75	2.14	29.44	2.76
Contact	26.60	5.46	27.40	4.79
Personal	25.32	6.32	26.95	6.21

Reliability

Internal consistency was assessed for the connectedness and learning scales using Cronbach's coefficient alpha. Cronbach's coefficient alpha provides the mean correlation between each pair of items in the scale (Brace, Kemp & Snelgar, 2006). The guidelines offered by George and Mallery (2003) for evaluating the alpha coefficients will be used: > .9 Excellent, > .8 Good, > .7 Acceptable, > .6 Questionable, > .5 Poor, < .5 Unacceptable. The reliability ranged from good to excellent. Cronbach's coefficient alpha for the full classroom community scale was .93. Additionally, the internal consistency estimates for the connectedness and learning subscales were .90 and .85, respectively. Rovai (2002) and others (Rovia & Baker, 2005; Rovai & Jordan, 2004) all report similar measures of reliability for this scale.

To accomplish the research goals within this study, the following research questions will be answered:

- Research Question One: Does exposure to the experimental social awareness information system have an impact on the online learners' perceived connectedness?

- Research Question Two: Do different categories of social awareness information have a different effect on the online learners' perceived connectedness?

- Research Question Three: Does exposure to the experimental social awareness information system have an impact on learning?

- Research Question Four: Do different categories of social awareness information have a different effect on learning?

To assess the four research questions, ten multivariate analyses (ANCOVAS) were conducted. Prior to analysis, the ANCOVAS were assessed to be certain the data met the assumptions of normality and homogeneity of variance. Because multiple analyses were performed the alpha level needed for significance was reduced to .005 (.05/10) using the Bonferroni correction procedure. Normality was assessed with the examination of scatterplots and the assumption was met. Homogeneity of variance was assessed with Levene's test of equality of variance. Levene's test of equality of variance examined the null hypothesis that the error variance of the dependent variable is equal across groups; the result of the tests was not significant, verifying the assumption of equality of variance and is presented in Table 3.

Table 3

Levene's Test of Equality of Error Variance

Dependent Variable		*F*	*df1*	*df2*	Sig.
Connectedness	Control vs. Other	0.76	9	74	.652
	Control vs. Appearance	1.26	9	24	.310
	Control vs. Educational	2.09	7	24	.084
	Control vs. Contact	0.78	7	23	.613
	Control vs. Personal	0.62	8	26	.753
Learning	Control vs. Other	0.98	9	74	.461
	Control vs. Appearance	0.87	9	24	.566
	Control vs. Educational	1.35	7	24	.270
	Control vs. Contact	0.62	7	23	.737
	Control vs. Personal	0.46	8	26	.872

Control vs. Other (Connectedness)

The first ANCOVA examined connectedness by group (control vs. other). The results were statistically significant, $F(1, 77) = 9.20$, $p = .003$, $\eta^2 = .11$, suggesting there were differences in connectedness by group (control vs. other) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. The participants in the control group scored significantly lower ($M = 23.25$, $SD = 4.75$) than those in other ($M = 27.24$, $SD = 5.17$). The effect size of .11 indicates a smaller than typical strength of the relationship. The null hypothesis - exposure to the experimental social awareness information system does not have an impact on the online learners' perceived connectedness – must be rejected in favor of the alternative. Results of the ANCOVA are presented in Tables 4, 5 and 6.

Table 4

ANCOVA for Connectedness by Group (Control vs. Other) after Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 77)	p	η^2
Taken or completed online courses	8.91	8.91	0.33	.566	.00
Current enrollment	0.12	0.12	0.00	.948	.00
Experience with a threaded discussion forum	16.28	16.28	0.61	.438	.01
Duration	12.60	12.60	0.47	.495	.01
Frequency	1.29	1.29	0.05	.827	.00
Group	246.05	246.05	9.20	.003*	.11
Error	2059.52	26.75			

* = p < .005

Table 5

Means and Standard Deviation for Connectedness by Group (Control vs. Other) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Other		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Connectedness	16	23.25	4.75	68	27.24	5.17

Table 6

Means and Standard Error/Deviation for Control vs. Other on Connectedness Before and After Controlling for Covariates

Category	Before		After	
	M	*SD*	*M*	*SE*
Control	23.25	4.75	22.29	1.50
Other	27.24	5.17	27.01	0.98

Control vs. Appearance (Connectedness)

An ANCOVA was conducted for connectedness by group (control vs. appearance) and was not statistically significant, $F(1, 27) = 8.92$, $p = .006$, $\eta^2 = .25$, suggesting there were not differences in connectedness by group (control vs. appearance) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 7, 8 and 9.

Table 7

ANCOVA for Connectedness by Group (Control vs. Appearance) after Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 27)	p	η^2
Taken or completed online courses	14.93	14.93	0.62	.438	.02
Current enrollment	5.08	5.08	0.21	.650	.01
Experience with a threaded discussion forum	23.68	23.68	0.99	.330	.04
Duration	17.69	17.69	0.74	.399	.03
Frequency	31.6	31.6	1.31	.262	.05
Group	214.36	214.36	8.92	.006	.25
Error	649.09	24.04			

* = p < .005

Table 8

Means and Standard Deviation for Connectedness by Group (Control vs. Appearance)

using Controlling for Taken or Completed Online Courses, Current Enrollment,

Experience with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Appearance		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Connectedness	16	23.25	4.75	18	27.56	4.90

Table 9

Means and Standard Error/Deviation for Control vs. Appearance on Connectedness

Before and After Controlling for Covariates

	Before		After	
Category	*M*	*SD*	*M*	*SE*
Control	23.25	4.75	21.44	1.68
Appearance	27.56	4.90	27.54	1.58

Control vs. Educational (Connectedness)

The results of the ANCOVA for connectedness by group (control vs. educational) was statistically significant, $F(1, 25) = 10.98$, $p = .003$, $\eta^2 = .31$, suggesting there were differences in connectedness by group (control vs. educational) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. The participants in the control group scored significantly lower ($M = 23.25$, $SD = 4.75$) than those in the educational category ($M = 29.75$, $SD = 2.14$). The effect size of .31 indicates a medium strength of the relationship. Results of the ANCOVA are presented in Table 10, 11 and 12.

Table 10

ANCOVA for Connectedness by Group (Control vs. Educational) after Controlling for

Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded

Discussion Forum, Duration, and Frequency

Source	*SS*	*MS*	F (1, 25)	*p*	η^2
Taken or completed online courses	17.73	17.73	1.22	.280	.05
Current enrollment	8.95	8.95	0.62	.440	.02
Experience with a threaded discussion forum	21.44	21.44	1.47	.236	.06
Duration	5.03	5.03	0.35	.562	.01
Frequency	8.05	8.05	.55	.46	.02
Group	159.56	159.56	10.98	.003*	.31
Error	363.34	14.53			

* = p < .005

Table 11

Means and Standard Deviation for Connectedness by Group (Control vs. Educational)

using Controlling for Taken or Completed Online Courses, Current Enrollment,

Experience with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Educational		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Connectedness	16	23.25	4.75	16	29.75	2.15

Table 12

Means and Standard Error/Deviation for Control vs. Educational on Connectedness

Before and After Controlling for Covariates

| | Before | | After | |
Category	M	SD	M	SE
Control	23.25	4.75	23.18	1.45
Educational	29.75	2.15	29.07	1.29

Control vs. Contact (Connectedness)

The fourth ANCOVA was conducted for connectedness by group (control vs. contact) and the results were not statistically significant, $F(1, 24) = 5.17$, $p = .032$, $\eta^2 =$ .18, suggesting there were not differences in connectedness by group (control vs. contact) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 13, 14 and 15.

Table 13

ANCOVA for Connectedness by Group (Control vs. Contact) after Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 24)	p	η^2
Taken or completed online courses	25.08	25.08	0.88	.357	.04
Current enrollment	24.82	24.82	.87	.359	.04
Experience with a threaded discussion forum	0.43	0.43	0.02	.904	.001
Duration	18.94	18.94	0.67	.423	.03
Frequency	1.60	1.60	0.06	.815	.002
Group	147.11	147.11	5.17	.032	.18
Error	682.58	28.44			

* = p < .005

Table 14

Means and Standard Deviation for Connectedness by Group (Control vs. Contact) using Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Contact		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Connectedness	16	23.25	4.75	15	26.60	5.46

Table 15

Means and Standard Error/Deviation for Control vs. Contact on Connectedness Before

and After Controlling for Covariates

Category	Before		After	
	M	*SD*	*M*	*SE*
Control	23.25	4.75	22.99	1.73
Contact	26.60	5.46	28.44	2.12

Control vs. Personal (Connectedness)

The final ANCOVA for connectedness by group (control vs. personal) was not significant, $F(1, 28) = 1.62$, $p = .213$, $\eta^2 = .06$, suggesting that there were not differences in connectedness by group (control vs. personal) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Tables 16, 17 and 18.

Table 16

ANCOVA for Connectedness by Group (Control vs. Personal) after Controlling for Taken

or Completed Online Courses, Current Enrollment, Experience with a Threaded

Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 28)	p	η^2
Taken or completed online courses	3.34	3.34	0.10	.359	.00
Current enrollment	1.62	1.62	0.05	.830	.00
Experience with a threaded discussion forum	12.48	12.48	0.36	.554	.01
Duration	0.24	0.24	0.01	.935	.00
Frequency	24.1	24.1	0.70	.409	.02
Group	56.40	56.40	1.62	.213	.06
Error	972.91	34.75			

* = p < .005

Table 17

Means and Standard Deviation for Connectedness by Group (Control vs. Personal) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Personal		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Connectedness	16	23.25	4.75	19	25.32	6.32

Table 18

Means and Standard Error/Deviation for Control vs. Personal on Connectedness Before

and After Controlling for Covariates

	Before		After	
Category	*M*	*SD*	*M*	*SE*
Control	23.25	4.75	21.85	2.01
Personal	25.32	6.32	25.06	2.69

The null hypothesis - different categories of social awareness information will produce an equal degree of perceived connectedness of participants – must be partially rejected. There are significant differences between control and educational, however, there are not significant differences in appearance, personal, and contact.

Control vs. Other (Learning)

The initial ANCOVA for learning by group (control vs. other) was not statistically significant, $F (1, 77) = 5.22$, $p = .025$, $\eta^2 = .06$, suggesting there were not differences in learning by group (control vs. other) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. The null hypothesis - exposure to the experimental social awareness information system does not have an impact on learning – cannot be rejected in favor of the alternative. Results of the ANCOVA are presented in Tables 19, 20 and 21.

Table 19

ANCOVA for Learning by Group (Control vs. Other) after Controlling for Taken or

Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion

Forum, Duration, and Frequency

Source	SS	MS	F (1, 77)	p	η^2
Taken or completed online courses	0.02	0.02	0.001	.979	.00
Current enrollment	0.13	0.13	0.006	.938	.00
Experience with a threaded discussion forum	0.51	0.51	0.02	.878	.00
Duration	10.69	10.69	0.49	.484	.006
Frequency	6.80	6.80	0.31	.577	.004
Group	113.17	113.17	5.22	.025	.06
Error	1668.17	21.66			

* = p < .005

Table 20

Means and Standard Deviation for Learning by Group (Control vs. Other) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Other		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Learning	16	25.69	3.93	68	27.93	4.77

Table 21

Means and Standard Error/Deviation for Control vs. Other on Learning Before and After

Controlling for Covariates

	Before		After	
Category	*M*	*SD*	*M*	*SE*
Control	25.69	3.93	24.94	1.35
Other	27.93	4.77	28.14	0.89

Control vs. Appearance (Learning)

An ANCOVA was conducted for learning by group (control vs. appearance) and the result was not significant, $F(1, 27) = 8.06$, $p = .009$, $\eta^2 = .23$, suggesting that there were not differences in learning by group (control vs. appearance) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 22, 23 and 24.

Table 22

ANCOVA for Learning by Group (Control vs. Appearance) after Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 27)	p	η²
Taken or completed online courses	6.45	6.45	0.39	.537	.01
Current enrollment	1.52	1.52	0.09	.764	.003
Experience with a threaded discussion forum	8.39	8.39	0.51	.482	.02
Duration	1.09	1.09	0.07	.799	.002
Frequency	15.51	15.51	0.94	.341	.03
Group	132.85	132.85	8.06	.009	.23
Error	445.14	16.49			

* = p < .005

Table 23

Means and Standard Deviation for Learning by Group (Control vs. Appearance) using Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Appearance		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Learning	16	25.69	3.93	18	28.06	4.43

Table 24

Means and Standard Error/Deviation for Control vs. Appearance on Learning Before

and After Controlling for Covariates

	Before		After	
Category	*M*	*SD*	*M*	*SE*
Control	25.69	3.93	23.90	1.39
Appearance	28.06	4.43	28.71	1.31

Control vs. Educational (Learning)

The result of the ANCOVA for learning by group (control vs. educational) was not significant, $F(1, 25) = 3.04$, $p = .094$, $\eta^2 = .11$, suggesting that there were not differences in learning by group (control vs. educational) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 25, 26 and 27.

Table 25

ANCOVA for Learning by Group (Control vs. Educational) after Controlling for Taken or Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration, and Frequency

Source	SS	MS	F (1, 25)	p	η²
Taken or completed online courses	31.47	31.47	2.73	.111	.10
Current enrollment	35.92	35.92	3.11	.090	.11
Experience with a threaded discussion forum	1.77	1.77	0.15	.699	.006
Duration	.05	.05	0.004	.950	.000
Frequency	3.27	3.27	0.28	.600	.01
Group	35.10	35.10	3.04	.094	.11
Error	288.72	11.55			

* = p < .005

116

Table 26

Means and Standard Deviation for Learning by Group (Control vs. Educational) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Educational		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Learning	16	25.69	3.93	16	29.44	2.76

Table 27

Means and Standard Error/Deviation for Control vs. Educational on Learning Before

and After Controlling for Covariates

Category	Before		After	
	M	*SD*	*M*	*SE*
Control	25.69	3.93	26.71	1.29
Educational	29.44	2.76	29.48	1.15

Control vs. Contact (Learning)

The final ANCOVA for learning by group (control vs. contact) was not significant, $F(1, 24) = 2.05$, $p = .165$, $\eta^2 = .08$, suggesting that there were not differences in learning by group (control vs. contact) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 28, 29 and 30.

Table 28

ANCOVA for Learning by Group (Control vs. Contact) after Controlling for Taken or

Completed Online Courses, Current Enrollment, Experience with a Threaded Discussion

Forum, Duration, and Frequency

Source	SS	MS	F (1, 24)	p	η^2
Taken or completed online courses	12.88	12.88	0.61	.443	.03
Current enrollment	30.83	30.83	1.46	.239	.06
Experience with a threaded discussion forum	3.80	3.80	0.18	.675	.01
Duration	6.17	6.17	0.29	.594	.01
Frequency	0.41	0.41	0.20	.891	.001
Group	43.26	43.26	2.05	.165	.08
Error	507.20	21.13			

* = p < .005

Table 29

Means and Standard Deviation for Learning by Group (Control vs. Contact) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Contact		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Learning	16	25.69	3.93	15	27.40	4.79

Table 30

Means and Standard Error/Deviation for Control vs. Contact on Learning Before and

After Controlling for Covariates

	Before		After	
Category	*M*	*SD*	*M*	*SE*
Control	25.69	3.93	26.31	1.50
Contact	27.40	4.79	29.26	1.82

Control vs. Personal (Learning)

The result of the ANCOVA for learning by group (control vs. personal) was not significant, $F(1, 28) = 1.62$, $p = .213$, $\eta^2 = .06$, suggesting that there were not differences in learning by group (control vs. personal) after controlling for taken or completed online courses, current enrollment, experience with a threaded discussion forum, duration, and frequency. Results of the ANCOVA are presented in Table 31, 32 and 33.

Table 31

ANCOVA for Learning by Group after Controlling for Taken or Completed Online

Courses, Current Enrollment, Experience with a Threaded Discussion Forum, Duration,

and Frequency

Source	*SS*	*MS*	F (1, 28)	*p*	η^2
Taken or completed online courses	2.33	2.33	1.62	.778	.00
Current enrollment	2.92	2.92	0.08	.752	.00
Experience with a threaded discussion forum	0.07	0.07	0.10	.960	.00
Duration	.001	.001	0.00	.988	.00
Frequency	44.91	44.91	0.00	.221	.05
Group	46.45	46.45	1.57	.213	.06
Error	802.23	28.65			

* = p < .005

Table 32

Means and Standard Deviation for Learning by Group (Control vs. Personal) using

Controlling for Taken or Completed Online Courses, Current Enrollment, Experience

with a Threaded Discussion Forum, Duration, and Frequency as Covariates

	Control			Personal		
Variable	*N*	*M*	*SD*	*N*	*M*	*SD*
Learning	16	25.69	3.93	19	26.95	6.21

Table 33

Means and Standard Error/Deviation for Control vs. Personal on Learning Before and

After Controlling for Covariates

Category	Before		After	
	M	*SD*	*M*	*SE*
Control	25.69	3.93	24.33	1.82
Learning	26.95	6.21	27.24	2.46

The null hypothesis - different categories of social awareness information will produce an equal learning of participants – cannot be rejected. There are not significant differences in control and appearance, educational, contact, or personal.

Chapter Summary

The increased emphasis to online education has made it necessary to reveal the impact of social awareness support between students online. The primary purpose of this study was to demonstrate the relationship between social awareness information on an online learner's sense of community within an online learning environment. Particularly, the study sought to determine what extent a learner's sense of connectedness is improved with the exposure to social awareness information and if and to what degree learning advances occur due to the improved sense of connectedness. Conclusions from the analyses of the data will be described in Chapter Five.

CHAPTER V

CONCLUSION

Summary of Purpose

Online education expands the range of possibilities in education by supplementing or replacing traditional face-to-face educational programs. Students of online education now learn at their own pace, on their own time while managing their lives according to individual needs. The primary goal of this study was to facilitate online learning by introducing social information support to learners. The socialization support can help learners to become integrated, connected, confident, and eventually successful in their learning. Considering the ever-growing number of online learners, the number of students that express discontent with online education and the feeling of isolation and high dropout rates, confirms there is a need to evaluate the impact social information support provides to learners. This study examined the impact of social awareness information provided on a learner's sense of community within an online learning environment. Specifically, the study investigated if learners' sense of connectedness is improved with the exposure to others' social awareness information; and if and to what degree learning advanced due to the improved sense of connectedness.

Summary of Procedures

The study was conducted in the fall semester of 2011 at a medium size private university in the North East and lasted for a four-week period. Participants were recruited in three formats: first, participants voluntarily signed up through flyers posted on kiosks or bulletin boards on campus; second, faculty members were solicited from the course list offered by the university and were contacted for their approval to recruit their

128

students in class; third, faculty members of online courses were asked to post the study URL on their course management system (e.g., Blackboard).

At the time of recruitment, voluntary and informed consent for participation in the study was obtained. Participants were assigned to one of five experimental groups (appearance, education, contact, personal, or control groups) using a counterbalancing technique. Participants were then asked to register to the experimental, social awareness system. During the registration, participants were asked to share a certain amount of social awareness information. The kinds and amount of information that were asked to share were regulated, and depended on their assigned groups (e.g., the appearance group for height, eye color and handedness; the education group for the last degree earned, major and education year; the contact group for e-mail, cell phone, home phone and work phone numbers; the personal information group for age, gender, hobbies, marital status and number of dependents; and the control group for no sharing). The registration period occurred for two weeks before the experiment began. Once the registration was complete, participants were asked to respond to the pre-experiment online survey questions asking their demographical information.

The experiment consisted of two tasks: reading an article and participation on a discussion board. Participants were first asked to read an article entitled, '*The Interconnected Nature of the 21st Century World*' (Learning Sciences International, 2008). After laying the foundation of knowledge, participants were asked to determine if they were a digital native or a digital immigrant. Once a determination of their status as a digital native or a digital immigrant was complete, the participants joined a discussion forum. The experimental system provided participants with a discussion board that

included both a visual depiction and supporting text related to social awareness information (first and last name along with category information). While participants review social awareness information by hovering over anyone's name, their activities (e.g., duration and frequency) were recorded. On the discussion forum, the participants responded to five prompts that instructed them to provide an opinion, discussion point and share their experiences as a digital native or digital immigrant. Participants were given a time frame of two weeks to complete the task. Upon completion of the tasks, all participants were asked to answer the post-experiment online survey that was comprised of Rovai's (2002) Classroom Community Scale (CSS). The scale was to measure participants' self-reported connectedness and learning. The connectedness subscale represented the feeling of participants regarding their cohesion, community, spirit, trust, and interdependence. The learning subscale represented the feelings of community members regarding the degree to which they shared educational goals and experienced educational benefits by interacting with other members of the course. The data gathered from the surveys and experimental system provided the researcher with information regarding all participants' perspective.

Participants Demographics

The participants of the study were a mixture of undergraduate and graduate students, above 18 years of age during the fall semester of 2011. Ninety-two people initiated their participation, but 84 participants (56 undergraduates, 24 graduate, and 4 doctoral students) completed all requirements of the study. Of the 84 participants, 67 were currently enrolled or completed an online course and 68 had experience with a threaded discussion forum.

Summary of the Findings

In order to determine if exposure to or different categories of social awareness information had a significant effect on an online learner's perceived connectedness or learning, ten multivariate analyses (ANCOVAs) were conducted. Two covariates comprised of a total of five levels adjusted for factors that may influence the results. The two covariates were a participant's previous online learning experience (whether a participant had completed or taken an online course; if a participant was currently enrolled in any online course(s); and if a participant had experience using a threaded discussion board forum) and social information usage experience (frequency and duration) collected by the experimental system. The ANCOVAs conducted for both connectedness and learning compared the control group by all categories (control vs. other) as well as evaluated the control group with each individual category.

Four research questions were developed for this study. The analysis and interpretation for each question is presented below:

Question 1. Influence of social awareness information system on perceived level of connectedness

The first ANCOVA results provided sufficient evidence to reject the first null hypothesis, which stated exposure to the experimental social awareness system will have no impact on a participants' perceived level of connectedness. When participants with the social awareness information system are viewed as a group, their perceived connectedness with others was better when compared to the control group members'. Even without applying the potential covariates, the results demonstrate how social

awareness information on connectedness can influence the participants' feeling of cohesion, community, spirit, trust, and interdependence.

Question 2. Relationship between categories of social awareness information and degree of perceived connectedness

The second through fifth ANCOVA conducted on connectedness provided the evidence to partially reject the second null hypothesis, which stated that different categories of social awareness information will produce an equal degree of perceived connectedness. While significant differences were witnessed between the control group and the educational group, indicating that sharing educational social information (last degree earned, major and education year) was beneficial for online learners to feel connected to each other, no statistically significant differences were found among appearance, personal, and contact groups.

Question 3: Influence of social awareness information system on a participants' learning.

The ANCOVA conducted for learning compared the control group by all categories of learning (control vs. other) and did not provide evidence to reject the third null hypothesis, which stated exposure to the experimental social awareness information system will have no impact on a participants' learning. There were slight differences between the control and other groups possibly indicating a change in presentation but not in significance.

According to Rovai (2002) and this study, the term learning represented the feelings of participants regarding the degree to which they shared educational goals and experienced educational benefits by interacting with other members within the online

lesson. It was evident that little interaction among the participants occurred by the lack of responses to each individual participants' reply on the discussion forum. This finding seems to convey that the online lesson failed to produce the desired effect or educational goal. The lack of significance could also have illustrated the feeling of isolation and discontent with the online lesson as reported by many in the literature.

Questions 4: Relationship between categories of social awareness information and learning of participants.

The fourth null hypothesis, different categories of social awareness information will produce an equal learning of participants is not evident and therefore not rejected. There are not significant differences in control and appearance, educational, contact, or personal category as it pertains to learning of participants. The feelings of participants regarding the degree to which they shared educational goals and experienced educational benefits by interacting on the discussion board could not be confirmed.

The small number of responses to each individual participants' reply on the discussion forum within the five categories represent how the online lesson was not effective in providing interaction among participants and therefore no learning occurred. The participants seem to not share any educational goals or experience educational benefits in any particular category given the limited contact among participants on the discussion board. The lesson was designed to provide participants a means to discuss and interact on a discussion board but these findings prove otherwise.

Findings Related to Literature

The benefit of social awareness information has been examined in the literature. Although the study did not find evidence of exposure to social awareness information

having an impact on learning, the findings confirmed the claim that social awareness

provides a sense of connectedness defined by Rovai (2002) as a feeling of cohesion,

community, spirit, trust, and interdependence. The type of social information presented

in the educational category such as the last degree earned, major and educational year

appear to provide a strong relationship compared to other categories studied (control,

appearance, contact and personal).

Mock (2001) and Bolloju and Davison (2003) have found most students to be

fairly passive in their interaction with online discussion boards. They note that while a

minority of self-motivated learners enthusiastically take advantage of online

communication channels, most students require a structured, cohesive framework with

systematic support. The limited responses to each individual participants' replies on the

discussion forum, and the lack of support for learning to occur resulted in the absence of

a proven framework for facilitating online communication (Roblyer & Wiencke, 2003).

Heo (2005) discussed this finding of when an online learner's social interaction is limited

decreased motivational levels and a feeling of isolation and subsequently, high drop out

rates occur. Although the study did not experience a high drop out rate, the lack of

interaction on the discussion forum, support the studies finding of no evidence of

learning.

The study utilized the benefits of absence of structured meeting times and

physical space as outlined by Peters (2001); however, the asynchronous discussions seem

to be diminished to digital characters or typescripts on a computer screen as discussed by

Ko and Rossen. (2001). Given learning was not evident, the online lesson and directions

may have been deficient. Many including Vonderwell (2002) agree that social

interaction among learners play an important role in the learning process and can have a significant impact on learning outcomes, while Donlevy (2004) warned that maintaining course participation has proven to be a challenge with online students. The online lesson did not support the participants and therefore these findings signify why learning was not evident.

Application of Findings

The findings of the study will have impact on online education. Educators, course designers and content management companies will benefit in recognizing that social awareness information positively impacts online educational participants by providing a sense of connectedness when presented with educational related materials such as last degree earned, major and educational year.   The significant feelings of participants regarding their cohesion, community, spirit, trust, and interdependence in the educational category provide empirical support for the importance of this type of social awareness information in an online educational environment.

Within the study, the value of the social awareness information in an online environment served as an assessment toward modifications needed to develop course management systems. The assessment that a sense of connectedness occurred in the educational category reports to the designers of the course management systems useful insights on social awareness information, and empowers online instructors with information that can improve their online teaching. Numerous studies confirm that while barriers exist to online communication they are not insurmountable, and this study's findings appear to confirm those observations.

Implications of Future Research

The purpose of the analyses presented was to illustrate the importance of social awareness in an online learning environment. Overall, the findings in the study reveal social awareness can be a valuable tool in online education. The results suggests that social awareness information has a positive relationship on an online learner's sense of connectedness but more research is needed to determine to what extent this sense of connectedness is linked to learning.

Many researchers including Rovai (2002) have quantified attitudes of connectedness and learning in online educational participants. The data demonstrates that by providing educational related information (last degree earned, major and educational year) to participants of an online discussion forum, participants feel a sense of connectedness. A sense of connectedness did not translate into participants sharing educational goals and experiencing educational benefits by interacting with other members of the course (learning). That is, having positive feelings of other participants regarding their cohesion, community spirit, trust, and interdependence is not a requirement of learning. Given the fact that learning was separate from the social sense of participants, it is speculated that the online lesson was incomplete. Maintaining participants' awareness is a component of course development that must be considered when designing a lesson. The development of systems in order to facilitate awareness is widespread; however, the content, which these systems provide, needs to be substantiated before being placed online. The role of the instructor in this case was a 'ghost in the wings' (Mazzolini & Maddison, 2003), which might have led participants not to interact or learn. Consequently, the online lesson played a role in the lack of interaction or learning as these findings exemplify.

Furthermore, because there was a lack of empirical support of the impact of social awareness on learning, a different approach is recommended for future researchers in replicating this study such as the inclusion of an established online lesson in order to elicit interaction among participants over a longer period of time. A method of including a social interaction activity before experimentation would ensure participants were ready for the experiment and interaction among all participants was likely. Such an activity could be a 'think-write-pair-share' utilizing the disclosure category each group is assigned. For example, each participant is asked to gather the necessary disclosures on other group members and then post his/her findings to a discussion board. Participants could also be asked to answer a short list of questions in pairs (5-10 questions). The questions require participants to answer utilizing the social awareness system and not a direct dialogue between participants. Each person would then report on his or her findings to the group. These pre-activities should provide a sufficient amount of time for social interaction to occur given social information is exchange at a slower rate online compared to traditional face-to-face interactions as indicated by the social information processing theory. By nurturing these associations, social interaction would be anticipated. Additionally, a pre-activity between participants would disclose shared backgrounds, ideas or common ground to foster future social interactions among participants. Common ground between participants online is important because it creates a sense of support and acceptance. Common ground theory conveys how information among participants is shared and developed through connections participants believe are common and valuable. If participants form connections or common ground prior to experimentation, social interaction would be expected.

Limitations and Delimitations of the Study

As with all studies, the current study is not without limitations. It is recognized that the control, appearance, contact and personal category information did not play a significant role in a participant's learning; however, the implementation of the social awareness information or categories in a full semester course may elicit different results. The short, single online lesson did not provide the interaction necessary for learning to be quantified, therefore future studies may benefit from using participant groups within established online courses. Additionally, the content of lessons and the category information may prove significant if participants believe access to this content is relevant to their needs.

The social awareness system was designed specifically for use with higher educational students. This study was conducted with students at a medium-size private university from Western Pennsylvania, where its students are from predominantly middle to upper class Caucasian families. The university from which the participants were recruited offers a variety of degrees (face-to-face and online), and Blackboard is the course management system used to facilitate online courses offered at the university. This implies that the participants of the study were exposed to a variety of online content similar to the ones employed in the experimental, social awareness system. While the study did not account for variations between the learning management system employed and blackboard, the statistics may assist the reader in determining the ability to generalize this study to future populations.

Researchers are cautioned on these results given the majority of the participants' major was education and their last earned degree earned was a high school diploma.

These findings are not uncharacteristic given participation was high for in-class, school of education undergraduate recruitment compared to others (flyers, e-mail and blackboard postings). The amount of variation in the educational category was relatively small providing further evidence of this finding.

Although the survey questions were designed to obtain honest responses, it is impossible to guarantee that the responses were true and accurate. Interpretation of questions may have influenced the responses to some survey items.

Summary

Satisfaction with online education has increased in conjunction with advancing technologies and research. The development of the social awareness system used to raise social awareness appear to enhance the quality of online education, providing there is an infrastructure in place, which supports the integration into course design, and instructors provide students with an established framework for delivery. The impact of social awareness information on an online learner's sense of connectedness and learning was examined. The influence of the social awareness information categories within an online learning environment was discussed in chapter five. The findings of the study were presented for each of the research questions posed. Social awareness information can influence a participants' feeling of cohesion, community, spirit, trust, and interdependence (connectedness). The study indicated that sharing educational social information (last degree earned, major and education year) was beneficial for an online learners sense of connectedness, while no evidence was established among the appearance, personal, and contact categories. Furthermore, the impact of social awareness on learning was not apparent but may be attributed to limitations in the study.

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APPENDIX A

SURVEY

CCS Test Booklet

Classroom Community

Scale

(CCS)

Developed by

Alfred P. Rovai, PhD

alfrrov@regent.edu

SURVEY

DIRECTIONS: Below you will see a series of statements concerning a specific course or program you are presently taking or recently completed. Read each statement carefully and place an X in the parentheses to the right of the statement that comes closest to indicate how you feel about the course or program. You may use a pencil or pen. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, place an X in the neutral (N) area. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. **Please respond to all items**

1. I feel that students in this course care about each other.............................(SA) (A) (N) (D) (SD)

2. I feel that I am encouraged to ask questions...(SA) (A) (N) (D) (SD)

3. I feel connected to others in this course..(SA) (A) (N) (D) (SD)

4. I feel that it is hard to get help when I have a question.............................(SA) (A) (N) (D) (SD)

5. I do not feel a spirit of community...(SA) (A) (N) (D) (SD)

6. I feel that I receive timely feedback..(SA) (A) (N) (D) (SD)

7. I feel that this course is like a family...(SA) (A) (N) (D) (SD)

8. I feel uneasy exposing gaps in my understanding.....................................(SA) (A) (N) (D) (SD)

9. I feel isolated in this course...(SA) (A) (N) (D) (SD)

10. I feel reluctant to speak openly..(SA) (A) (N) (D) (SD)

11. I trust others in this course...(SA) (A) (N) (D) (SD)

12. I feel that this course results in only modest learning..............................(SA) (A) (N) (D) (SD)

13. I feel that I can rely on others in this course..(SA) (A) (N) (D) (SD)

14. I feel that other students do not help me learn...(SA) (A) (N) (D) (SD)

15. I feel that members of this course depend on me......................................(SA) (A) (N) (D) (SD)

16. I feel that I am given ample opportunities to learn...................................(SA) (A) (N) (D) (SD)

17. I feel uncertain about others in this course..(SA) (A) (N) (D) (SD)

18. I feel that my educational needs are not being met...................................(SA) (A) (N) (D) (SD)

19. I feel confident that others will support me..(SA) (A) (N) (D) (SD)

20. I feel that this course does not promote a desire to learn.........................(SA) (A) (N) (D) (SD)

Scoring Key

Overall CCS Raw Score

CCS raw scores vary from a maximum of 80 to a minimum of zero. Interpret higher CCS scores as a stronger sense of classroom community.

Score the test instrument items as follows:

For items: 1, 2, 3, 6, 7, 11, 13, 15, 16, 19

Weights: Strongly Agree = 4, Agree = 3, Neutral = 2, Disagree = 1, Strongly Disagree = 0

For items: 4, 5, 8, 9, 10, 12, 14, 17, 18, 20

Weights: Strongly Agree = 0, Agree = 1, Neutral = 2, Disagree = 3, Strongly Disagree = 4

Add the weights of all 20 items to obtain the overall CCS score.

CCS Subscale Raw Scores

CCS subscale raw scores vary from a maximum of 40 to a minimum of zero. Calculate CCS subscale scores as follows:

Connectedness Add the weights of odd items: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Learning Add the weights of even items: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

APPENDIX B

PERMISSION TO USE SURVEY FROM ROVAI

Wednesday, March 19, 2008 8:09 AM -0500

From: Alfred Rovai <alfrrov@regent.edu>

Subject: RE: Classroom Community Scale

To: "marianod@duq.edu" <marianod@duq.edu>

Bcc: Darren Mariano

Attachments: CCS Booklet.pdf   122K
I&HE4.pdf   111K

Hi Darren,

Yes you may use the instrument. Just reference the attached article (in Adobe Acrobat format). I've also provided a clean copy of the current version of the instrument.

Best wishes,
Fred

Alfred P. Rovai, PhD
Professor of Education, ADM-216E
Regent University
1000 Regent University Drive
Virginia Beach, VA 23464-9800
Phone 757.226.4861
http://web.mac.com/aprovai/Site/Welcome.html

-----Original Message-----
From: marianod@duq.edu [mailto:marianod@duq.edu]
Sent: Tuesday, March 18, 2008 10:10 PM
To: Alfred Rovai
Subject: Classroom Community Scale

Dr. Rovai-

Hi! My name is Darren Mariano and I'm a graduate student at Duquesne University's School of Education in Pittsburgh, PA. I am e-mail you to see if you would give me permission to use your 'Classroom Community Scale' for my disseration work?

Thank You for the consideration. Take care,

-Darren Mariano

--
This message has been scanned for viruses and
dangerous content by MailScanner, and is
believed to be clean.

APPENDIX C

PRE-SURVEY QUESTIONNAIRE

Demographic & Previous Online Learning History Questionnaire

Please answer each of the following demographic questions. All questions require completion before you can continue. After you click 'Done', you will be redirected to the project website. Please continue to follow the directions outlined. Thank You.

1. Gender:

◯ Male   ◯ Female

2. Age:

◯ 18-19   ◯ 30-39   ◯ 50 or above

◯ 20-29   ◯ 40-49

3. Employment Status:

◯ Unemployed   ◯ Employed full-time   ◯ Two or more jobs

◯ Employed part-time   ◯ Self-employed

4. Degree Program:

◯ Undergraduate   ◯ Graduate   ◯ Doctoral

5. Academic Major:

[   ]

6. Have you ever taken or completed any online courses?

◯ Yes   ◯ No

7. Are you currently enrolled in a or any online courses?

◯ Yes   ◯ No

8. Do you have any experience with a threaded discussion forum?

◯ Yes   ◯ No

APPENDIX D

EXPERIMENTAL SYSTEM MOUSE-OVER OR IMPLEMENTATION

Appendix D(a). Mouse-Over: Mouse-over of participant with associated contact

information displayed.
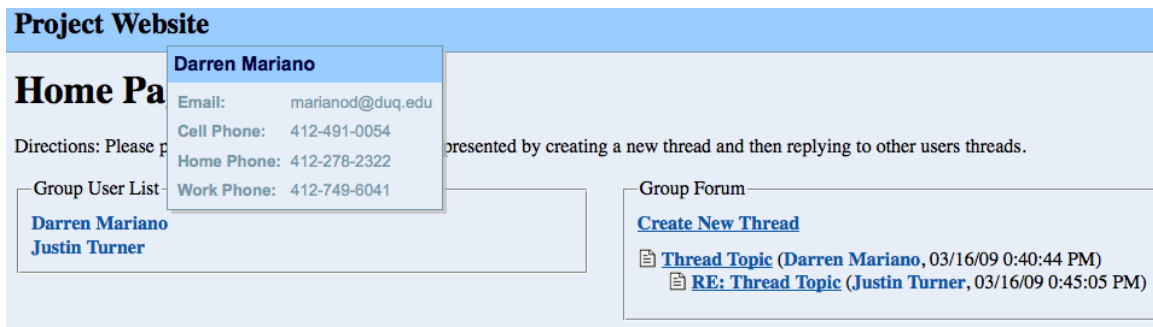
Appendix D(b). Implementation Mouse-Over: **Lesson Forum and Hypothetical Group**

User List. Threaded discussion forum with integrated experimental system: Mouse-

Over of user Darren Mariano utilizing contact information.

APPENDIX E

EXPERIMENTAL SYSTEM CONFIGURATION OR REGISTRATION

Register User

Please create your login information by completing the items below.
Please write-down the information entered.
You will need your login each time you enter the lesson website.

┌─ Credentials ─────────────────────────────────────┐
│ Login: [_____]   │
│ Password: [_____]   │
│ Confirm Password: [_____]   │
└───┘

┌─ User Information ────────────────────────────────┐
│ Please enter your first & last name along with your e-mail address. │
│   │
│ This information will be used during the online lesson and to announce │
│ the winners of the raffle   │
│   │
│ Fist Name: [_____]   │
│ Last Name: [_____]   │
│ Email: [_____]   │
└───┘

(Register) (Cancel)

Appendix E. **Experimental System Registration or Configuration: Participant**

creates a username and password along with entering personal information (first

and last name and e-mail address).

APPENDIX F

EXPERIMENTAL SYSTEM REGISTRATION FLOWCHART

-------- **START HERE** --------
Participant is aware of study and URL address. He or she navigates to URL address, reads homepage and participant decides to join study.

If participant already has username & password he or she logs in.

Reads directions & Clicks 'Register'.

Reads consent form, agrees and continues with study.

Experimental Tool Registration Flowchart

Personal Info Regulated
Counterbalancing

Tool places participant into one of five categories and participant is asked to supply such information for configuration.

As one participant gets assigned into the appearance category, the second participant would be assigned to the educational category, the next participant to the contact category and the next participant to the personal category, followed by the last category (no information) until the categorization repeats backwards over again. A counterbalancing technique is employed to ensure that as participants' register for study, their selection into one of the five categories does not preclude a future participant from any other particular category. This also guarantees that all five categories are evenly distributed as participants register for the study.

Participant Registration
Participant provides Personal Information in RED

Creates a Username & Password

Username
Password

Provides Personal Information

First Name
Last Name
E-mail Address

Appearance Info Category

Height
Eye Color
Handedness

Education Info Category

Last degree earned
Major
Education Year

Contact Info Category

E-mail
Cell Phone
Home Phone
Work Phone

Personal Info Category

Age
Gender
Hobbies
Marital Status
Dependents

Control Info Category

NO Info

Pre-survey Questionnaire

Participant logs in using username & password previously created.

Lesson lasts 2 weeks time.

Lesson Website

Directions, Lesson document, Social Awareness Tool & Discussion Board.

Post-survey Questionnaire & Raffle winner announced

169

APPENDIX G

EXPERIMENTAL SYSTEM CATEGORIES

Category 1: Control – No Personal Information; No view shown

Category 2: Appearance Information

Appearance Information

Please complete the information requested below and click "Submit" when finished.

Height: 1' ⬍   0" ⬍
Eye Color: Brown ⬍
Handedness: Right ⬍
            (Submit) (Cancel)

Height (drop downs for feet and inches)
Eye Color (Brown, Blue, Green, Hazel)
Handedness (Right or Left)

Category 3:Education Information

Education Information

Please complete the information requested below and click "Submit" when finished.

Last Degree Earned: High School ⬍
Major: [   ]
Education Year: Freshmen Student ⬍
                     (Submit) (Cancel)

Last Degree Earned (High School, Bachelors, Masters, Doctorate)
Major (box for participant to type major, no more than 30 characters)
Education Year (Freshmen Student, Sophomore Student,, Junior Student, Senior
                Student, Graduate Student)

Continued on next page…

Category 4:Contact Information

Contact Information

Please complete the information requested below and click "Submit" when finished.

Email:

Cell Phone:

Home Phone:

Work Phone:

Submit   Cancel

E-mail address (must have @ sign. No more than 30 characters;
                example: marianod@duq.edu)
Cell phone (must have correct format with area code; example: 412-000-0000)
Home phone (must have correct format with area code; example: 412-000-0000)
Work phone (must have correct format with area code; example: 412-000-0000)

Category 5: Personal Information

Personal Information

Please complete the information requested below and click "Submit" when finished.

Age: 18

Gender: Male

Hobbies:

Marital Status: Single

Number of Dependents: 0

Submit   Cancel

Age (Drop down from 18-100)
Gender (Male or Female)
Hobbies (Box for user to type hobbies; no more than 30 characters)
Marital Status (Single, Married, Divorced, Widowed)
Number of Dependents (drop down from 0 though 6)

APPENDIX H

EXPERIMENTAL SYSTEM FORGOT PASSWORD LINK

Appendix H (a). **Experimental System Forgot Password Link: Participant selects**

'Forgot Password?' to enter e-mail address for retrieval.

Appendix H (b). **Experimental System Forgot Password Link: Participant enters e-**

mail address to retrieve a new password via e-mail.

174

APPENDIX I

EXPERIMENTAL SYSTEM ADMINISTRATION

Project Administration

Administration Menu
Properties
Statistic
    Profile View Statistic
    User Session Statistic

Home Page

Administrative Home Page. Only administrator can access it!

Appendix I (a). **Experimental System Administration Function: Homepage. Secure access to data via administrative login.**

Project Administration

Administration Menu
Properties
Statistic
    Profile View Statistic
    User Session Statistic

Profile View Statistic

Generate Statistic

Appendix I (b). **Experimental System Administration Function: Profile Statistic. A Microsoft excel csv document can be exported from data within MySQL database to be saved, viewed and analyzed for frequency and duration of system use.**

Continued on next page…

176

Participant ID that performed the viewing

How many times the pop up was viewed and for how long (frequency and duration)

Participant ID they viewed and what category they were assigned

New Open Save Print Import   Copy Paste Format   Undo   Redo   AutoSum Sort A

Verdana   10   B I U   A $ % ,

Sheets

	A	B	C	D	E
1	Viewer id	Viewed id	User group	Popup visible count	Popup visible time (sec)
2	2	2	PERSONAL	6	32
3	3	3	APPEARANCE	7	100
4	5	5	CONTACT	10	50
5	5	7	CONTACT	8	33
6	7	5	CONTACT	1	5
7	8	8	EDUCATION	1	1
8	6	10	CONTROL	1	4
9	6	6	CONTROL	1	2

Appendix I (c). **Experimental System Administrative Function: Data Example. A Microsoft excel csv document of sample data exported from within a MySQL database of frequency and duration of system use. The data contained in this file is for example purposes only.**

Continued on next page…

Appendix I (d). **Experimental System Administrative Function: Systems Properties.**

Sample data entered to show options available for event tracking, presentation,

security and discussion completion date.

APPENDIX J

LETTER OF CONSENT

DUQUESNE UNIVERSITY

600 FORBES AVENUE ◆ PITTSBURGH, PA 15282

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: The Effectiveness of Creating a Sense of Community in Online Learning with Social Awareness Information

INVESTIGATOR: Darren G. Mariano
103 Manor Drive
Oakdale, PA 15071
(412) 491-0054 Cell
(412) 749-6041 Work

ADVISOR: (if applicable:)   Misook Heo, Ph.D.
Department of Instruction and Leadership in Education
327 Fisher Hall, Duquesne University
412-396-1662

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in education at Duquesne University.

PURPOSE: You are being asked to participate in a research project that seeks to investigate the impact of social awareness information on an online learner's sense of community within an online learning environment. You will be asked to answer pre- and post-experiment online survey questions. In addition to the surveys, you will be asked to share personal information and post asynchronous discussion responses during the experiment. Your performance will not be graded nor will your participation affect your academic standing in your class.

These are the only requests that will be made of you.

RISKS AND BENEFITS: Given the social information support system deals with the social information of individuals, your identity will be exposed to your classmates. The experimental system will assign you to one of five groups and require you to enter personal information to be shared with your classmates. Your personal information from one of these five categories (Appearance, Education, Contact, Personal or no

27

180

information) will be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. The investigators cannot guarantee the confidentiality of data being shared among classmates during the online discussion, however the investigators will make sure that all collected data for data analysis will be kept confidential and will be stored securely in the investigator's computer.

The decision to decline participation will in no way affect your course or academic standing. While you are expected to interact with the participants of the experiment, this research is not for assessing your performance in the experiment. Your interactions with the experimental system (i.e. frequency, access duration, etc.) and online survey responses will be the main focus of the research, and these data will be recorded for analysis. The recorded data, however, will ONLY be used for research purposes. Any identifying information will be removed from all data analyses.

If you feel any discomfort during participation, you may withdraw from the study and in no way will your decision affect your course or academic standing. A benefit to you is that the use of the experimental system may enhance your learning experience. Additionally, your participation may have a long-term benefit by suggesting how systems of this type can improve online communication.

COMPENSATION: There will be no monetary compensation for you. Your participation, however, will include you in a raffle for a chance to win an Apple iPad, a tablet based computer.

At the conclusion of the lesson, a random number generator utilizing the first (lower limit) and last (upper limit) participation ID will be used to determine the winner of the raffle. The winners' participant ID number will be corresponded to their registration information (first name, last name and e-mail address) and the winner will be notified by e-mail so that he/she can claim the Apple iPad.

28

181

CONFIDENTIALITY: While your name and personal information will appear on the experimental system, all of your interactions with the system, including activities and online survey responses (via Zoomerang online survey site), will be recorded in association with a participation ID, not your name. Since Zoomerang collects survey responses over the Secure Socket Layer (SSL) with 128-bit encryption, your responses will be securely transmitted. No identity will be made in the data analysis. All experiment and consent data will be stored securely in the investigator's computer. Your response(s) will only appear in statistical data summaries. All materials will be securely maintained for a minimum of five years.

RIGHT TO WITHDRAW: You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time. If you choose to withdraw from this study, any data already collected will not be used for the research.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to participate in this research project.

          I understand that should I have any further questions about my participation in this study, I may call Mr. Darren G. Mariano at 412-749-6041 or Dr. Misook Heo at 412-396-1662. I may also contact Dr. Joseph Kush, Chair of the Duquesne University Institutional Review Board, at 412-396-6326.

       I acknowledge that I have read this form, am at least 18 years of age and, by clicking the accept button and completing the online survey, it reflects my consent to participate in this study.

accept

APPENDIX K

PARTICIPATION FLYER

Win an iPad

Darren G. Mariano, a doctoral student in the Instructional Technology Program of the School of Education, asks for your participation in his research, *The Effectiveness Of Creating A Sense Of Community In Online Learning With Social Awareness Information.* This research is to examine the impact of social awareness information on a learner's sense of community within an online learning lesson. The lesson involves reading an article and responding to five prompts on an online discussion board. Personal information may be shared with other participants. Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. Students who are currently enrolled in the university (undergraduates & graduates) and who are above the age of 18 years of age are eligible for the experiment. A weekly time commitment is required (about 30 minutes to 1 hour per week for 2 weeks). With your participation, a better online learning experience is expected, but not guaranteed.

Participants will not be monetarily rewarded for participation in the study, however,

they will be included in a raffle for a chance to win an **Apple iPad**, a tablet based computer.

For those interested, please visit the URL Address: http://www.duquesneit.com or contact Darren G. Mariano, Instructional Technology program, via phone 412-749-6041 or email (marianod@duq.edu).

Signature of the Co-investigator: *Darren G. Mariano* Date: *October 14, 2011*

APPENDIX L

PARTICIPATION REQUEST VIA E-MAIL TO STUDENTS

Participation Request via E-mail to Students

Subject: Research Participation Wanted for Instructional Technology Research

Darren G. Mariano, a doctoral student in the Instructional Technology Program of the School of Education, asks for your participation in his research, *The Effectiveness Of Creating A Sense Of Community In Online Learning With Social Awareness Information*. This research is to examine the impact of social awareness information on a learner's sense of community within an online learning lesson. The lesson involves reading an article and responding to five prompts on an online discussion board. Personal information may be shared with other participants. Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. Students who are currently enrolled in the university (undergraduates & graduates) are eligible for the experiment. Only students who are above the age of 18 years of age will be allowed to participate. A weekly time commitment is required (about 30 minutes to 1 hour per week for 2 weeks). With your participation, a better online learning experience is expected, but not guaranteed.

Participants will not be monetarily rewarded for participation in the study, however, they will be included in a raffle for a chance to win an **Apple iPad**, a tablet based computer.

For those interested, please visit the URL Address: http://www.duquesneit.com or contact Darren G. Mariano, Instructional Technology program, via phone 412-749-6041 or email (marianod@duq.edu).

APPENDIX M

LETTER TO FACULTY MEMBERS

Letter to Faculty Members

Darren G. Mariano
[Address]

Dear [Faculty Member]:

I am writing to request permission to visit your classroom and/or post an Announcement seeking research participates on your Blackboard site during the first two weeks of September 2011. As a Doctoral student in the Instructional Technology Program of the School of Education, I would like to present the opportunity for your students to participate in my research entitled, *The Effectiveness Of Creating A Sense Of Community In Online Learning With Social Awareness Information*.

This research is to examine the impact of social awareness information on a learner's sense of community within an online learning lesson. The lesson involves reading an article and responding to five prompts on an online discussion board. Personal information may be shared with other participants. Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. Students who are currently enrolled in the university (undergraduates & graduates) are eligible for the experiment. A weekly time commitment is required (about 30 minutes to 1 hour per week for 2 weeks). With their participation, a better online learning experience is expected, but not guaranteed.

My visit to your classroom will be brief (less than 10 minutes). All that I ask is for you to step out of the room so that I may present your students with a flyer approved by Duquesne University's Institutional Review Board and invite the students to participate. Only students who are above the age of 18 years of age will be allowed to participate.

If you are willing to grant this permission, please e-mail me at marianod@duq.edu or call [Phone].

Sincerely,

Darren G. Mariano
Doctoral Student in Instructional Technology

APPENDIX N

IN CLASS STATEMENT

In Class Statement

(Begin - Co-investigator reads:)

Hi, my name is Darren Mariano and I am conducting research in the school of education. My study is entitled: THE EFFECTIVENESS OF CREATING A SENSE OF COMMUNITY IN ONLINE LEARNING WITH SOCIAL AWARENESS INFORMATION. Your participation is entirely voluntary. Your participation will not impact your grade in this or any course. You are free to opt-out of the study if you wish at any time. Only students who are above the age of 18 are allowed to participate. Students who are currently enrolled in the university (undergraduates & graduates) are eligible for the experiment.

Existing research illustrates the need for social awareness information in online education and studies the impact of the visual presence of the information in online education. The goal of this study project is to examine the impact of social awareness information on an online learner's sense of community within an online course lesson. The entire study will be conducted online and the lesson involves reading an article and posting your opinions and questions to an online discussion board. The lesson will not last more than 2 weeks time. You will be required to register for the study during a 2-week period and provide your first and last name along with an e-mail address. Additional personal information might be required however please keep in mind that you will not be evaluated. The purpose of this study is to evaluate a Social Awareness System.

Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. The final category is no information

All data collected during the study will be confidential and analyzed cumulatively. If you complete the study then you will be entered into a raffle to win an Apple iPad.

To register for the study please visit the following URL address:

http://www.duquesneit.com

I will now distribute a flyer outlining what I have discussed.
(Distribute Flyer)
Thank you for your time and consideration.

(End)

APPENDIX O

FACULTY ANNOUNCEMENT POSTING TO STUDENTS

(BLACKBOARD)

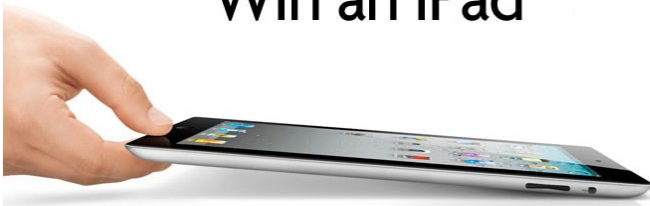# Faculty Announcement Posting to Students (Blackboard)

Subject: Instructional Technology Research

Darren G. Mariano, a doctoral student in the Instructional Technology Program of the School of Education, asks for your participation in his research, *The Effectiveness Of Creating A Sense Of Community In Online Learning With Social Awareness Information*. This research is to examine the impact of social awareness information on a learner's sense of community within an online learning lesson. The lesson involves reading an article and responding to five prompts on an online discussion board. Personal information may be shared with other participants. Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. Students who are currently enrolled in the university (undergraduates & graduates) are eligible for the experiment. Only students who are above the age of 18 years of age will be allowed to participate. A weekly time commitment is required (about 30 minutes to 1 hour per week for 2 weeks). With participation, a better online learning experience is expected, but not guaranteed.

Participants will not be monetarily rewarded for participation in the study, however, they will be included in a raffle for a chance to win an **Apple iPad**, a tablet based computer.

For those interested, please visit the URL Address: http://www.duquesneit.com or contact Darren G. Mariano, Instructional Technology program, via phone 412-749-6041 or email (marianod@duq.edu).

APPENDIX P

SOCIAL AWARENESS COURSE HOMEPAGE(S)

Project Website

Researcher

Advisor

Project Description & Purpose

My study is entitled: THE EFFECTIVENESS OF CREATING A SENSE OF COMMUNITY IN ONLINE LEARNING WITH SOCIAL AWARENESS INFORMATION. Your participation is entirely voluntary. Your participation will not impact your grade in this or any course. You are free to opt-out of the study if you wish at any time. Only students who are above the age of 18 are allowed to participate. Students who are currently enrolled in the university (undergraduates & graduates) are eligible for the experiment.

Existing research illustrates the need for social awareness information in online education and studies the impact of the visual presence of the information in online education. The goal of this study project is to examine the impact of social awareness information on an online learner's sense of community within an online course lesson. The entire study will be conducted online and the lesson involves reading an article and posting your opinions and questions to an online discussion board. The lesson will not last more than 2 weeks time. You will be required to register for the study during a 2-week period and provide your first and last name along with an e-mail address. Additional personal information might be required however please keep in mind that you will not be evaluated. The purpose of this study is to evaluate a Social Awareness System.

Participants will be asked to answer or list one of five categories of personal information that may be shared: Appearance, Education, Contact, Personal or no information. Each category has a subset of personal information to be shared. The appearance category includes height, eye color and handedness. The education category includes the last degree earned, major and education year. The contact category includes e-mail, cell phone, home phone and work phone numbers. The personal information category contains age, gender, hobbies, marital status and number of dependents. The final category is no information

All data collected during the study will be confidential and analyzed cumulatively. If you complete the study then you will be entered into a raffle to win an Apple iPad.

Important Documents

- **The Interconnected Nature of the 21st Century World**
- **Consent Form**

Directions

1. You must first register for the research study and agree to the informed consent before beginning. Once registered you will be taken to research website and can begin the study.
2. Please click this link to register for the Study: **Register**
3. Login to Research Project Website and follow directions. **Login**

Compensation

Participants will not be monetarily rewarded for participation in the study, however, they will be included in a raffle for a chance to win an Apple iPad, a tablet based computer. Participants must register for the study, complete the pre/post survey and follow the directions posted on the website homepage to be eligible for the raffle.

Help Avaiability

- The following browsers are compatible: Internet Explorer 7 (PC), Firefox (PC, Macintosh), Safari (PC, Macintosh).
- Available via email (marianod@duq.edu) or by appointment.

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Appendix P (a). Experimental System: **Extranet, Social Awareness Course Homepage. Homepage resolved from URL: http://www.duquesneit.com**

Home Page

Project Website User ID#: 15 Welcome, marianod14 | Sign Out

Home Page

Your User ID# is: 15, please, follow this link to take the pre-survey.

Directions

1. Please read the following article in PDF form entitled: The Interconnected Nature of the 21st Century World

2. Below are five discussion forum prompts. After reading the above article, please post your response(s) to the questions.

   'Are you a digital immigrant or a digital native?'
   'What technologies are you using regularly or struggling with as a digital native or digital immigrant?'
   'Which of the technologies that you use regularly in your free time could help you as a student and how?'
   'Do you feel that your instructors have connected with you as a digital immigrant or digital native?'
   'Share an experience where being a digital immigrant to a specific technology resulted in frustration?'

3. Throughout the next two-week period, please review other participants' responses and discuss/comment.

4. A Group User List is provided, please hover over a users name for more information.

5. On 11/10/12, the discussion board will close and you will be asked to complete the post-survey.

Directions: Please post your responses to the questions presented by creating a new thread and then replying to other users threads.

Group User List

Testing One
Testing FIVE
User 1
Darren Mariano

Darren Mariano

Degree: High School
Major: Education
Education Year: Freshmen Student

Group Forum

Create New Thread

Native (Testing One, 09/28/11 3:31:49 PM)
   RE: Native (Darren Mariano, 03/07/12 11:06:54 PM)

test (Testing One, 10/07/11 3:57:35 PM)

© 2011/12

W3C CSS level2 W3C XHTML 1.0

Appendix P (b). Experimental System: **Intranet, Social Awareness Course Homepage.**

Homepage after user registered and logged in using sample data.

APPENDIX Q

READING MATERIAL

("THE INTERCONNECTED NATURE OF THE 21ST CENTURY

WORLD")

The Interconnected Nature of the 21st Century World

Digital natives, digital immigrants

My son, Noah, is what some would call a "digital native," one who has never known a world without instant communication. While the 20-year-old university student may appear to inhabit a bedroom in my house, he actually spends much of his time in another galaxy—out there, in the digital universe of gaming sites, web-conferencing, text messages, BitTorrent, and social networking sites like Facebook.

His father, Travis, on the other hand, is a "digital immigrant," one who is still coming to terms with how to check his cell phone's voice mail and view a digital video on YouTube.

This generational divide has been evident for a while, but only now are we beginning to realize that today's technology is changing the way people absorb information and the way our students think and learn. Some researchers believe that this constant interaction with digital media is causing today's students to begin to think and process information in ways very different from the pre-Internet generation. Current research proposes that, "Different kinds of experiences lead to different brain structures" (Prensky, 2001). Students who have immersed themselves in using digital tools such as video games, e-mail, instant message, and television have physically different brains as a result of the digital stimulation. Social science suggests that the environment and culture in which people are raised influences the way they catalog and process information. This can be clearly seen when examining thinking skills enhanced by repeated exposure to computer games and other virtual media, as thought patterns are less linear and more divergent in style (Prensky, 2001). Today's student also is better at multitasking and responds faster to expected and unexpected stimuli.

Marc Prensky (2001) first coined the term digital native to refer to today's students. "They are native speakers of technology," Prensky says, "fluent in the digital language of computers, video games, and the Internet. I refer to those of us who were not born into the digital world as digital immigrants. We have adopted many aspects of the technology, but like those who learn another language later in life, we retain an 'accent' because we still have one foot in the past." For example, digital immigrants will often choose to read a manual rather than learn from the experience of working with the software program. "Our accent from the predigital world often makes it difficult for us to effectively communicate with our students," Prensky says.

Referring to younger people as "the digital natives" for whom technology use comes more naturally and to older people as "the immigrants" who comprise most of the adult population and teaching cadre in our schools and universities can be helpful in understanding the obstacles that surface when teaching this generation of learners.

The need for an expanded continuum

Educational Consultant Wes Fyrer (2006) feels that, rather than individuals falling into one camp or the other, there exists a continuum in which people can find their place:

The Natives: Students who have grown up in, or are growing up in, the digital age; who assimilate digital tools and methods for communication as easily as they breathe.

The Immigrants: Older adults in society and in our schools who did not grow up with digital technology tools, but who are working to "learn the language" and to communicate effectively with the natives around them. Some of the immigrants are open and accepting of "native ways," but many are resistant to change.

The Refugees: Older adults in society who have chosen to flee from – rather than integrate into – the native culture. They may actively work against the goals and interests of both the digital natives and the digital immigrants. The refugees are primarily motivated by fear and a staunch desire not only to resist change but to actively oppose it, to deny the existence of a changed environment, and/or to ignore it.

The Bridges: The digital bridges are neither truly natives nor fully digital immigrants. Like millenials, who have one foot in each century, the bridges have both native and immigrant traits. As a result, digital bridges are able to communicate relatively effectively with both groups.

The Undecided: These people have not made up their minds about which group they fit into, or which group they want to fit into. They are likely immigrants or refugees, but may not have taken sufficient action to reveal their identities and/or preferences for group identity.

But does this oversimplification give teachers an excuse to not master these pervasive tools as a means for engaging the students they teach? David Warlick blogs about digital natives and digital immigrants and warns educators not to let our immigrant condition limit us as we move forward in learning how to speak in a digital tongue our students will understand.

"But I believe that it is time that we stop hiding behind our immigrant status and start acting like natives. We need to stop making excuses and start leading. We are teachers, after all. It's our job to lead, not follow. Sure, we'll never be able to keep up with our kids in lots of ways. They have the luxury of time, and their brain cells are fresher. But it is our job to look into the future and then to plan and lead the way for our children" (Warlick, 2006).

Christopher Dede, Timothy E. Wirth Professor in Learning Technologies at Harvard Graduate School of Education, argues that using these labels can lead to overgeneralizations: "Don't start with the technology, when you start with technology, it's a solution looking for a problem." Dede starts, instead, with learning styles. "No matter what age you are, your learning style can be shaped by the kind of media you use." Dede suggests that age may not be the determining factor of how seamlessly we use the tools of the 21st Century. For example, those who have a media-

based learning style synthesize and process experiences rather than information, regardless of their age. They learn best when taught actively, through collaborations both online and in the real world.

Last generation

The rapid changes taking place in this digital world are just beginning. One of the clear indicators of natives and immigrants will not simply be a question of age, but rather of the instinctive acceptance of rapid technological change. We may very well be the last generation of educators who has the prerogative of deciding whether or not to develop a digital literacy. Many of us have chosen not to acquire proficient technology skills, yet we have still experienced success in our professions. However, the children we teach today do not have that choice. Students must acquire a high degree of digital literacy to be truly marketable in the 21st Century. As educators, we do our students a great service if we allow them to seamlessly garner these skills within the safety nets of our classrooms. This means educators will need to immerse themselves in the digital landscape to be able to design learning activities that will be meaningful and authentic to this generation of learners (Nussbaum-Beach, 2003).

Digital students: Who are they and how do they learn?

According to Diana and James Oblinger (2005), today's students learn differently than previous generations and, as a result, they feel disconnected from schools that were designed for another time. Most of today's students have grown up in an environment where they control the flow of information they receive and the graphic format in which they receive it. Think about it: almost everywhere they go, this media-rich generation finds a constant stream of multimedia competing for their attention. They take in the world via cell phones, handheld gaming devices, portable digital assistants (PDAs), and laptops that they take everywhere. They are truly mobile. And at home they mainline electronic media in the form of computers, TV, and collaborative video games they play with users they have never met from around the world. Everywhere they go in society—technology beckons. The future is rushing at them full speed—until they enter our classrooms and time seems to stand still. Children today spend much of their day learning in the same way their grandparents did and, as a result, school seems rigid, uninteresting, and unyielding to many students (Nussbaum-Beach, 2003).

Digital disconnect

Today's multitasking students are better equipped for change than many of their teachers. In fact, researchers Ian Jukes and Anita Dosaj refer to this disconnect as the result of poor communication between "digital natives" – today's students – and "digital immigrants" – many adults. These parents and educators, the digital immigrants, speak DSL, digital as a second language (Jukes and Dosaj, 2003). Look at the differences between how digital students learn and how analog teachers teach.

The differences between digital native learners and

digital immigrant teachers.

Digital Native Learners	Digital Immigrant Teachers
Prefer receiving information quickly from multiple multimedia sources.	Prefer slow and controlled release of information from limited sources.
Prefer parallel processing and multitasking.	Prefer singular processing and single or limited tasking.
Prefer processing pictures, sounds, and video before text.	Prefer to provide text before pictures, sounds, and video.
Prefer random access to hyperlinked multimedia information.	Prefer to provide information linearly, logically, and sequentially.
Prefer to interact/network simultaneously with many others.	Prefer students to work independently rather than network and interact.
Prefer to learn "just-in-time."	Prefer to teach "just-in-case" (it's on the exam).
Prefer instant gratification and instant rewards.	Prefer deferred gratification and deferred rewards.
Prefer learning that is relevant, instantly useful, and fun.	Prefer to teach to the curriculum guide and standardized tests.

*Ian Jukes and Anita Dosaj, The InfoSavvy Group, February 2003

Students are coming into our classrooms ready to learn in digital ways that are familiar to them and instead, they are just sitting there with pencil and paper in hand not engaged and not learning. The disconnect between how students learn and how teachers teach is easy to understand when one considers that the current school system was designed for preparing students for working in factories and agriculture. However, the world has changed and continues to change at an ever-increasing rate. While schools have done a masterful job of preparing students for an industrial age, we are moving at warp speed into a whole new era! Some believe the future of our educational system will hinge on our ability to lead and adapt, as we prepare our students for the future. We are the first generation of teachers who are preparing students for jobs that haven't even been invented yet. This means educators will need to rethink not only what to teach, but what it means to teach and learn in the 21st Century. Schools must be willing to redesign themselves or render themselves irrelevant in preparing students for success in the 21st Century.

Literacy in the 21st Century

Being literate in the future will certainly involve the ability to read, write, and do basic math. However, the concept of literacy in the 21st Century will be far richer and more comprehensive than the education you and I received growing up (Warlick, 2003). The very nature of information is changing: how we organize it where we find it, what we use to view it, what we do with it, and how we communicate it. Will Richardson (2006) – in his book Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms – talks about the transformational nature of these pervasive

technology tools, especially in terms of their ability to nurture connections and collaborations: "Whether it's blogs or wikis or RSS, all roads now point to a Web where little is done in isolation and all things are collaborative and social in nature." The most prevalent change in how we use the Internet in the 21st Century is not as much in the ability to publish information as it is the ability to share and connect with others from around the globe.

The social web: Learning together

Today's read/write web technologies have the power to create informal peer-to-peer social connections and to open new avenues for learning environments that go beyond those that are linear, teacher-centered, and lecture-based to ones that are divergent, dynamic, student-centered, constructive, and communication-rich.

A passionate student is a learning student. As the people of the world are becoming increasingly connected, the nature, use, ownership, and purpose of knowledge are changing in profound ways. Our goal as educators is to leverage these connections and changes as a powerful means to improve teaching and learning in our schools. We have a changing demographic in our classrooms, and by networking together with individuals from around the world we are building capacity in our students and ourselves to understand multiple viewpoints and perspectives. And by using digital media and web-based tools, students can build their own learning experiences, construct meaning, and collaborate in teams to solve authentic content-based problems. Many teachers who use these empowering technologies are now discovering we can have rigor without sacrificing excitement. The secret: focus on student passion and interest, not machines and software. Today's digital natives are passionate about team-based learning approaches because of their vast digital gaming experiences. It feels natural for them to learn by collaborating online with others they have never met.

Developing an effective learning environment in the 21st Century requires drawing on a wide range of teaching concepts, methods, strategies, and technologies. For example, building a rich environment for inquiry involves an understanding of literacy, of problem- and project-based learning, of critical and creative thinking skills, of problem solving techniques and constructivist learning theory. Allowing students to work in teams both in the classroom and with others around the world ensures that students are engaged in activities that help them actively pose questions, investigate and solve problems, and draw conclusions about the world around them. Author and researcher Daniel Goleman (1996) suggests that working in teams enables students to practice needed life skills. "Requiring students to learn socially actually forces students to draw on their emotional intelligence. This is a set of skills that includes how one handles emotions, deals with frustration, or resolves conflict." Through our creative use of the vast array of web-based social networking tools available, our students become researchers, writers, videographers, and activists rather than passive receivers of a textbook's content. They still learn content but through an authentic means that will prepare them for the world of work of tomorrow, rather than the world of work of today or yesterday. Collaboration is the focus of that learning.

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APPENDIX R

DISCUSSION FORUM PROMPTS

Discussion Forum Prompts

'Are you a digital immigrant or a digital native?

'What technologies are you using regularly or struggling with as a digital native or digital immigrant?

'Which of the technologies that you use regularly in your free time could help you as a student and how?'

'Do you feel that your instructors have connected with you as a digital immigrant or digital native?'

'Share an experience where being a digital immigrant to a specific technology resulted in frustration?'

Appendix R. Discussion Forum Prompts: Five discussion forum prompts for participants to read, answer and discuss.