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## **Social Networking Systems as a Vehicle to Promote Sense of Community and Performance in Online Classes**

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The University of Southern Mississippi

SOCIAL NETWORKING SYSTEMS AS A VEHICLE TO PROMOTE  
SENSE OF COMMUNITY AND PERFORMANCE IN ONLINE CLASSES

by

Jonathan Mark Woodward

Abstract of a Dissertation  
Submitted to the Graduate School  
of The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

August 2012

## ABSTRACT

### SOCIAL NETWORKING SYSTEMS AS A VEHICLE TO PROMOTE SENSE OF COMMUNITY AND PERFORMANCE IN ONLINE CLASSES

by Jonathan Mark Woodward

August 2012

Academicians are navigating through the intersection of information technology and social change. The path that educators choose will help determine the future of higher education in traditional and online settings. The journey of teachers is clouded by the abundance and rapid creation of emerging technologies, but the trends of Net Generation students offer direction. Among Web 2.0 applications, social networking systems (SNSs) offer students a new approach to communicating, learning, and collaborating.

The sociocentric view of knowledge and learning and the theories of Vygotsky and Dewey are helping to drive educators to look for a solution to a missing link in the current e-learning ecosystem, which many identify to be community. This study sought to identify whether SNSs promote sense of community, connecting, learning, and performing better than learning management systems (LMSs) in community college e-learning classrooms. Chaos theory was used as a metaphor to identify variables.

The results indicated that students in the SNS environment performed significantly better than students in the LMS environment by almost an entire letter grade. SNS students made dramatic gains toward achieving the performance level of face-to-face students. The findings revealed that females gained more than males over time in e-learning for sense of community, connecting, and learning. SNS students did

not outperform LMS students on sense of community, connecting, or learning. The results could offer educators direction in the pursuit of a healthy e-learning ecosystem that is flexible and adaptive. The findings are applicable to scholars, teachers, administrators, and policy makers.

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SOCIAL NETWORKING SYSTEMS AS A VEHICLE TO PROMOTE  
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by

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A Dissertation  
Submitted to the Graduate School  
of The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

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## CHAPTER I

### PURPOSE OF THE STUDY

#### Introduction

Academicians are navigating through the intersection of information technology and social change. The paths that these current educators choose will help determine the future of higher education in traditional and online settings. In order to ensure maximum success, instructional technology experts argue that educators must understand clearly which technology tools students already use and embrace in their personal lives, the importance of these tools, and how students use them (Smith & Caruso, 2010). While students are exploring these emerging technologies on their own, teachers should seek direction on what technology applications (i.e., tools) are most appropriate for online teaching environments. However, the journey of teachers is clouded by this exponential growth in technology. Emerging technologies are being created at a rapid and abundant pace. The trends of the Net Generation students (i.e., born 1981-2000) may be able to offer teachers some direction (Held, 2009).

This educational quandary is confounded further by quantitative and qualitative changes in e-learning. The staggering growth of e-learning is rapidly becoming a dominant component of higher education in the twenty-first century. During the fall 2009 semester, 29.0% of all college students enrolled in at least one online class. More poignantly, online enrollment comprised 9.6% of total enrollment in colleges for the fall 2002 semester but 29.3% of total enrollment in the fall 2009 semester (Allen & Seaman, 2010). In addition, recent globalization trends are redefining the traditional e-learning populace from a homogeneous segment of working adults who are generally motivated

and goal-oriented “to one that is heterogeneous, younger, vigorous, dynamic and responsive” to the brisk tempo of technology development (Dabbagh, 2007, p. 217).

The tectonic shifts in technology, growth in e-learning, and generational trends in technology use lay the foundation of the twenty-first century classroom. Students no longer consider a classroom having overhead projectors and PowerPoint as being enhanced with *technology* (Smith & Caruso, 2010). Smith and Caruso (2010) described these technologies as being expected and considered as constants, similar to electricity, air conditioning, and blackboards and whiteboards. In like manner, the authors revealed that faculty and students soon will consider online research, learning management systems (LMS), and Wi-Fi networks as being constant, no longer *technology*. For example, almost all cameras are now digital, so the term *digital camera* is now virtually obsolete. Similarly, faculty and students increasingly use technology to mediate learning; thus, the terms *web-enhanced* or *technology-enhanced* classroom may soon be obsolete. Therefore, technology may no longer be a mere *tool* used by educators.

Organizational effectiveness hinges, in large part, on the flow of information. Siemens (2005) asserts that organizations and classrooms should focus on preserving, creating, and employing information flow. The intertwined nature of technology and education is now acknowledged. In 2006, Susan Patrick spoke about this alliance while serving as the President of the North American Council on Online Learning: “I think that in the future, there won’t be any differentiation between where the education comes from. We’re not going to call it online learning, we’re just going to call it learning” (Marikar, 2006, p. 2). Unfortunately, educators have largely avoided the possibilities of Web 2.0 to realize this interconnected scenario (Downes, 2010). This study sought to identify if

ubiquitous Web 2.0 technologies could enhance the sense of community in online instruction.

### Statement of the Problem

In recent decades, several researchers have argued that a sense of community is an essential part of learning, including the e-learning environment (Hung & Yuen, 2010; McMillan & Chavis, 1986; Moore, 1994; Sarason, 1974; Yuen & Yang, 2010). Their research is based in part on the sociocentric view of knowledge and learning (SVKL). This view, based on the social learning theories of Vygotsky (1978) and Dewey (1938), indicates that

An individual's interactions with others are major determinants of both the substance and process of education and knowledge construction. Knowledge, understanding, perspective, and the resultant expression of ideas are therefore relational, and not solely individual, as they are by-products of the interactions of groups of people across time. (Collins & O'Brien, 2003, p. 330)

SVKL and the theories of Vygotsky (1978) and Dewey (1938) are helping to drive educators to look for a solution to a missing link in the current e-learning environment, which many identify to be *community* (Yuen & Yang, 2010). Adding to the movement toward social learning is evidence that a strong sense of community is imperative for the Net Generation (Strauss & Howe, 2007a). Yuen and Yang (2010) provided a convincing argument to use social networking systems (SNS) to meet this communal void, which is included in the literature review.

Researchers have discovered that building community in an e-learning environment is not as intuitive or as easy as some enthusiasts have advocated (Liu, Magjuka, Bonk, & Lee, 2007). Consistent with SVKL and the theories of social

constructivists, many studies demonstrate that a sense of community relates positively to key factors in learning: social support, coping skills, higher self-esteem, social skills, flow of information, group cooperation, intrinsic motivation, interest in academic and social activities, academic satisfaction, emotional and academic support, academic self-efficacy, and commitment to obtaining group and individual academic goals (Battistich, Solomon, Watson, & Schaps, 1997; Dede, 1996; Pretty, Conroy, Dugay, Fowler, & Williams, 1996; Rovai, 2000; Rovai, Wighting, & Lucking, 2004; Vieno, Perkins, Smith, & Santinello, 2005).

The literature clearly demonstrates the importance of a sense of community in education (Rovai & Lucking, 2003; Sergiovanni, 1999), but little research has been conducted on how class format affects a sense of community in the e-learning environment (Yuen & Yang, 2010). None of the research explores the mediating effect of SNS on sense of community in community colleges. This study was placed in the context of a specific course (i.e., Art Appreciation) in a community college. However, the ability to promote a sense of community in an e-learning environment has implications for many collegiate disciplines and levels beyond the community college because of the relationship between community and learning. Therefore, the problem is that while theory and empirical research have indicated the vital role of sense of community in the e-learning classroom, knowledge of how to improve the sense of community in e-learning classes is limited.

### Background

This study sought to identify whether SNSs promote sense of community, connecting, learning, and performing better than LMS in community college e-learning classrooms. Web 2.0 applications are facilitating exponential change on the Internet and

in society (Surry & Ensminger, 2010). Among these applications, SNSs offer students a new approach to communicating, learning, sharing information, researching, and collaborating (Yuen & Yang, 2010). However, a dichotomy exists between the way in which students use technology in everyday life and the way in which learners use technology for educational purposes (Repman, Zinskie, & Downs, 2010). SNSs are an example of and may be a solution for this disconnect.

SNSs offer a powerful blend of characteristics that place this application in a promising position to enhance learning. First, the EDUCAUSE Center for Applied Research (ECAR) studies reveal that SNSs are a technological juggernaut among students because over 90.0% of current undergraduate students use SNSs (Smith & Caruso, 2010; Smith, Salaway, & Caruso, 2009). Second, social networking sites represent a powerful tool for social interaction and transformation. For example, the *Arab Spring* in 2011 revolution in Egypt that ousted President Hosni Mubarak started with social networking (Evangelista, 2011). Third, most SNSs are free or inexpensive. While lecture capture, podcasting, and vodcasting require massive amounts of storage space to house recorded content or payment to a third-party contractor to store the media in an off-site server (EDUCAUSE, 2005, 2008). SNS avoids this need for a massive technological infrastructure.

Ironically, while advances in technology have given rise to numerous options and possibilities for online learning, many educational institutions have invested their resources and time into older technologies, such as LMS (Morgan, 2003). However, this investment may not be the best way to proceed with e-learning. Morgan (2003) clarified that the original intent of LMS was not to facilitate e-learning. Rather it was designed to augment face-to-face classes. However, these systems have evolved into the dominant



prototype for delivering online courses. Some researchers have argued that LMSs put e-learning on the wrong path. They assert that LMSs develop and operate in ways that primarily meet the needs of the organization rather than the students (Yuen & Yang, 2010). Several researchers over the last decade have questioned the monopoly of LMSs to drive e-learning (Palloff & Pratt, 1999; Rovai, 2002a, 2002b; Yuen & Yang, 2010). In addition, Net Generation students thrive on a sense of community, and community goes beyond face-to-face interaction for them (Oblinger, 2008; Strauss & Howe, 2007a). Integrating social multimedia technologies into courses can facilitate this preferable social environment (Oblinger, 2008).

In order to accomplish this scenario, the researcher positioned social interaction and facilitation in the context of a twenty-first century e-learning environment (i.e., SNS). This research compared learning in the context of two systems that are LMSs and SNSs. The possible expansion of the theoretical foundation of this research considered the influence of nonlinear dynamics (i.e., chaos theory), which accounts for key influential variables that naturally form in the context of systems. Chaos theory was used as a metaphor to identify variables.

### Research Hypotheses and Questions

The hypotheses in this study were examined through the Classroom Community Scale (CCS), course final grades, and class format:

H<sub>1</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of community* as measured by a pretest and posttest of the CCS.

H<sub>2</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of connectedness* as measured by a pretest and posttest of the subscale for connectedness in the CCS.

H<sub>3</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of learning* as measured by a pretest and posttest of the subscale for learning in the CCS.

H<sub>4</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *performance* as measured by course final grade.

The demographic data, CCS, course final grades, and class format provided the basis for the investigation of the following ancillary research questions:

RQ<sub>1</sub>: Does a relationship exist between students' *sense of community* and their age, gender, ethnicity, and/or general course format (i.e., traditional versus LMS and SNS) in a community college course as measured by a pretest and posttest of the CCS?

RQ<sub>2</sub>: Does a relationship exist between students' *connectedness* and their age, gender, ethnicity, and/or general course format in a community college course as measured by a pretest and posttest of the CCS?

RQ<sub>3</sub>: Does a relationship exist between students' *learning* and their age, gender, ethnicity, and/or general course format in a community college course as measured by a pretest and posttest of the CCS?

RQ<sub>4</sub>: Does a relationship exist between students' classroom *performance* and their age, gender, ethnicity, and/or general course format in a community college as measured by course final grade?

## Definition of Terms

The following terms are used in this study and should be understood in context:

- *Chaos theory* – “An event, behavior, or process which is variable, nonlinear, and unpredictable. Although chaos exists with identifiable patterns and boundaries, the patterns as well as the boundaries are flexible and indeterministic, changing unpredictably” (Trygestad, 1997, p. 3).
- *E-learning* – A general term for distance education conducted in an online environment. Hybrid and/or blended courses were not considered e-learning.
- *Learning management system (LMS)* – The predominant online platform used for delivering, teaching, and supervising Internet-based education. Yuen and Yang (2010) assert that this type of e-learning holds a monopoly on online teaching.
- *Net Generation* – Individuals born between the years 1980 and 2000. This generation is also known as the Millennials.
- *Sense of community* – “A feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9).
- *Social networking site (SNS)* – An online site or platform that builds online communities of individuals who share activities and/or interests, or individuals who are attentive to others’ activities and/or interests (Yuen & Yang, 2010). For the purpose of this study, social networking is defined as “tools that facilitate collective intelligence through social negotiation when participants are engaged in a common goal or a shared practice” (Gunawardena et al., 2009, p. 6).

### Delimitations

The following delimitations represent steps that the researcher took to voluntarily limit the scope of the study:

- The study included students enrolled in online Art Appreciation courses at a community college in the Southeastern United States, referred to as SSCC.
- The researcher employed Desire2Learn as the LMS in the study.
- The researcher employed Ning as the SNS in the study.
- Data collected for this study were confined to one semester.

### Assumptions

This study assumed that sense of community plays a significant role in learning, including the e-learning environment. It also assumed that the absence of sense of community has a negative influence on e-learning because of feelings of disconnectedness and isolation (McElrath & McDowell, 2008). The researcher asserts that a lack of community contributes to high attrition rates in e-learning (Angelino, Williams, & Natvig, 2007; Ferguson, 2010). Several researchers agree that the educational quality of courses can be measured by attrition rates: “If there is a high attrition rate, the perception is that the institution has a quality problem” (Angelino et al., 2007, p. 2; see also Ferguson, 2010; Moody, 2004). Therefore, high attrition rates in e-learning classes may indicate a qualitative issue. Another assumption of this research was that e-learning attrition rates would decrease and quality would improve in an online setting that promotes sense of community.

The researcher also assumed that SNSs promote sense of community, connecting, learning, and performing in an e-learning environment. SNSs have the potential to create enhanced communication among students, expand the avenues of communication beyond

the classroom, and enhance online teaching (Harris, 2008). SNSs are immensely popular and show great promise for e-learning, yet little is “known about how to integrate social networking focusing on building a sense of community, particularly in e-learning courses” (Yuen & Yang, 2010, p. 289).

#### Justification

LMSs may not represent the best mode to deliver e-learning. LMS is the prevailing delivery method for e-learning, but administrative support has been the primary focus of LMS (Repman et al., 2010). A growing number of researchers are challenging whether LMS can promote collaboration and innovation; still, many institutions mandate the use of LMS in online instruction (Craig, 2007). In addition, organizations may experience accelerated growth if they meet the needs of students in e-learning. Innovative tools that would foster collaborative and creative learning activities are not currently integrated into LMS (Repman et al., 2010).

The theories of Vygotsky (1978), Dewey (1938), Lave (1988), and Lave and Wenger (1991) clearly support the social nature of learning and the idea of the teacher as facilitator. According to Yuen and Yang (2010), SNSs would allow for social learning and teacher facilitation to be accomplished in an e-learning scenario, including higher education. In the context of an SNS, teachers can naturally facilitate the learning process through social interaction because SNSs are designed to promote social communication and collaboration (Facebook, 2012; Yuen & Yang, 2010).

This study illustrated the importance and feasibility of using SNSs to deliver e-learning courses. If the results had indicated that SNS did not enhance the sense of community or performance among learners, then contemporary e-learning approaches (i.e., LMSs) would have been further validated. However, students in the SNS

environment performed better than students in the LMS environment. In addition, the performance of the SNS students made dramatic gains toward achieving the performance level of traditional students. Therefore, further research on the implementation of SNS in e-learning is appropriate.

This study was bound by limitations and beckons future research. The study took place in the context of one type of class (i.e., Art Appreciation) and in a community college, so generalizability was filtered through this environment. The results indicated the need for legitimate follow-up research. This is particularly true concerning students' performance (i.e., course final grade) and the findings of gender and community. Further research could be conducted by teaching e-learning courses through SNSs in a variety of subjects and levels; this study only focused on one type of class, Art Appreciation. Research using SNSs in e-learning could be conducted in a broad undergraduate university setting. This study focused on community colleges whereas previous research primarily focused on graduate students. Also, future research could measure the effect of incorporating SNSs into LMS environments. SNSs might offer a bridge between contemporary delivery platforms of e-learning (i.e., LMS) and thriving Web 2.0 tools.

#### Summary

This study sought to realize the educational efficacy of SNS in comparison to LMS. Specifically, the researcher examined the extent to which these e-learning formats facilitated learning. Based in part on the SVKL, this study attempted to assess the development of sense of community, connecting, learning, and performing in a community college classroom as mediated by LMS and SNS, the two e-learning class formats. The literature precipitates the possibility of improving the contemporary approach to e-learning (i.e., LMS). SNS represents a powerful Web 2.0 technology that

could offer one means of improvement (Yuen & Yang, 2010). However, a limited amount of research exists on the ability of SNSs to develop community in an e-learning environment. This study may help to fill this gap.

## CHAPTER II

### REVIEW OF LITERATURE

#### Introduction

The following literature review begins with a brief history of distance education. Next, the theoretical framework helps to identify pertinent variables for this project. Afterward, the review expands upon four of the variables identified via the theoretical framework: systems, initial effects, bifurcations, and transduction. The researcher addresses the *systems* variable and compares the two e-learning systems—learning management systems (LMSs) and social networking systems (SNSs). Next, the researcher describes the *initial effects* of the learners: age, gender, and ethnicity. Then, the researcher discusses the *bifurcations* of this study, which are characterized as the role of community in learning. Since this study assumed that sense of community plays a significant role in learning, the literature that addresses the relationship between community and e-learning is reviewed. The researcher exemplifies *transduction* through the potential of emerging technologies, including legal concerns regarding SNS. Finally, the researcher provides a synthesis of the interactions between the variables and a justification for this study.

#### History of Distance Education

Distance learning has evolved over many centuries, and the Net Generation is currently helping to propel changes forward at a fast pace. Over time, this method of teaching has taken on many shapes and forms. Recent definitions of distance learning include computer technology as a foundational attribute of distance learning (Held, 2009). Casey (2008) heralded Keegan's perception of distance learning, which seems to incorporate several of the recent definitions: (a) teachers and students are permanently



separated during the learning process; (b) academic institutions provide student support services as well as prepare and plan the learning material; and (c) instructors and students use technical media such as computers, audio, video, or print to complete coursework.

### *Technology progression in distance learning*

In the large historical perspective, online education is simply the tailpiece of a developmental process over the last millennium. For example, the Mongolian Emperor Genghis Khan organized a mobile learning system that relayed information from the teacher to the student in a face-to-face manner by fast horsemen (Baggaley, 2008). Similarly, the Chautauqua movement transported educational presentations across Canada and the eastern United States of America during the late nineteenth century (Rieser, 2003). Older distance education delivery methods emphasized direct contact between students and teachers, while the current distance learning approaches emphasize asynchronous, indirect communication (Baggaley, 2008). Beldarrain (2006) emphasized that educators should bear in mind that distance learning developed thousands of years ago, and the goal of distance learning is to educate individuals that would not be able to access a traditional classroom.

In 1892, the University of Chicago created the first recognized college-level distance-learning program. The delivery method of this program was the United States Postal Service (Hansen, 2001). The expansion of distance learning in the twentieth century paralleled developments in technology. The radio was the first multimedia technology employed to deliver distance education. Several universities obtained radio licenses to offer distance learning by the early 1920s, but by the year 1940, only one college-level course had been offered. As might be expected, the television was the next multimedia technology turned to in order to deliver distance learning. In 1963,

technicians created the Instructional Television Fixed Service (ITFS) in order to allow educational institutions to broadcast courses by subscribing to this low-cost service (Casey, 2008).

According to Casey (2008), two important events took place in 1964 that further enhanced multimedia technology in distance learning. First, around this time, distance learning was gaining some acceptance worldwide, especially in Australia, Great Britain, and the United States. Second, the Carnegie Corporation funded the University of Wisconsin to use the Articulated Instructional Media (AIM) method to discover the best uses of technology. The AIM project aimed to identify, classify, and methodize best practices for how to develop and employ multimedia instructional packages in distance education. In 1970, Coastline Community College offered the first fully-televised college courses in Orange County, California (Held, 2009).

Beginning in the 1970s, multimedia technology developed at an exponential pace. A major development was the invention of the microprocessor in the 1970s, which enhanced distance education with the introduction of the inaugural Computer Bulletin Board System (BBS) (Moschovitis, Poole, Schuyler, & Senft, 1999). Casey (2008) explained that this specific technology enhanced communication between teachers and students. Real-time video broadcast of courses became available in the 1980s as satellite communication costs became more feasible. This satellite technology also enabled courses to be accessible in many remote locations. For example, Alaska created “the first state educational satellite system offered through television courses” (Casey, 2008, p. 4).

### *Recent trends*

The high water mark of this evolution occurred in 1991 with the advent of the World Wide Web (Casey, 2008). Soon thereafter, colleges slowly embraced the Internet

as a viable option for distance learning (Allen & Seaman, 2008). In addition, many educational institutions incorporated broadband transmission of data, which enhanced the possibilities of the Web. In 1993, the Higher Learning Commission granted accreditation to Jones International University, and it became the first fully online college (Casey, 2008). Prior to 1999, 44.0% of colleges having an enrollment larger than 15,000 had offered their first online classes. Another growth period occurred among this group between the years 2006 and 2007, during which period 20.0% of higher education institutions offered their first online course (Allen & Seaman, 2008). Table 1 illustrates the school year that colleges involved with online learning launched their first online class, and the data go through the year 2007. Minimal standards plagued many of the

Table 1

*The Years Colleges Began Offering Online Courses*

Year	Public	Private Non-Profit	Private For-Profit
Prior to 1999	23.1%	8.9%	7.9%
1999-2000	13.7%	10.0%	2.7%
2001-2002	13.4%	10.4%	16.9%
2003-2004	19.2%	17.8%	29.2%
2005-2006	16.5%	22.3%	22.3%
2007	14.1%	30.6%	21.0%

Note. From "Staying the course: Online education in the United States, 2008," by E. Allen and J. Seaman, 2008, United States of America: The Sloan Consortium, p. 7. Copyright 2008 by the Sloan Consortium. Adapted with permission from the author.

initial attempts at online learning, especially as this learning related to assessment. Naturally, some educators challenged the validity of online education because of concerns about accessibility, sustainability, and quality (Collins, 2007).

*Online enrollment increase.* During the fall 2009 semester, 29.0% of all college students enrolled in at least one online class. Estimates indicated that this cohort of learners numbered around 5.6 million, which was an expansion of 21.0% over the previous year. During the years 2002-2009, the overall annual growth of college enrollment stood at less than 2.0% annually. Conversely, online enrollment during this period boasted a compounded growth of 19.0%. More poignantly, online enrollment comprised 9.6% of total enrollment in colleges for the fall 2002 semester, but 29.3% of total enrollment in the fall 2009 semester stemmed from online courses (Allen & Seaman, 2010).

#### Theoretical Foundation

The theoretical foundation for this study was based on the sociocentric view of knowledge and learning (SVKL) as articulated by Vygotsky (1978), Dewey (1938), Lave (1988), and Lave and Wenger (1991). Social learning is a premise largely rooted in the theory of constructivism. Constructivists contend that learners actively construct their own paradigm of reality and knowledge based on experiences and perceptions. According to constructivists, learning occurs through observing, processing, and interpreting stimuli (Ally, 2008). Individuals filter these functions through previous experiences, beliefs, and a mental framework so that the information becomes personal knowledge (Jonassen, 1991). The establishment that learning is internal and gained through interaction has enduring historical underpinnings.

Constructivism has deep philosophical roots, including a variety of branches. One of these traces back to Socrates (Manus, 1996) and Vico (Vico, 1710/2010; Von Glasersfeld, 1989). Theorists continued to describe learning as a construct in the twentieth century. Three of the theoretical progenitors of the constructivist approach were Piaget (1954), Vygotsky (1978), and Dewey (1938). As it relates to this study, the works of Vygotsky and Dewey are most relevant. Lave's (1988) and Lave and Wenger's (1991) practical implementation of situated cognition stems from the work of Vygotsky (1978) and Dewey (1938). Situated cognition then is the precise branch of constructivism that served as the theoretical framework for this research project.

The research took place in the context of two systems – LMS and SNS.

According to Doll (1986):

Education, as a process of intended human development, should be modeled on an open system paradigm. However, it has been plagued with the Newtonian, closed system paradigm....Theorists such as Dewey, Piaget, and Bruner have worked on developing a new educational model – one based on an open system concept – but until the social sciences accept a new paradigm it is almost impossible for education to develop one. (p. 14)

Therefore, the theoretical approach of this study was systematic (i.e., open system) rather than linear (i.e., closed system). The conceptual foundation was further expanded in order to take into account nonlinear dynamics (i.e., chaos theory), which accounts for variables that naturally form in the context of systems. Therefore, four tenets of chaos theory are discussed as a metaphor in order to identify appropriately variables in the context of systems. First, constructivism is described, and second, the researcher identifies variables for the study through chaos theory.

### *Constructivism*

Learning is an internal process according to constructivists. In juxtaposition to behaviorism, the constructivists hold that knowledge does not flow from someone else or the outside. Instead, learners create knowledge after they interpret and process information. In other words, learners are seen as active rather than passive. According to constructivists, learners should not merely be presented with information; they should be encouraged to work with it to construct knowledge. Constructivists hold that students construct knowledge, which requires that students become an active part of the learning process (Stoerger, 2010). For this reason, instructors are viewed as facilitators and advisors, while students assume the central role of learning (Rickey, 1995). Some constructivists emphasize situated learning (Hung, Looi, & Koh, 2004; Lave, 1988; Lave & Wenger, 1991). Situated learning includes activities that are both intellectual and physical (Ally, 2008). In situated learning theory, discovery and construction of knowledge takes the place of one-way instruction (Tapscott, 1998). The following discussion outlines the roots of constructivism and offers a neo-constructivist paradigm.

*Philosophical roots of constructivism.* Over 2,000 years ago, Socrates argued that learning came from within a person and emphasized *why* learning should occur over *what* was learned. Socrates taught through dialogue and by questioning. Conversely, other teachers in ancient Greece held that knowledge could be obtained and resided outside oneself. The Sophists, for example, emphasized *what* was learned and *how* it was taught. The Sophists taught via modeling and lecturing. One could argue that while Socrates trained philosophers, Sophists taught philosophy (Manus, 1996). This dichotomy loosely parallels constructivism (i.e., building knowledge from within) versus behaviorism (i.e.,

learning occurs in response to external stimuli); therefore, Socrates can be viewed as a forerunner of constructivism.

Moving forward into Western European philosophy, seeds of constructivism were also planted by the Italian philosopher Giambattista Vico (1668-1774). In 1710, Vico produced a treatise suggesting that learners construct knowledge (Vico, 1710/2010). Vico focused on the innate human desire to create knowledge and the relationship between language origination, knowledge, and truth (Marshall, 2011). According to Von Glasersfeld (1989), Vico originated the term *constructivist*, and Vico's mantra was that human knowledge is derived through mental construction. Vygotsky and Dewey proposed similar ideas two centuries later.

*Constructivist theorists: Vygotsky and Dewey.* Vygotsky (1978) proposed the Social Development Theory, which is foundational to constructivism. In this theory, Vygotsky argued that social interaction is the cornerstone of cognitive development. He introduced two concepts—the More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD)—and claimed that social learning results in cognitive development. This sequence stands in contrast to Piaget's (1954) description of cognitive development because Piaget theorized that development was an antecedent to learning. Vygotsky (1978) clearly described his belief about this sequence: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)" (Vygotsky, 1978, p. 57).

Vygotsky (1978) expounded on the MKO and ZPD in his writings. Vygotsky (1978) stated that a MKO was any individual who had a higher ability level or more understanding than the learner. The MKO is often an older adult, coach, or teacher, but

computers, peers, or younger individuals could also serve as MKOs. The role of the MKO is realized when a learner is trying to understand a new concept, process, or task. The ZPD is the distance between a learner's ability to perform a task independently and a learner's ability to perform that task through peer collaboration or teacher guidance. Vygotsky (1978) argued that learning occurred in this zone. Therefore, Vygotsky (1978) espoused the idea that learning is propelled forward through social interaction.

Dewey (1938) was also a strong advocate for social interaction, and he proposed that the social arena was the proper place for the *educational process*. Dewey (1938) advocated active learning and experiential education. He warned educators to avoid teaching on either of two extremes: a sole focus on the subject matter or a myopic focus on the needs of students. Dewey (1938) described a balanced approach in which teachers filtered the presentation of material through the experiences and needs of learners. According to Dewey (1938), educators should guide and facilitate learning and not just disseminate knowledge.

Both Vygotsky (1978) and Dewey (1938) argued that educators should facilitate learning, and this approach is consistent with the approach of Socrates, as described above. Vygotsky's (1978) ZPD described the teacher as the MKO who monitored how much assistance a student needed in order to progress. Dewey (1938) also advocated for this equilibrium so that learners did not know too much too soon. This process was later termed scaffolding (Wood, Bruner, & Ross, 1976). Bruner (1985) interpreted Vygotsky's statements about the ZPD: "The tutor or the aiding peer serves the learner as a vicarious form of consciousness until such a time as the learner is able to master his own actions through his own consciousness and control" (p. 24). Bruner (1985) clarified that learners are able to use new tools when they gain conscious control over a new



concept or function. Before this control is gained, the MKO scaffolds the learning process to allow a learner to internalize a foreign concept, and then this concept is transformed into an instrument consciously controlled by the learner. Vygotsky (1978), Dewey (1938), and Bruner (1985) argued that scaffolding takes place in a social context.

*Neo-constructivism: Situated cognition, situated learning, and e-learning.* Lave (1988) applied the abstract principles taught by Vygotsky (1978) and Dewey (1938) through situated cognition. Lave (1988) and Lave and Wenger (1991) termed this approach as *situated learning theory* and used several principles of situated cognition in order to develop this pedagogical approach. According to Lave, students gain knowledge by interacting with the world in a relevant manner (Lave, 1988; Lave & Wenger, 1991). The initial goal of situated cognition is to place students in a rich, authentic environment and to create a community of learners (Stoerger, 2010). In Lave's (1988) and Lave and Wenger's (1991) situated learning theory, this community of learners is labeled as a community of practice (CoP). Situated cognition activities allow students to link new knowledge to real-world contexts (Macdonald, Bullen, & Kozak, 2007). This study combined elements of situated cognition and situated learning theory by placing learners in a relevant community. In order to utilize the communal aspect of situated cognition and the relevance of situated learning theory, the community was maintained through SNS.

According to Oblinger and Oblinger (2005), situated learning is rarely used in schooling as compared to behaviorism or cognitivism: "This is largely because creating tacit, relatively unstructured learning in complex real-world [institutional] settings is difficult" (p. 15.5). Still, situated learning is vital in part because it addresses the critical issue of transfer of knowledge (Oblinger & Oblinger, 2005). Mestre (2002) defined this

transfer as the application of knowledge from one scenario to another scenario. Transfer is verified if learning on one task leads to better performance on a transfer task, which is usually positioned in a real-world scenario. The low rate of transfer accomplished by conventional instruction is one of the primary criticisms of the current educational system. This low transfer rate also applies to students who do very well in training settings or schools (Oblinger & Oblinger, 2005).

*Implications for e-learning (i.e., the why).* In alignment with the groundwork of Socrates, constructivists' strategies are particularly strong in teaching why students learn. In other words, constructivism facilitates higher-level thinking that promotes personal meaning, situated learning, and contextual understanding. Instructional designers may be able to harness learning through a neo-constructivist approach.

Brown, Collins, and Duguid (1989) argued that if learning does not take place within the context of relevant activities, then knowledge remains unused even when relevant issues arise. They suggested that educators present learning in meaningful and relevant ways so that students understand why they are covering material and see its practical value. For instance, if teachers use an example to make a point, then the example should relate to students. Projects and activities that are meaningful help students personalize knowledge. Because the transfer of knowledge is facilitated in contextual situations, learners should be required to apply knowledge in each situation in order to promote relevance (Ally, 2008).

Practical activities encourage learners to construct knowledge, as opposed to directly receiving information from a teacher. This nonlinear approach emphasizes interactivity. Interactivity promotes knowledge construction. Moreover, interactive online classes may also support knowledge construction. Online learning has the

potential to initiate interactions with the teacher and other students because of its nature (Murphy & Cifuentes, 2001). That is, the student must log on to class and pursue information. Cooperative and collaborative activities help students learn from others, and this gives learners a real-life encounter with group work (Ally, 2008). An interactive approach is entangled with constructivists' strategies that help students understand why they are studying the content offered in a class because knowledge becomes practical and personal through collaboration.

### *Chaos Theory*

Traditionally, the view of the classroom has been as a closed system with predictable outcomes, a small number of variables, and defined boundaries. This modernistic, linear paradigm discounts the learner as an active builder of meaning with dissimilar goals, needs, and beliefs (Trygestad, 1997). Leinhardt (1992), in contrast, clarified that learning is dynamic, multidimensional, and nonlinear. Scholars of teaching are faced with a pedagogical quandary as to renovate what has been considered a stable, linear process into an unstable, nonlinear system (Leinhardt, 1992). To account for the variables in this complex system, the researcher follows the lead of Cziko (1989), Trygestad (1997), and Siemens (2005) and contends that chaos theory can help. An extended discussion on chaos theory is beyond the scope of this paper; for a basic understanding of the principles of chaos theory in education, please see Trygestad (1997) and Smith (1998).

Theoretical elements of chaos theory are presented below in order to describe the relationship between chaos theory, SNSs, and educational application. The five variables of chaos theory that are pertinent to this discussion are systems, initial effects, bifurcations, transduction, and fractals. First, these five variables are defined. Second,

the functional application of each variable in the classroom is discussed. In relationship to human systems, these chaos theory variables provide evidence that learning does not occur in a vacuum. Learning takes place when these variables intersect.

*Systems.* Because most human and natural systems are unpredictable and nonlinear, chaos exists in almost all such systems. Chaos represents reality and must be researched despite being complex or simple, stable or seemingly random. Several similarities exist between human and natural systems and chaos theory: stability, complexity, and a nonlinear state (Trygestad, 1997). This study focused on systems as a tenet of chaos theory, which is not to be confused with systems theory. Chaos theory allowed the study to follow an open systems approach. Change in one area can propagate change in another area; this is because systems are often interrelated. A foundational pattern and order permeates all chaotic systems (Ditto & Pecora, 1993), yet systems are chaotic, unpredictable, and dynamic because change is constant (Trygestad, 1997). In other words, systems appear chaotic but are actually based on vastly complicated rules.

Change is also constant in the classroom. Trygestad (1997) pointed out that, in reality, a typical classroom is unpredictable because it is an open system that is chaotic and nonlinear. Educators attempt to encourage predictive behaviors and reduce instability by trying to standardize and categorize in the midst of chaos. Teachers seek to understand such situations. They tend to claim that irregularity is random, which reduces instability and allows for order. However, this random *noise* (i.e., errors) is crucial for understanding the learning process. Brooks and Wiley (1988) claimed that noise “is any influence that causes the system to wander randomly among its possible states” (p. 70). In the scientific method and modernism, researchers labeled such noise as an outlier and disregarded its influence. In chaos theory, noise (i.e., errors) is of paramount importance

to a system's analysis; that is, noise helps to define learning patterns in education. Learning is not stable. Rather, it is a dynamic system with interrelated, multifaceted patterns (Trygestad, 1997). The cognitive system resists change, but once new information is introduced, instability helps to activate change (Gleick, 1988). Therefore, classrooms can be unstable, unpredictable, and complex and still be successful. In other words, thriving classrooms may represent a nonlinear, open, and chaotic system. As it relates to this study, the concept of systems provides support for placing the study in the context of two systems, LMS and SNS. Patterns found within systems also provide credence for using chaos theory to identify variables.

*Initial effects.* Altering the initial condition of a system can lead to radical change or transformation. Lorenz demonstrated this consequence through mathematical computations of weather forecasting, which he termed the "butterfly effect" (Trygestad, 1997, p. 3). In Lorenz's model, patterns were found in the midst of unpredictable weather behavior, and the patterns were greatly altered by minute changes in the initial condition of the model. Extreme sensitivity to initial conditions implies that the evolution of duplicate systems will quickly diverge if the original state of either system is changed slightly (Trygestad, 1997).

Cognitive psychologists have found that prior learning plays an important role in facilitating understanding. The foundation for learning is found in prior knowledge. In keeping with chaos theory, learning is, therefore, extremely sensitive to initial conditions, and a small influx (i.e., interruption) during the learning process might produce a behavior that is completely different from the expected behavior without the interruption (Trygestad, 1997):

Thus the concept of chaos assumes particular importance for educational research...in that it provides a model for understanding how even infinitesimally tiny initial differences in any of a multitude of factors (e.g., teacher attention, teaching materials, motivation, home background, student background knowledge) could in the course of time lead to significantly and totally unpredictable differences in outcomes. (Cziko, 1989, p. 19)

Cziko (1989) went on to offer an example of pretest and posttest scores. He revealed that posttest scores are unpredictable even based upon identical pretest scores.

This is an example of chaotic forces in the initial state of a phenomenon.

Simultaneously, boundaries and tendencies can be found by examining the normal curve classroom achievement on such a test (Shavelson, 1996). This phenomenon serves as an ideal example of how a macroscopic pattern can conceal microscopic chaos. In the end, this scenario demonstrates the manner in which a small change in the initial condition of a student may significantly affect learning for that individual. In relationship to this study, the initial effects observed were gender, age, ethnicity, and the pretest versus posttest of the Classroom Community Scale (CCS).

*Bifurcations.* Nonlinear systems oscillate. However, these fluctuations must stay within the pattern boundaries established by attractors. A bifurcation (i.e., the splitting of something into two pieces) may occur when the oscillation of a system is at a point that is far from equilibrium and threatens the system's structure (Loye & Eisler, 1987).

Trygestad (1997) added that neither the critical point nor direction of change is predictable; thus, one cannot predict bifurcations. While the state of a system is near equilibrium, the system appears homogenous, but if nonequilibrium transpires, then the result can be dramatically different from the homogenous state, which is a bifurcation. A

bifurcation can be stabilized with time by a feedback loop in the system, but in some cases, a bifurcation evolves into a new system.

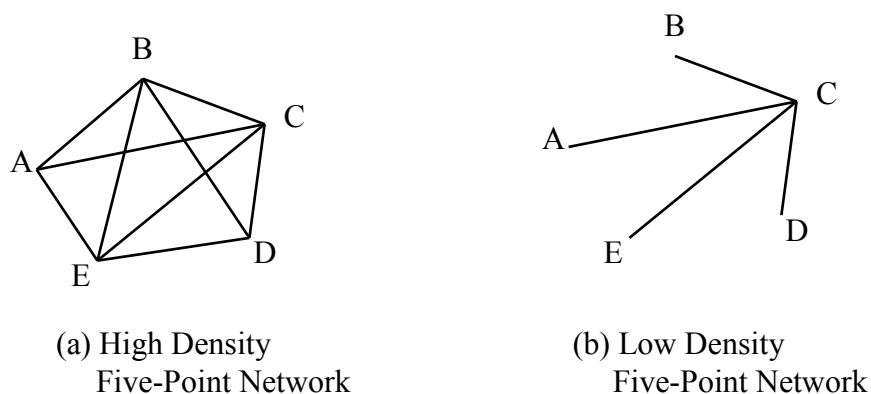
A learner's individual decision-making is an example of the unpredictable nature of bifurcations in education. Both the teacher and pupil can control learning, often withstanding bifurcations. Equilibrium is usually sought by both entities (Trygestad, 1997). However, learners often have goals that are different from curricular objectives, such as protecting self-esteem (McGilly, 1994). Teachers should recognize that the critical point in the process of learning is the crossroads of disequilibrium and bifurcation. This critical point is often referred to as the *aha!* moment (i.e., abrupt understanding of a concept) (Trygestad, 1997). In relationship to this study, the observed bifurcation was the influence of community to enhance learning as defined by performance and the gain score of the learning subscale of the CCS. That is, course final grades and students' perception of how much learning occurred during the course were the bifurcations in this study.

*Transduction.* The intervention of a system by minor external factors may have major consequences on a system. Transduction describes a situation in which a stimulus has created an effect that causes a transformation in the object upon which it is acting in a qualitative or dimensional manner. For example, speakers (stimulus) in a sound system convert electricity into sound waves and are, thus, called electro-mechanical transducers (Smith, 1998). Another example of transduction is when a visual stimulus results in someone composing a song. In fact, a generic form of transduction takes place when any idea develops into action. For example, social desirability represented a potential transduction in this study because it was an outside force that may have influenced the outcomes.

Human history is filled with examples of transduction. An ostentatious example of transduction in education stems from the recognition that one human can change the course of learning, culture, and history. Handy (as cited by Bowden, 1991) described how an individual's idea could influence social action. Rather than focusing on historical ideas (e.g., manifestos), Handy examined actions as an outgrowth of ideas: "What mattered to him were specific activities which led to tangible results" (Bowden, 1991, p. 186). Handy argued that understanding the relationship of the individual to society helps historians trace the influence that an individual has on society (Bowden, 1991). The theories of Albert Einstein certainly changed the course of learning, culture, and history. For example, Einstein's theories (i.e., ideas) led to the atomic bomb, which ended World War II.

Transduction also can play a different role in education, specifically in networks. A transduction can cause a new effect, but a transduction link also can help to "isolate influences and prevent their propagation throughout the network" (Smith, 1998, p. 22). Figure 1 serves as an illustration of how this might work in a network. The same individuals simultaneously can be associated in more than one way. For instance, Figure 1-a could demonstrate the connected patterns of people during a party, but Figure 1-b could illustrate how this same group of people is associated within the school they attend or for which they work. The associations formed in one dimension (e.g., party) could influence choices in a different dimension (e.g., school). One advantage of chaos theory is that it takes into account the transduction of influence from one dimension to another (Smith, 1998).





*Figure 1.* A demonstration of transduction in a network. If all possible links in a network are present, then it is saturated. The only link missing in (a) is the A-D link. In example (b), point C is a crucial link that connects all other points. From “Social Structures and Chaos Theory,” by R. D. Smith, 1998, *Sociological Research Online*, 3(1), p. 15. Retrieved from <http://www.socresonline.org.uk/3/1/11.html>. Copyright 1998 by Sociological Research Online. Reprinted with permission from the author.

Smith (1998) argued that most people empirically know each of the examples given above, but most of the sociological strategies used to research such networks cannot encompass this type of influence because they do not account for the influence of transduction. However, an approach based on chaos theory could address this level of integration. To consider this approach, researchers must identify qualitative and quantitative aspects of the stimuli in question (Smith, 1998). Qualitative structural aspects clarify that a stimulus is restricted to a known collection of dimensions, and quantitative structural aspects demand that the stimulus must maintain an identified level of connectedness to the said dimension. The qualitative aspect permits transduction to take place. The quantitative aspect permits the stimulus to change over time and permits observers to identify a structure’s statistical boundaries.

In this study, emerging technology—specifically SNS—represented the transduction link that facilitated connectivity and restricted external influences. The qualitative aspect is clarified in that students were restricted to two specified dimensions: LMS and SNS.

The quantitative aspect was accomplished through the tools within these two dimensions (e.g., blogs or discussion boards) because they maintained the connectedness. Emerging technology applications are the stimuli that allow these dimensions to exist and foster connectivity. The researcher outlined recent emerging technologies, how students use technology, and concerns in using SNS (i.e., legal concerns).

*Fractals.* The patterns of a system persist no matter how small or large the system becomes. Mandelbrot's illustration of patterns modeled the self-similarity found in a coastline: "The resulting theory of infinity of patternization based on scale, in which macro and micro levels replicate one another, was proposed" (Trygestad, 1997, p. 4). Trygestad (1997) recounted that this concept became known as the theory of fractals. Fractals clarify that chaotic systems may demonstrate order or disorder deep within the system or on the surface, although the system might be inversely fluctuating or stable at that moment.

These basic tenets of self-similarity (i.e., fractals) permeate society. Human psychology and statistics avoid crediting random chance to explain phenomena (Shavelson, 1996). Therefore, fractals pique the curiosity of researchers because in a self-similarity scenario commonalities exist in two or more different phenomena (Smith, 1998). For example, Fisher and Pry (as cited by Smith, 1998) created a *logistic equation* that describes a pattern in which certain capital markets embrace financial products in a consistent manner. Furthermore, Marchetti (1980) illustrated that a logistic equation predicted cycles of invention, innovation, discovery, and the capacity of a child to learn a language. In fact, the patterns describing how a child learns a language are parallel to patterns revealing how groups learn to use technology (Marchetti, 1980; Smith, 1998).

As chaos theory relates to education, fractals show that the patterns of a system persist no matter the scale of the system—assuming no new stimuli are introduced to the system. Information is also gained and lost at various scales. Cognitive development transpires when a learner identifies patterns of interconnected concepts and links those patterns with other interconnected patterns. Therefore, learning is variable, is complex, and takes place at different scales. A normal classroom illustrates this scenario because each student is at a different level of comprehension and exhibits multiple scales of comprehension (Trygestad, 1997). If similarity is found among institutions, classes, or individuals, then similar patterns can be identified. Trygestad (1997) added that similar stimulation of such patterns can be repeated in the hope of repeating the results. Specific to this study, if an approach works for one group of learners (i.e., this study), then those patterns will likely work for a similar group of learners (i.e., future studies). That is, the concept of fractals allows for the generalizability of the findings resulting from this study.

*Link Between Constructivism and Chaos Theory.*

According to chaos theorists, learning is dynamic, multidimensional, and nonlinear (Leinhardt, 1992). The constructivist nonlinear approach can then be associated with chaos theory (You, 1994). This approach avoids supplying a linear sequence of steps to be completed by the learner. Instead, a set of concepts is presented that can be consumed in no particular order. That is, learning is constructed from a scattered variety of stimuli rather than from a sequential model (Leinhardt, 1992). This notion is foundational for constructivism and relates directly to the principle of systems in chaos theory.

Constructivism also connects with the principles of initial effects and bifurcations. The initial state (i.e., initial effects) of the learner is paramount as knowledge is

constructed (Rickey, 1995; Trygestad, 1997), and learners filter new information through their previous experiences (Jonasson, 1991). Learners' reactions to change are similar to the manner in which bifurcations describe change in the topological structure of a given family—the complex pattern and order within a family (Blanchard, Devaney, & Hall, 2006; Trygestad, 1997). That is, learners either progress toward new learning (i.e., bifurcation) or return to their initial state (i.e., equilibrium). During the process of learning, bifurcations occur when learners resist change and seek stability in accordance with previous knowledge, but learning facilitates change through instability. Learners begin to acquire new knowledge when their cognitive function is in a system that is far from equilibrium (Trygestad, 1997). In alignment with SVKL and the theories of Vygotsky (1978) and Dewey (1938), social collaboration may facilitate the struggle to personalize information and construct new understanding that results in a bifurcation.

Observers also can see transduction in some constructivist ideas. For example, some of the research on creativity relates to transduction. This is seen in Csikszentmihalyi's (1996) argument that domain-changing creativity is comparable to a gene mutation that permanently changes the species. Both transduction and domain-changing creativity refer to a process in which the species, system, or human is changed.

As transductive change relates to constructivism, chaos theory may help to explain how complex social changes occur. Social psychologists have sought to explain how new ideas emerge in complex social structures (Smith, 1998), but to date they have not applied chaos theory terminology to describe such changes in e-learning. This study, however, clarifies that a strong link exists between constructivism and a nonlinear approach and places the nonlinear approach in the context of e-learning systems. The

remainder of the literature review addresses each of the variables introduced via chaos theory.

#### Systems: Evolution of Distance Learning – Focusing on Modern Platforms

Electronic technology is now ubiquitous and is a pervasive part of everyday life for many individuals in America and elsewhere. Educational practice is moving quickly toward online hybrid classes, Web-enhanced classes, the Internet, and wireless technologies. Naturally, American students presume that technologies will be employed in the learning environment (Nworie & Haughton, 2008). E-learning has two primary advantages over traditional face-to-face instruction that have been linked with student achievement. Students can spend more time on certain tasks, and e-learning offers more opportunities for interaction that is collaborative (Held, 2009). LMSs facilitate the first advantage well, but LMSs fall short in promoting collaboration. However, collaboration is a core element of many of the Web 2.0 technologies, such as SNS.

#### *LMSs*

Ironically, postsecondary organizations have invested their resources and time into older technologies (e.g., LMS) while failing to implement advances in technology that gave rise to numerous options and possibilities for e-learning (Morgan, 2003). Downes (2010) astutely observed, “As the web surged toward 2.0 the educational community solidified its hold on the more traditional approach. The learning management system became central” (pp. 12-13). In the early days of online learning (i.e., e-learning), instruction was labored and growth stifled because there was not a user-friendly delivery system. The panacea for this issue was LMS, which was designed to help teachers manage courses and deliver content. LMSs, also known as course management systems (CMSs), are software applications created to facilitate

communication, teaching, and learning on the Internet. Currently, LMS is a key component in e-learning (Morgan, 2003).

Teachers can use LMSs to create and organize course materials (e.g., handouts or tests). While variety exists among the various LMS companies, most of them furnish four essential tools: (a) delivery of course content; (b) peer-to-peer communication and student-to-teacher communication; (c) interactivity with resources; and (d) testing and grading online (Held, 2009). Popular LMSs include Blackboard (which purchased WebCT), Moodle, Desire2Learn, Angel, and Sakai. This list is by no means exhaustive.

*Choosing an LMS.* Selecting the most appropriate LMS may prove to be critical for institutions. The growth of e-learning has been paralleled by improvements in LMSs that increasingly boast better features. In the early days of LMS, choosing the most appropriate tool was often distilled down to functionality and cost. However, LMS companies now feature powerful applications that are attractive to faculty members who are experienced in LMS and tech-savvy students. However, these features do not always allow teachers to facilitate institutional goals (Schaffhauser, 2010).

The researcher considered using two LMSs for this study: Blackboard and Desire2Learn (D2L). A plethora of LMSs exist, but the researcher filtered the variety of platforms through the limitations of this study and institutional considerations. The study took place in the context of a Southeastern state's virtual community college—hereafter referred to as SSVCC—which only allows Blackboard and D2L (C. Pruitt, personal communication, 2011). Therefore, the researcher was limited to these two LMSs to conduct the study. Having stated this limitation, a 2010 national survey of information technology in U.S. higher education revealed that these two organizations represent two of the top three most prevalent LMSs (Green, 2010). In comparing the three most

popular LMSs (Blackboard, Moodle, and D2L), Blackboard was the only one to lose market share between 2006-2010. Postsecondary schools adopting a campus-standard chose Blackboard 71.0% of the time in 2006 but only 57.1% of the time in 2010, which is a 19.6% decrease. During the same period, D2L increased fivefold. Institutions that adopted a campus standard chose D2L in 2.0% of schools in 2006 but 10.1% of schools in 2010. The founder of the Campus Computing Project, Kenneth Green, commented on this trend: “The LMS market is a textbook example of a mature market with immature, or evolving, technologies, and that’s a recipe for volatility....This is now a very competitive market for LMS providers” (Green, 2010, p. 1). As evidenced by these growth trends, Blackboard and D2L offered competitive features.

This research took place at a large community college in the Southeastern United States, hereafter referred to as SSCC. Thus, part of the decision between Blackboard and D2L resulted from SSCC’s mission and the preference of SSCC academicians. Schaffhauser (2010) argued that educators should consider “how well the LMS supports your school’s overall mission” in the midst of the alluring features (p. 21). The mission of SSCC is to respond “to the educational needs of our community...by providing an outstanding learning environment supported by excellent instruction and services” (SSCC, 2011b, para. 1). The researcher’s mission in this study was to realize the educational efficacy of SNS in comparison to LMS.

The mission of SSCC was compared to that of Blackboard and D2L. Blackboard’s mission is “to transform the Internet into a powerful environment for the education experience” (Blackboard, 2003, p. 1). Desire2Learn’s mission is “to improve human potential globally by providing the most innovative technology for teaching and learning” (Baker, 2009, para. 7). Blackboard’s mission aims at transforming the Internet

while D2L's mission focuses on improving human potential through innovative technology designed for teaching and learning.

In comparison to the intent of SSCC and the researcher, D2L's mission aligns more closely to SSCC's mission than Blackboard's – *teaching and learning* is similar to instruction and services. In addition, D2L's mission is closer to the intent of this study – *innovative technology* is similar to studying emerging technology such as SNS. In regard to the preferences of SSCC's academicians, both the organizational leaders and teacher in this study preferred D2L over Blackboard for qualitative reasons (J. V. Pugh, personal communication, August 5, 2011). Therefore, the researcher chose D2L as the LMS platform for this study.

Regardless of what LMS was chosen for this study, most LMSs have common attributes. Therefore, Desire2Learn was viewed as representative of this group (Held, 2009). LMSs offer both advantages and disadvantages when incorporated into e-learning. Mott (2010) reviewed several of these attributes.

*Advantages.* Most LMS applications offer a variety of advantages that make this tool attractive to educators and administrators. First, the prevalent LMSs offer a platform for e-learning that is both private and secure, including compliance with FERPA. Second, most LMSs are simple, consistent, and structured. Third, LMSs allow classroom information to be integrated with student information systems (e.g., PeopleSoft or Banner). For example, rosters in an LMS can be automatically populated through the integration of student information systems and LMS. Fourth, LMSs have recently added the ability for teachers to structure content in a sophisticated manner (e.g., adaptive release or sequencing). Fifth, integration within an LMS allows for automation such as test grades automatically rolling into the course grade book (Mott, 2010).



*Disadvantages.* Despite these administrative advantages, LMS also presents several drawbacks. First, LMSs are teacher centric rather than being centered on students. Second, most LMSs offer tools that are rigid and nonmodular. Third, students have few opportunities to manage or *own* their learning experiences in each class and across their coursework. Fourth, LMSs continue to face obstacles and difficulties in regard to interoperability. LMS platforms have made significant improvements in this area, yet LMSs still lack the ability to enhance or replace native tools, employ alternative tools, or easily move data in and out of the platform. In relationship to this study, perhaps the greatest weakness of LMSs stems from the isolated nature of the platform; classes offered through LMS are often sectioned off from the *wider Web* and students' other classes (Mott, 2010).

*Issues with LMS.* The investment in LMS may not be the best way to proceed with e-learning. Morgan (2003) clarified that the original intent of LMS was not to facilitate e-learning. Rather, it was designed to augment face-to-face classes. However, these systems have evolved into the dominant prototype for delivering online courses (Morgan, 2003). Some researchers have argued that LMSs put e-learning on the wrong path. They question the monopoly of LMSs to facilitate e-learning because LMSs operate in ways that primarily meet institutional needs rather than student needs (Palloff & Pratt, 1999; Rovai, 2002a, 2002b; Yuen & Yang, 2010).

In addition, Net Generation students thrive on sense of community, and for this cohort, community goes well beyond face-to-face interaction (Oblinger, 2008; Strauss & Howe, 2007a). Educators can facilitate this preferable social environment by integrating social multimedia technologies in courses (Oblinger, 2008). This study proposed a new approach to e-learning because it employed SNS rather than LMS as the platform for e-

learning in a community college setting. The basis for using SNS as a platform for e-learning stems from the SVKL.

### *SNSs*

Social networking sites are transforming the social fabric of higher education (Smith & Caruso, 2010; Smith et al., 2009; Yuen & Yang, 2010). Social networks are founded on trust between members of a community and the strength of their relationships (Liccardi et al., 2007). Social networks link individuals together through similar interests or objectives. The goal of social networking sites is to create online communities of individuals that have similar interests or objectives; SNSs also facilitate the creation, management, and development of each person's presence online (Yuen & Yang, 2010). Social networking is immensely popular and shows great promise for e-learning, yet little is "known about how to integrate social networking focusing on building a sense of community, particularly in e-Learning courses" (Yuen & Yang, 2010, p. 289).

The term *social networking* describes websites where individuals create a profile, establish connections with others, correspond with users, and discuss interests and preferences (e.g., MySpace, Facebook, and Ning) (Gunawardena et al., 2009). Gunawardena et al. (2009) explained that social networking in education is simply the process of "expanding knowledge by making connections with individuals of similar interests" (p. 4). For the purpose of this study, social networking is defined as "tools that facilitate collective intelligence through social negotiation when participants are engaged in a common goal or a shared practice" (Gunawardena et al., 2009, p. 6). Boyd and Ellison (2007) expanded on this definition by listing three basic elements involved in social networks: (a) create a profile within certain constraints that can be viewed by others; (b) select a list of other individuals with whom the user shares a connection; and

(c) navigate and view the list of selected connections and those connections made by others within the system.

*SNSs in e-learning.* Several researchers and educators are investigating the use of SNSs in education, including the development of their own social networks (Hung & Yuen, 2010; Marsh & Panckhurst, 2007; Oradini & Saunders, 2008; Yuen & Yang, 2010). Using social networking sites as a platform for learning allows the learner to be at the center of instruction and assignments (Oradini & Saunders, 2008). Studies indicate that over 90.0% of undergraduate college students use SNSs, so they are poised to use this application in the context of learning (Smith & Caruso, 2010).

Social networking services can be grouped according to those involved in the social network or according to the purpose of the network, and Childnet International (2008) outlined both of these categories. When grouping social networks according to users, two primary categories exist: content and users. Some sites are organized in relationship to a certain type of content. Other sites are structured according to the profiles of users.

Social networks can be grouped into six categories according to the purpose of the network (Childnet International, 2008). First, micro-blogging social networks (e.g., Jaiku or Twitter) permit users to publish brief messages with a group of contacts; the messages must be 140 characters or less. Second, mobile social networks (e.g., Facebook or Twitter) allow members to interact with contacts through a mobile version of their site. Third, multi-user virtual environments (e.g. World of Warcraft or Second Life) permit users to collaborate in real-time via avatars: “An avatar is a virtual representation of the site member” (Childnet International, 2008, p. 11). Fourth, white-label social networks (e.g., Ning or PeopleAggregator) allow individuals to create their own small-scale social

network. Fifth, content-based social networks (e.g., YouTube or Flickr) permit individuals to post content that can be shared publicly or within a group. Sixth, profile-based social networks (e.g., Facebook or MySpace) are structured around users' profile page.

*Choosing an SNS.* Similar to LMSs, selecting the most appropriate SNS to drive e-learning is critical for institutions as well as this study. Among the previous six categories of social networks, the limited number of researchers who have investigated SNS in education have frequently adopted white-label social networks, specifically Ning (Hung & Yuen, 2010; Marsh & Panckhurst, 2007; Oradini & Saunders, 2008; Yuen & Yang, 2010). White-label social networks offer a blank slate upon which users can customize a small-scale social network for any purpose they desire (Childnet International, 2008).

Ning was chosen as the SNS platform for this study. Ning is the “world’s largest platform for creating social websites” (Ning, 2011, para. 1). As a white-label social network, Ning allows members to develop a customized social network. Ning is user-friendly and allows beginners to successfully build a functional and attractive site (Yuen & Yang, 2010). Ning also allows users to restrict who may be a member of the website and allows the administrator of the account to control content. Members can integrate Ning with a variety of social media tools, such as YouTube, Twitter, and Facebook (Ning, 2011). Ning supports a mobile version of their networks. In line with previous researchers, Facebook and other prevalent SNSs (e.g., MySpace) were not employed for this study because students tend to use these sites for “personal or social extra-curricula” reasons (Yuen & Yang, 2010, p. 293).

The instructor in this study created a customized SNS through Ning. This SNS was private, so only class members for specified courses were invited to join. Therefore, no one outside the scope of the class or this study were allowed to participate or join this SNS. Students were able to use a variety of features in the context of this SNS driven by Ning: offer presentations, create blogs, collaborate, upload a variety of content such as videos or podcasts, discuss, and create subgroups within the class (Ning, 2011).

*Advantages.* Social networking sites have become a standard on most university campuses because they form an opportunity to communicate with students on a daily basis. By using SNS, teachers and learners can interact in a setting that students accept and use regularly (Held, 2009). In fact, SNSs represent the primary means of communication for many college students. Furthermore, some students have abandoned the use of personal and school email addresses in favor of SNS. Many of these students desire constant access to SNSs and accomplish this by downloading mobile features of an SNS onto their mobile devices (Harris, 2008). Harris (2008) also argued that minority, first-generation, and low-income students benefit from the development of SNS.

A number of social networks have gained a large audience. MySpace and Facebook are the most popular SNSs for many American Net Generation students. These applications afford users a great deal of flexibility in creating an individual identity (Held, 2009). Conrad (2008) referred to YouTube as an SNS that can expand consumers' options by communicating electronically over a distance. In addition, Google Apps incorporates social networking features into the multiple features that already were available.

*Disadvantages.* As with most great forces or tools, there is a great deal of responsibility that comes with social networking sites. While these applications have

great potential, they also allow for a number of dangers and unethical activity. SNSs present a number of issues for administrators, faculty, and students. Dangers exist when personal and private information is posted online, and educators need to be cognizant of the professional implications of sharing information in a public forum (Wandel, 2008). Harris (2008) described this constant threat: “The influence of SNS on privacy issues, credibility, and the breeding of inappropriate relationships and behavior pose technological dilemmas in which more universities will have to continually work to develop instructional online social networking policies” (p.1).

SNSs are volatile by nature. For example, educators are unable to manage how learners interact and share information in an SNS, especially outside of the scope of the school or class. However, the remedy for this situation might be found in new SNS applications that allow educators to create closed social networks for a specific group or class, such as the one used in this study (i.e., Ning). Teachers should include a disclaimer in their syllabi that releases the school of responsibility for strong opinions, and they are advised to enforce standard college policy in all SNSs (Wandel, 2008).

#### Initial Effects: Age, Gender, and Ethnicity

Some theorists have described initial effects as it relates to learning. They contend that a small change in the initial condition of a student may significantly affect learning for that individual (Trygestad, 1997). Therefore, the researcher reviewed the literature in order to determine the pertinent initial conditions that could influence change or transformation in the learners of this study. This study sought to identify whether SNSs promoted sense of community, connecting, learning, and performing better than LMSs in community college e-learning classrooms. The pretest of the CCS—the instrument used in this study—served as an initial effect because it indicated the initial

state of the learners, but a literature review was not appropriate for this variable because it was unique to the sample in this study. However, previous research on technology use and sense of community in the e-learning environment does reveal appropriate initial effects. Three trends emerged from the literature and were studied as initial effects: age, gender, and ethnicity. Gender and ethnicity were less prevalent in the literature, but generational characteristics (i.e., age) seemed to have a major impact in regard to technology and sense of community.

*Age: Progression of Recent Generations to the Net Generation*

Many educators seek to improve teaching and learning by employing multimedia technology, but these efforts are usually “based on a vision of the Net Generation as a homogenous group of technology users” (Lohnes & Kinzer, 2007, p. 1). Veering away from this narrow focus, Oblinger (2008) emphasized that educators should recognize the Net Generation (Net Geners) as harbingers of change. Because the Net Generation was exposed to technology early in life, their expectations of and approach to learning differs from previous generations, and this early exposure is altering societal norms and culture. In addition, some researchers reveal that individuals from a variety of generations who frequently use technology have a tendency to exhibit Net Generation characteristics (Oblinger & Oblinger, 2005). The principal explanations acknowledged for why these changes are moving beyond Net Geners and into other generations are globalization and the societal embrace of technology (Held, 2009).

*Recent generations preceding the Net Generation.* Young (2007) recommended a comparison between the learning process of the Net Generation versus previous generations. Each generation is shaped by the circumstances and events that occur during every stage of life. Behaviors and attitudes mature as each generation ages, yielding new

directions in the public mood (Strauss & Howe, 2007b). Arsenault (2004) explained that every generation creates a new, distinctive culture; and he reported that this process results from a shared collective arena of preferences, emotions, attitudes, and dispositions. Throughout recent American history, researchers have assigned a myriad of monikers to various generations. These labels have reflected the culture and particular period during which this labeling occurred. For this paper, the sobriquets that Oblinger (2005) employed were used to describe each generation. The following descriptions center on general characteristics and the technology that each generation observed and embraced.

*Silent Generation (1925-1945).* Ninety-five percent of the 50 million members of the Silent Generation are retired. Authority figures encouraged this cohort to suppress their ideas and thoughts, and their parents were disciplinarians. This generation is generally realistic, yet insecure (Strauss & Howe, 1991). Until the accessibility of television in the 1940s, radio was the primary multimedia technology. According to one survey in 1950, “Practically no radio listening was reported for TV homes during evening hours” (Cunningham & Walsh, 1950, p. 21).

*Baby Boomers (1946-1964).* The approximately 81 million Baby Boomers comprise 26.4% of the United States population (U.S. Census Bureau, 2010). This fraction of the population created a number of social changes in areas such as civil rights and music. Their generational characteristics are quite eclectic; they exhibit a positive outlook with a tendency to reevaluate, while at the same time having the potential to be arrogant, selfish, and ruthless (Lipschultz, Hilt, & Reilly, 2007). The technology of the boomer generation heralded the explosion to come. They “grew up with transistor radios,



mainframe computers, 33 $\frac{1}{3}$  and 45 rpm records, and the touch-tone telephone” (Hartman, Moskal, & Dziuban, 2005, para. 4).

*Generation X (1965-1980)*. The *me* generation represents 51 million Americans who grew up in a culture divergent from previous generations. Generation X characteristics such as self-sufficiency, resilience, and flexibility developed as a result of being latchkey kids (i.e., returning home from school without parental supervision), experiencing high divorce rates of their parents, and watching mothers return to work (Milliron, Plinske, & Noonan-Terry, 2008). Generation Xers utilize pragmatism in accomplishing tasks, gravitate in the direction of better environments (e.g., new job), and desire continual and prompt feedback (Scheef & Theifold, 2005). A plethora of technologies converged during this generation such as VHS players, portable boom box players, and audio Compact Disc (CD) players. This legion of Americans embraced computers and began sending emails prompted by the explosion of IBM and Apple computers (Milliron et al., 2008).

*Net Generation (a.k.a., Millennials) (1981-2000)*. Ironically, the 90 million individuals representing the largest population in United States history (i.e., Net Generation) grew up in smaller families. They were primarily children of Baby Boomers (1946-1964), but Generation Xers (1965-1980) were the parents of the later-born half of the Net Generation (Strauss & Howe, 2007a). Parents were typically overprotective and gave undivided attention to Net Geners, and the children enjoyed many possessions, especially the most modern technologies (Manning, 2007). This group is family oriented, culturally and ethnically diverse, tech-savvy (i.e., technologically proficient), and eager to learn. They are also more traditional than the previous two generations and hard-workers, often working a full or part-time job while in school (Windham, 2004).

Oblinger (2008) described the Net Generation as being able to receive and process information at a brisk pace. This ability leads them to be impatient with those not operating at this same speed, including teachers. Some have labeled Net Geners as having attention deficits because of their short attention span, intolerance for pedagogical lectures, and fast pace of learning. However, these individuals are often processing information even while appearing distracted, which some have termed “continuous partial attention” (Small & Vorgan, 2008, p. 44). Oblinger (2008) argued that faculty should avoid passive learning techniques and employ active learning activities, incorporating communication technologies for pupils to seek information and encourage social interactions. In fact, Net Geners easily form and cultivate online relationships with people they have not personally met, and the line between the physical and virtual world is indistinct, if not indistinguishable (Roos, 2005).

*Digital natives versus digital immigrants.* A major dilemma in education has been that this new generation has encountered and experienced technology since birth as opposed to the current generation of teachers who encountered technology later in life. Prensky (2001a, 2001b) described this quandary as the younger generation being “Digital Natives” (i.e., individuals born into the digital age) verses older generations, which he labeled “Digital Immigrants” (i.e., individuals born before the digital age began) (Prensky, 2001b, p. 1). He claimed that this difference causes a *language* barrier that could be the primary problem in education today. In fact, Prensky (2001b) described a physiological difference in the brain function of individuals belonging to the Net Generation. These cognitive differences require innovative methods to reach this new generation.

One such method pointed out by Wood (2006) is cultural relevance. Wood (2006) taught that “relevance needs to be a natural part of curriculum, not an add on or superficial component” (para. 11). As teachers use the Internet and other technology tools (e.g., social networking sites), they can find examples of cultural relevance that are a natural part of the curriculum. This approach aligns with SVKL and situated cognition, which is the theoretical basis for this study.

Interestingly, McLester (2007) claimed that the emerging generation was the motivating force behind the Web’s evolution from being a mere information source to being participatory. Some researchers (Gibson, Aldrich, & Prensky, 2007) encouraged teachers to engage learners in the content, using interactivity rather than merely delivering content. This approach would involve offering students options, such as online activities in traditional environments.

*Net Generation learning styles.* Prensky (2001b) contended that individuals who grew up with the computer tend to filter information differently than previous generations because they “think differently from the rest of us. They develop hypertext minds. They leap around. It’s as though their cognitive structures were parallel, not sequential” (Prensky, 2001b, p. 3). Prensky (2001b) argued that some linear thought processes that have previously governed a large portion of the educational system can actually impede learning for brains developed through Web-surfing and gaming. Students from the Net Generation favor doing rather than listening, and they generally long to solve real-world problems. As assertive information seekers, they are aware of and consciously choose the learning techniques that are conducive to their own learning style.

The Net Generation had exposure to technology early in life because they were born in the midst of the exponential growth in technology (Wood, 2006). Therefore, their

classroom expectations and approach to learning is different from previous generations. Key learning styles of the Net Generation include a variety of methods: (a) inductive discovery—they learn via discovery rather than lecture; (b) visual-spatial skills—they integrate the physical and virtual (perhaps as a result of expertise with games); (c) ability to read visual images—they communicate intuitively through visual structures; (d) fast response time—they respond rapidly and expect a quick response; and (e) attention deployment—they rapidly shift their attention from one focus to another, choosing to ignore things of no interest (Oblinger & Oblinger, 2005). In addition, the inclusion of socialization in coursework is natural and vital so that these students can collaborate and network with classmates and individuals across the globe (Roos, 2005).

Stemming from these traits of the Net Generation, Iverson (2005) endorsed a constructivist method to educating online students from this generation using a technique referred to as *dirty teaching*. This method stems from the premise that instruction is convoluted, emotional, and entwined with the student's ethnic, cognitive, and societal differences. *Dirty teaching* employs the construction of online educational environments that correspond to the Net Generation's core characteristic of understanding and learning through one's own experience with technology. This study fulfills several aspects of this approach by teaching through SNS.

*Net Generation and learning through technology.* The culture and fast pace of Net Generation students is beckoning teachers to examine the medium and mode by which they deliver educational material. Net Geners deem the Internet as a fundamental element of learning, work, leisure, and life. The Internet has been a constant for most of these individuals since the beginning of their life (Held, 2009). Spanier (2003) expounded on this idea by explaining that “they have never known life without 24-hour

news, personal computers, UPC symbols, microwaves, CDs, VCRs, or the Internet” (p. 1). He also disclosed how this generation often learns about other individuals before meeting them face-to-face, which is accomplished through social networking tools such as MySpace or Facebook. Similarly, their communication is progressively more digital through e-mailing, instant messaging, texting, and sending geolocation data.

The Net Generation frequently adopts (and drops) technologies (Lorenzo & Dzuiban, 2006). Statistics compiled by Oblinger and Oblinger (2005) revealed that by the age of 21 Net Geners have experienced the following: (a) 200,000 e-mails; (b) 20,000 hours watching the television; (c) 10,000 hours of cell phone use; (d) 10,000 hours playing video games; and (e) 5,000 hours or less reading. Many Net Generation students long for mobile technologies that are integrated into learning and their lifestyle (Levin & Arefeh, 2007).

However, Net Geners place conditions on learning enhanced through multimedia technology. For example, students get frustrated when teachers do not use technology effectively (Oblinger & Oblinger, 2005; Smith & Caruso, 2010; Smith et al., 2009). Convoluting this expectation is a consumer orientation toward education that Net Geners hold, viewing education as a commodity to be accumulated, aquired, and consumed (Oblinger, 2008).

*Implications for teaching the Net Generation.* A strong sense of community is imperative for the Net Generation. Strauss and Howe (2007a) described several iterations of Net Geners’ proclivity to conform and gravitate toward what is good for the group. Dress codes, collaborative learning, and Barney (i.e., the children’s show) have contributed to this generation’s tight peer relationships and teamwork. If teachers tap into this tendency toward community, then they can invigorate creativity, producing

results and deeper commitment among this generation. Specifically, Net Geners are familiar with group work that utilizes interactive technologies. Their desire for community is also contributing toward career choices in public agencies and stable businesses, rather than following the entrepreneurial spirit of Generation X.

Another distinguishing characteristic of society at the outset of the twenty-first century is the brisk tempo of change in society and technology (Peters, 2007). Peters (2007) added that advancements in technology support emerging social patterns by allowing rapid transfer of information and communication. In fact, Rheingold (as cited by Peters, 2007) identified new *tribes* organized by work patterns and interest rather than geography.

*Allusion to current trends.* Fortunately, some approaches to the dissemination of knowledge are beginning to change in ways that reflect shifts in society. For instance, Holden and Westfall (2010) revealed that one of the greatest strengths of web-based instruction is the ability to provide instruction consistently to large and widely dispersed learners through existing infrastructure, which is primarily WAN (i.e., Wide Area Network), LAN (i.e., Local Area Network), or the Internet. Teachers can utilize a variety of media to support web-based instruction, integrate this media into existing elements of curriculum, or use it autonomously. Holden and Westfall (2010) further point out that educators can implement the media developed for the use of a web-based class in a traditional setting to enhance lessons.

*Research on age and sense of community in e-learning.* Several studies have employed the CCS to examine the influence of age on sense of community in an e-learning environment. Smith (2008) studied learning style preferences and sense of community in e-learning. Smith (2008) did not detect a significant difference in sense of

community based on age. However, Smith (2008) did report an age-related significant difference in regard to learning, as defined by the learning subscale of the CCS. This trend was especially true for non-traditional learners (i.e., 26 years of age and above) who reported significant scores in regard to learning. The findings of Ferguson's (2010) study indicated the exact opposite trend in regard to older learners. Ferguson (2010) reported that a significant, negative correlation existed between age and the learning subscale of the CCS. That is, the older a learner was the lower his or her score on the learning subscale. Ferguson's study did not indicate a significant relationship in regard to age and the connectedness subscale of the CCS. Other studies (e.g., Yuen & Yang, 2010) have reported that age had no significant difference in regard to sense of community, connectedness, or learning. The lack of research in regard to age and sense of community and the mixed results in existing research beckon further research. Although age is not the primary goal of this project, age was included as an ancillary research agenda item.

### *Gender*

The early research on gender differences in social behavior can be traced back over 40 years (Bakan, 1966). Bakan (1966) revealed that males tend to be task oriented and females tend to be more social or communal. Several studies have demonstrated that females are more verbose than males in regard to intimate information; these studies have been consistent at various ages and across cultures (Benenson et al., 2009). Benenson et al. (2009) concisely summarized the literature in this regard:

Prominent characterizations indicate that females, relative to males, are interpersonal, rather than individualistic (Block, 1973); are connected, rather than separate (Chodorow, 1978; Gilligan, 1982); are interdependent, rather than

autonomous (Johnston, 1988); are invested in connection, rather than status (Tannen, 1990); focus on maintaining intimacy, rather than distance (Winstead & Griffin, 2001); and, under stressful conditions, are more prone to “tend-and-befriend,” rather than to “fight-or-flight” (Taylor et al., 2000) (as cited by Benenson et al., 2009, p.1).

As it relates to education, one of the early studies concerning learning differences between the genders can be traced back to an examination of communication patterns (Belenky, Clinchy, Goldberger, & Tarule, 1986). Belenky et al. (1986) found that adult learners adopt one of two communication patterns in relationship to gaining information: separate voice and connected voice. The two voices are defined “as essentially autonomous (separate from others) or as essentially in relationship (connected to others)” (Belenky et al., 1986, p. 102). The majority of men adopt the separate voice, and the majority of women adopt the connected voice (Belenky et al., 1986). However, separate and connected communication patterns are not gender specific. The terms separate voice and connected voice were coined by Gilligan (1982). As it applies to this study, the separate voice does not facilitate building classroom community while the connected voice does promote classroom community.

Researchers have also proposed that the inherent communication patterns of humans are paralleled when they communicate through the computer (Herring, 1996; Rice & Love, 1987). This includes the e-learning environment. In comparison to males, female members of computer-based learning environments indicate a greater desire for collaborative learning and social connectedness (Wolfe, 1999). Blum (1999) studied gender-based communication patterns in online university classes. Blum (1999) reported that the communication of females was more cooperative and empathetic while the



communication of males was more autonomous and confrontational. Therefore, the literature has identified a difference between the genders as it relates to communication and sense of community in the online environment.

Several studies have used the CCS—the instrument used in this study—to verify this body of literature. Rovai (2001) created the CCS and was the first to use the tool to demonstrate communal differences between the genders in e-learning. Rovai (2001) recorded that females indicated a greater sense of community than males at the beginning and end of classes (i.e., pretest and posttest). The next year, Rovai (2002a) found a statistically significant relationship between gender and connectedness (i.e., the connectedness subscale of the CCS). Rovai and Baker (2005) confirmed these earlier findings by recording that females indicated higher scores on both the connectedness and learning subscales of the CCS.

Conversely, a variety of studies have revealed different results in regard to gender and sense of community as measured by the CCS. Smith (2008) found a significant difference between the genders in regard to the learning subscale of the CCS; however, participants in Smith's (2008) study did not indicate a gender-based difference in regard to sense of community or collaboration. Graff (2003) found no significant difference between the genders in relationship to scores on the CCS. Ferguson (2010) also recorded no significant difference between males and females in regard to the connectedness and learning subscales of the CCS. The mixed results offered by these studies gave impetus to include gender in this study in order to add to the body of research concerning sense of community, connectedness, and learning in the e-learning environment. Gender was an ancillary research focus because sense of community, connecting, learning, and performing are the primary focus.

### *Ethnicity*

The literature has identified cultural differences in the context of distance education, but this research has not been abundant (Anakwe, Kessler, & Christensen, 1999; Filipczak, 1997). The link between culture and communication is a key component in the existing research. Scott (1999) described the tendency of varying cultures to interpret communication technology in a divergent manner. Scott (1999) traced the research on the inextricable link between culture and communication to the mid-twentieth century (i.e., Hall, 1959). Some researchers have argued that communication technology should be altered to fit cultural assumptions and values (Hall, 1996). In this study, the researcher has attempted to position the communication technology in a way that meets the cultural assumptions and values of college students; these assumptions and values were discussed above in the discussion on generational characteristics.

Some studies have examined cultural and ethnic differences in the context of e-learning, including a few studies that have employed the CCS. Anakwe et al. (1999) recorded that community-based cultures did not embrace computer-driven learning, but e-learning did align with the desires and communication patterns of individualistic-oriented cultures. For example, Sanchez and Gunawardena (1998) described that the Hispanic culture is generally collectivist in nature, so learners from this cultural background generally prefer collaborative learning strategies over an individualistic approach.

A sizable portion of the ethnic research in e-learning has focused on African American students. Rovai and Gallien (2005) compared an African American-only section of a course to a mixed racial section of the same course. The African Americans in the mixed section had lower grades than their counterparts and scored significantly less

on perceived learning. The African Americans in the mixed group also scored less than the solely African American group on both the connectedness and learning subscales of the CCS. Rovai and Wighting (2005) confirmed this finding in a study that examined a class with a mixed racial makeup. Once again, African Americans scored lower on both the connectedness and learning subscales of the CCS. The findings of Rovai and Ponton (2005) coincide with these studies in that African American students in their study scored lower than Caucasian students on both subscales of the CCS and on overall sense of community.

The population of higher education is increasingly becoming diverse (Sanchez & Gunawardena, 1998). The disparate findings between African American students and Caucasian students are especially pertinent to this study because 22.7% of the student body at SSCC is African American (SSCC, 2011a). Ethnicity was an ancillary research focus of this project but represented an important issue. Because of the increasing diversity among college students, the ramifications of cultural differences need to be addressed:

A different set of understandings about the way diverse populations communicate, behave, and think needs to be developed by educators. Until this occurs, education will continue to stagnate in the dark ages and educators will provide lip service rather than action to the egalitarian values associated with pluralism and multiculturalism. (Anderson, 1988, p. 8)

#### Bifurcation: Community and Learning

Defining community and how it is obtained is essential before instructors can implement community-based goals in the classroom. Ultimately this implementation is aimed at meeting the needs of the community and the individual. Moore (1994) stated

that community has been viewed traditionally as a collective mass that defined what was valuable to the whole. In this traditional scenario, individuals obtained positions and belonging by serving cooperatively in the community. Moore (1994) argued that dramatic societal reforms in the 1960s have redefined community; how the individual benefits has now become the focus of society's communal perspective. As a result, political officials and educators are facing the question of whether education should be aimed at the group or the individual.

In recent decades, several researchers have sought to define and measure the sense of community (Hung & Yuen, 2010; McMillan & Chavis, 1986; Moore, 1994; Sarason, 1974; Yuen & Yang, 2010). Sarason (1974) conducted one of the earliest scholarly studies of community. Moving beyond the traditional view of community, Sarason (1974) described community as an individual's perception of interdependence and similarity with others within a stable structure. McMillan and Chavis (1986) probably developed the most frequently quoted and influential definition of community: "Sense of community is a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (p. 9). Over time, the core components of community have been identified: sense of belonging, shared beliefs and values, trust, common expectations, spirit, common goals, and interactivity (Rovai, 2002b; Yuen & Yang, 2010).

Having identified these core elements, some researchers argue that sense of community is dynamic; it transforms from one environment to another (Yang & Lui, 2008). The classroom environment represents one such environment in which learning is the objective (Rovai, 2002b). Student success and satisfaction have been linked to a

supportive classroom environment and an instructor exhibiting a caring attitude (Yang & Lui, 2008). In addition, sense of community has been used successfully as a predictor for performance on exams, perception of learning, and students' classroom attitudes (McKinney, McKinney, Franiuk, & Schweitzer, 2006).

Emerging technologies have captured the curiosities about time and space in developing a sense of community. According to Yuen and Yang (2010), an increasing number of researchers are examining "the sense of community through a complex interplay of social, instructional, and technological variables" (p. 285). Currently, the communities that people value most revolve around shared interests rather than proximity and geography (Yuen & Yang, 2010). In one study, students indicated that the most important factor in nurturing a sense of community was connectedness with peers (Wighting, 2006).

#### *Sense of Community in E-learning*

Connectedness and sense of community among learners may be able to be developed in an e-learning environment or through other electronic media that is interactive (Yang & Liu, 2008). In addition, researchers may be able to measure a sense of community in the context of online education: "Community can be examined in virtual learning environments used by distance education programs" (Rovai, 2001, p. 34, as cited by Yuen & Yang, 2010). Rovai (2001) found that educators can cultivate a sense of classroom community in asynchronous learning scenarios. In a later study, Rovai and Jordan (2004) discovered that hybrid courses (i.e., face-to-face and online) could nurture a greater sense of community among learners than either fully online or traditional classes.

E-learning offers a plethora of new mediums and platforms for teaching and learning, and educational organizations and businesses are increasingly adopting e-learning to deliver training and education (Carver, King, Hannum, & Fowler, 2007). Unfortunately, many of these e-learning classes mirror traditional models employed in face-to-face instruction (Twigg, 2001). In order to optimize the potential of e-learning, new models and approaches are needed in online instruction (Larreamendy-Joerns & Leinhardt, 2006). Carver et al. (2007) offered guidance for building a strong model within e-learning:

If e-learning is to offer improved learning opportunities, educators will have to rethink the models that underlie e-learning (Gunasekaran, McNeil, & Shaul, 2002; Schank & Kemi, 2000). Basing e-learning on traditional classroom-based models of instruction unnecessarily restricts e-learning. Progress will depend on embracing learner-centered models that place the student at the focal point, not the teacher and not the classroom (McCombs & Vakili, 2005; Mendenhall, 2007). While e-learning based on classroom-centered models is not necessarily poor instruction, it certainly fails to optimize what e-learning could be and fails to optimize the students' learning experiences. (para. 5)

However, new approaches to learning should be well planned. Monsour (2000) warned that any changes in education should not employ change for the sake of change or innovation for the sake of innovation. She stated that educators should measure progress in terms of clear goals.

#### *Nurturing a Sense of Community in an E-learning Environment*

Situated cognition theory helps to explain the social nature of learning. This theory describes learning as a process derived from social participation rather than merely

as an individual cognitive process (Hung & Yuen, 2010), which naturally facilitates the preferences of Net Generation learners. Net Generation learners prefer to gather knowledge through interactions with others, use multiple paths, and gain experiences (Johnson, Levine, & Smith, 2009; Smith et al., 2009). In situated cognition, individuals collaboratively construct understanding, meaning, and core beliefs as they work through an activity (Pea, 1993). Appropriate e-learning environments can help to facilitate this collaborative work.

This scenario represents a CoP (Lave & Wenger, 1991). Hung and Yuen (2010) clarified the definition of a CoP: “A CoP is best understood as a framework of social participation, and people generally are involved in a number of CoP, whether at home, school, work, or other social settings” (p. 204). The concept of overlapping layers in CoP was introduced by Lave and Wenger (1991) and has garnered a great deal of attention from researchers (Hung & Yuen, 2010). Supporters of CoP argue that learning and self-development are primarily determined by engaging in social interchange (Wenger, 1998). The concept of classroom community in online learning is the CoP that is studied in this research project.

Rovai (2001) introduced the notion of classroom community in online learning; he later developed this idea, including the creation of a tool to measure online classroom community (Rovai, 2002a, 2002b). Rovai (2001) clearly defined classroom community:

Classroom community is a specific type of community based on the following characteristics: (a) the setting is the world of education; (b) the primary purpose is learning; and (c) the community is based on a fixed organizational tenure, that is, a set length of the course or program in which members are enrolled. (p. 34)

He also made a distinction between a school community and a classroom community. A school community is the workplace that is primarily filled with managers of learning (e.g., teachers and administrators). Conversely, a community of learners represents a classroom community. Hung and Yuen (2010) pointed out that any class in which a student is enrolled qualifies as classroom community, at least according to Rovai's definition. Therefore, classroom CoP is developed by any activity that builds or sustains community in the context of a classroom, be it face-to-face or online.

Stacey (as cited by Smith, 2005) also found that construction of knowledge is developed through communicative and sociocultural contexts; her research revealed that effective learning is largely dependent on a socially constructed learning environment. Smith (2005) described the conversations that occur in this environment as the stimuli for learning and thought construction. Through this communication, "The group contributes more to each learner's understanding than they are able to do individually" (Smith, 2005, p. 5). Smith (2005) concluded that one of the best predictors of success for online students is their willingness to collaboratively engage with other online students; in this study, the variable *connectedness* seeks to measure collaboration.

A number of variables play a role in online classroom collaboration. Hung and Yuen (2010) described several studies in which teaching, cognitive, and social elements alter students' sense of classroom community; these elements are interconnected and necessary for the development of classroom community. Hung and Yuen (2010) also explained that while no causal relationship has been established between learning variables and classroom community, a student's sense of classroom community is an important component of success in an e-learning environment. Rovai (2002a) revealed that a sense of community might help students to learn more and finish stronger.



Emerging technology plays an important role in facilitating this collaboration in an online environment. Several researchers agree that technology-based education has influenced the learning theories, especially situated learning (Lave & Wenger, 1991). Learning theorists acknowledge the dramatic impact technology has made on social interaction, which plays an important role in the learning process (Beldarrain, 2006).

Therefore, a thorough review is needed of emerging technologies that show potential for improving learning. The following section offers a comprehensive review of these emerging technologies. The researcher covers applications that emerged in the last six years in order to illustrate the broad scope of these tools. In addition, the review helps to illustrate the power, breadth, and potential of these applications.

#### Transduction: Emerging Technologies in E-learning—Rise of Social Media

Coupled with the growth of e-learning, the recent explosion of emerging technologies has challenged and altered how faculty and students perceive learning (Watkins, 2007). Essex (2007) recorded that various Internet technologies have caused enormous changes in distance education. While hardware has played a role in these changes (e.g., personal computers and mobile phones), the principal technologies guiding this revolution in e-learning have been software driven through the Internet, LMSs, satellite communication, and Web 2.0 applications. Institutions of higher learning are beginning to recognize that current undergraduate students are increasingly proficient in Web 2.0 applications (Smith et al., 2009; Smith & Caruso, 2010). In addition, universities are beginning to realize the pedagogical potential of these technologies, especially Web 2.0 (English & Duncan-Howell, 2008). EDUCAUSE produces a monthly publication that seeks to identify, compile, and review new technologies that show promise in education. Appendix A (Emerging Technologies from 2005-2011) offers a

thorough list of the emerging technologies showing the most potential for education in chronological order by year; the years 2005 through 2010 are covered.

While the list in Appendix A is not completely exhaustive, the breadth and potential of these new applications is illustrated by the sheer volume of multimedia technologies described, while simultaneously illustrating how easily one can get lost in this ocean of change. Five of these emerging technologies represent applications that are gaining significant attention from teachers, researchers, and reviewers: virtual classrooms, lecture capture, podcasting/vodcasting, mobile learning, and SNSs. These technologies are representative of the preferences that students indicated on the 2009 and 2010 EDUCAUSE Center for Applied Research (ECAR) study (Smith & Caruso, 2010; Smith et al., 2009)—a detailed description of the ECAR studies is offered in a later section of this paper. An in-depth discussion of each of these five prominent technologies is beyond the scope of this paper. However, Appendix B (Five Prominent Emerging Technologies from 2005-2010) offers a summary, advantages, and disadvantages for each of the five prominent technologies.

SNSs offer a powerful blend of characteristics that place this application in the most promising position among the five leading applications. SNSs maintain several advantages. First, the ECAR studies revealed that SNSs are a technological juggernaut among students because over 90.0% of current undergraduate students use SNSs (Smith & Caruso, 2010; Smith et al., 2009). Therefore, the vast majority of students embrace and utilize this tool, and students' use of SNSs in education would require little to no training for students. According to the 2010 ECAR study, teachers would need more training than students (Smith & Caruso, 2010).

Second, most SNSs are free or inexpensive while the other four technologies require some costs. For example, mobile phones require the initial purchase of a mobile device and a monthly service contract (EDUCAUSE, 2010). Lecture capture, podcasting, and vodcasting require massive amounts of storage space to house recorded content or payment to a third-party contractor to store the media in an off-site server (EDUCAUSE, 2005, 2008). Similarly, virtual meetings require a great deal of technological infrastructure to be in place before the meetings can begin (EDUCAUSE, 2006b). Conversely, SNSs are inexpensive and often free.

Third, social networking sites represent a powerful tool for social interaction and transformation. The Egyptian revolution in 2011 that ousted President Hosni Mubarak started with social networking. One protest leader clarified this point: “This revolution started online....This revolution started on Facebook” (Evangelista, 2011, para. 3). President Barak Obama even alluded to Facebook in his 2011 State of the Union address: “We are the nation that put cars in driveways and computers in offices; the nation of Edison and the Wright brothers; of Google and Facebook” (Obama, 2011, para. 24). These events came only seven years after the creation of Facebook (EDUCAUSE, 2006a; Facebook, 2012). In addition to power and influence, educators are beginning to see the pedagogical potential of this Web 2.0 tool.

### *Social Networking in E-learning*

Many twenty-first century conversations about learning include social networking as an effective teaching tool in online education (Conrad, 2008). Casey (2008) agreed that social networking is gaining a great deal of attention alongside podcasts and blogs. Researchers define social networks as environments in which consumers interact through

a continuously evolving collection of networks based on friendships, interests (e.g., movies), school, or similar parameters (EDUCAUSE, 2006a).

Social networking represents the most pervasive Web 2.0 technology to date. Evidence of the value and importance of social networking sites can be seen in the huge online communities that have recently been formed (Ewbank, Kay, Foulger, & Carter, 2010). For example, Facebook was created in 2004, and by early 2012, this SNS had a population of over 901 million users, which would have made it the third largest country in the world (Facebook, 2012).

The idea that personal computers linked via the Internet could serve as the foundation of computer-mediated social networking and interaction was actually derived in the mid-1990s (Boyd & Ellison, 2007). SNSs have the potential to create enhanced communication procedures with students, expand the avenues of communication beyond the classroom, and enhance online teaching (Harris, 2008). Conrad (2008) discussed one caveat aimed at computer-based communication: the absence of social cues in an online environment force communication to become more detached, less personal, and more task-oriented than communication would be in person. Despite this weakness, the vast majority of students embrace SNSs.

#### *Current Students' Use of Technology and Teacher Readiness*

In conjunction with the consideration of emerging technologies, one should also consider how current students use those technologies. As noted previously, a divide exists between the way in which students use technology in everyday life and the way in which learners use technology for the purpose of education (Repman et al., 2010). This dichotomy can best be understood by investigating current students' use of technology. In order to accomplish this task, the researcher drew upon the results of the two most

recent ECAR surveys. Each ECAR study focused on the preferences and uses of technology among undergraduate students; the research is based on thousands of undergraduate students at several colleges and universities.

*2008-2009.* The first study was based on 39 institutions and 30,616 respondents during the 2008-2009 school year. The study confirmed that communication applications such as social networking sites, text messaging, and instant messaging are altering the manner in which university learners are connecting to each other and the world. A staggering 90.3% of the respondents used SNS, and 89.8% employed texting. These findings are higher among younger students, but the gap between older and younger students is closing. Students that were 18 or 19 reported a 95.4% usage rate, 76.0% of which was daily usage. Analogous to this group were students of ages 20 to 24, which showed a 94.7% usage rate and 62.9% daily usage rate. Respondents ranging in age from 30 to 39 experienced a sharp increase in SNS use over the previous year (236.0%), but students 40 and older saw the greatest increase as they quadrupled their use by 326.0%. Students felt confident about their ability to search the Internet effectively and efficiently, with 80.0% indicating they were very confident in this area. A large majority, 88.9% of students surveyed, indicated that they took a class that incorporated a LMS (Smith et al., 2009).

Laptops were prevalent among the 2009 freshmen class; 79.0% indicated that they owned a laptop no more than a year old. Of the undergraduate students surveyed, 84.2% downloaded music and videos. Similarly, 44.8% of the survey's respondents indicated that they submitted material to video websites, while 41.9% contributed to wikis. Students contributing to blogs stood at 37.3% and podcasts at 35.0% (Smith et al., 2009).

Unfortunately, less than half of the surveyed students reported that faculty members used information technology (IT) effectively in their course. Furthermore, only 45.9% of respondents reported that instructors have appropriate IT skills to enable the use of technology in a classroom setting (Smith et al., 2009).

*2009-2010.* The 2009-2010 study was based on 100 four-year institutions, 27 two-year colleges, and 39,950 respondents during the 2009-2010 school year (Smith et al., 2009). Smith and Caruso (2010) revealed that once again communications applications dominated students' use of technology. Nine out of ten respondents reported using social networking sites and text messaging; as a median frequency, these applications were used daily by this group. However, only 30.0% of the students used social networking in a class. Interestingly, 50.0% of the students used SNS to collaborate outside of the class setting; in other words, learners autonomously used SNS to collaborate on course topics despite SNSs not being employed as part of the course itself. In stark contrast, only 8.0% of students reported communicating with instructors through SNS on topics that were course-related. Juxtaposed against SNSs, these students used LMSs in 90.0% of their classes (Smith & Caruso, 2010).

Current college students increasingly have embraced mobile technology. The vast majority of students in the survey owned a laptop, 83.8%, as opposed to a desktop, 45.9%. Similarly, 62.7% of these learners owned a handheld device that is Internet capable. The report explored this trend further by investigating how students used these handheld mobile technologies. Seventy-five percent of these respondents accessed social networking applications. Also, approximately one-half of these students used their handheld device to send and receive email and to seek information (e.g., sports, facts,

news, and weather). The survey also included information on e-books, a new mobile technology. Only 4.0% of the students owned an e-book reader (Smith & Caruso, 2010).

Less than 20.0% of the respondents said they used clickers or other student response systems in class. A similar percentage of students reported using course lecture videos or podcasts. Interestingly, 64.0% of students disagreed or strongly disagreed with the following statement: “I skip classes when materials from course lectures are available online” (Smith & Caruso, 2010, p. 17).

Students’ view of instructors only slightly improved over the previous year. When asked if teachers have adequate technology skills to teach courses, a mere 49.0% of the students agreed; this does indicate a 4.0% increase over the previous year. Only 38.0% of the learners believed that instructors offered adequate training for the instructional technology used in their respective courses. Similarly, fewer than half of the respondents (47.0%) thought that instructors used instructional technology in an appropriate manner in courses (Smith & Caruso, 2010).

#### *Teacher Readiness for an E-learning Future*

Prensky (2001a) described the digital natives’ approach to learning as being fundamentally different than that of the aging teacher population. He stated that ICTs (i.e., information and communication technologies) are second nature for young students. Based on the work of Prensky (2001a), Peters (2007) stated that these pupils believe that “if you need the manual, the product is no good” and that “not knowing is an impetus to find out” (p. 5). In juxtaposition, Peters (2007) described the older teaching population as not being comfortable with ICTs. Peters claimed that educators have long maintained traditions of secrecy and individualism and that these teachers are challenged by having to work with programmers, Web developers, instructional designers, and technicians in

order to produce a successful Web-based class. He further compared the teachers and students by generalizing that current teacher's focus on instruction, memorization, and *doing it by the book* while young students focus on the quest for knowledge.

Mounting evidence signifies that teachers' success in using technology stems from those educators' acceptance and attitude towards technology (Yuen & Ma, 2008). Yuen and Ma (2008) reported, contrary to earlier findings, that perceived usefulness was not significant in the prediction of whether or not a teacher would use technology. Instead, they found that teachers' perceived ease of using technology was the only determinant as to the prediction of whether or not educators would actually use technology, specifically as it relates to e-learning. In summation, Yuen and Ma's (2008) research indicated that computer self-efficacy, subjective norm, and teachers' perceived ease of use could explain 68.0% of the differences detected in educators' intent to utilize e-learning.

Peters' (2007) research helped to clarify teachers' lack of readiness by finding three specific barriers. First, many teachers did not seem to have a mastery of basic desktop technologies and software (e.g., word processors or spreadsheets). Second, while mobile phones might be ubiquitous, the use of PDAs (i.e., Personal Data Assistants) and similar tools are not very prevalent among current teachers. Last, Peters (2007) alluded to research, which found that 2.0% of teachers had never turned on a PC, 5.0% were not able to burn a CD-ROM (i.e., Compact Disc Read-Only Memory), and very few teachers incorporated ICTs with instruction, despite the fact that some used these technologies for personal use. These results are quite alarming when they are juxtaposed with current societal trends to embrace technology.



### *Legal Issues*

Some aspects of the pursuit to include SNSs in e-learning are fraught with danger. Since the 1960s, society has become very litigious, and this trend has also infiltrated universities (Kaplin & Lee, 2007). SNSs seem poised to be a hotbed for controversy. Educators should strive to stay abreast of current legal developments and understand the liability of actions they take within an SNS. The following discussion outlines the laws of one state (i.e., Mississippi) that have implications for SNS. Mississippi was chosen as an example to represent the states in the Southeastern United States. Also, federal statutes and dictates that relate to SNS are discussed.

*Cyberbullying.* Because electronic communication is now pervasive in American society, cyberbullying is becoming an ever-increasing risk. Cyberbullying has been defined as “an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself” (Smith et al., 2008, p. 376). One of the major issues involved with the Internet is that social media creates permanence; criminal implications exist in many instances of electronic communication.

According to the National State Conference of Legislatures (2010), electronic communication plays a role in around 20.0% to 40.0% of all stalking crimes. Most state governments have responded by writing new laws: “Forty-seven states now have laws that explicitly include electronic forms of communication within stalking or harassment laws” (National State Conference of Legislatures, 2010, p. 1). The Mississippi Code of 1972 has an entire chapter of laws created to combat Computer Crimes and Identity Theft, § 97-45 (2003). The laws contained therein actually move beyond computers and

address all electronic media. A sentence to jail and/or a fine accompanies each statute. Another portion of the Mississippi Code addresses forbidden telephone communication.

*Electronic post with an injurious message.* Posting a message through electronic media for the purpose of causing injury to another individual is a crime in Mississippi, § 97-45-17 (“Posting of messages,” 2003). The law applies to any electronic medium of communication (e.g., Internet). Individuals sending any such message first must have the consent of the victim in order for the communication to be legal. This crime carries the weight of being a felony that is punishable by a jail term of up to five years, a fine of up to \$10,000, or both.

*Cyberstalking statute.* Another Mississippi law forbids *cyberstalking* and describes specific types of electronic communication, § 97-45-15 (Cyberstalking, 2003). The first portion of this statute prohibits any electronic communication that threatens to impose physical harm to any individual, another individual’s family member, another individual’s property, or for the purpose of extortion (e.g., money). The law then clarifies that it is illegal to repeatedly harass, threaten, or terrify through electronic communication. Defamatory electronic communication is also prohibited under two provisions. First, the statute forbids a person from making false statements about another individual’s criminal conduct, indecent conduct, illness, injury, disfigurement, or death. Second, the law bans harassing, threatening, or terrifying another person’s family members. The last segment of this statute is crucial for higher education institutions. It is unlawful for an individual to knowingly allow any of these prohibitions to occur on an electronic device under that person’s control. The punishments associated with these crimes include imprisonment from two to five years, a fine up to \$10,000, or both. The final statement of this statute clarifies that this law “shall not be construed to impair any

constitutionally protected activity, including speech, protest or assembly” (Cyberstalking, 2003, para. 3).

*Obscene language.* Mississippi lawmakers realized that harassment and stalking take place over the telephone in some instances and created a law to combat such activity, § 97-29-45 (Profane and indecent language, 2001). Individuals commit a criminal offense when they use lewd, lascivious, or obscene language over the telephone in order to harass, abuse, or threaten another person. Similarly, it is illegal to make a telephone call that threatens another person with physical harm or property damage. The law also contains ambiguous terminology stating that it is illegal for a person to make a call “without disclosing his identity and with intent to annoy, abuse, threaten (sic) or harass any person at the called number” (Profane and indecent language, 2001, para. 3). The statute forbids repeatedly calling a number for the purpose of harassment. In addition, the law prohibits people from knowingly allowing someone else to use a phone under their control for any of these purposes. Breaking this law carries a penalty of up to \$2,000 or five years in prison, or both. The law does not clarify whether or not text messaging is included in these prohibitions. However, the electronic media statutes that were discussed in the previous section would address any telephone communication that does not fall in the parameters of this specific law.

*Interference with class attendance.* It is unlawful for a person to threaten, coerce, or intimidate another individual with the intent of interfering with class attendance, § 37-11-20 (Intimidation, threatening or coercion, 1972). This statute specifies that the interference can stem from the distribution of material, illegal force, or threats of force. The law also specifies that these threats apply to “any person enrolled in any school” (Intimidation, threatening or coercion, 1972, para. 1). Such interference is considered to

be a misdemeanor that is punishable by a sentence of up to six months in jail, a fine of no more than \$500, or both. This statute also applies to minors, but they are tried in a youth court. While this law was initially crafted during the civil rights era, the ramifications of this edict still have repercussions. If a person disseminates *material* that in any way interferes with another student attending class, then this law is being violated. The dissemination of material would include electronic communication.

*Illegally recorded media or photographs.* The legislature of Mississippi has banned filming, taping, or photographing an individual in violation of a privacy expectation, § 97-29-63 (Photographing, taping, or filming, 1999). A person with indecent, licentious, or lewd intent cannot secretly film, videotape, photograph, produce an image, or record another person without the permission of that individual when he or she has a reasonable expectation of privacy (e.g., bedroom, bathroom, or locker room). This crime is considered to be a felony. The penalty for this offense is no more than five years in jail, a fine of no more than \$5,000, or both. This statute speaks to the act of merely recording another person, not venturing into the dissemination of this material. In 2007, the Supreme Court of Mississippi found a man guilty of this statute for videotaping another person without her permission; he was sentenced to several years in jail (*Gilmer v. State of Mississippi*, 2007). If an individual were to post such material online, then he or she would also be guilty of one or more of the statutes discussed above (e.g., § 97-45-17).

*Federal anti-hazing stance.* Moving beyond the initiatives of states, the federal government has taken an anti-hazing stance in recent years. A bill, H.R. 1207 (Hazing Prohibition Act of 2003, 2003), amending the Higher Education Act of 1965 was introduced in the United States House of Representatives that would have withheld

“Federal student financial assistance from students who have engaged in hazing” (para. 1). This bill was not passed.

However, the Office of Civil Rights has now clarified that anti-hazing action that borders on harassment will have a similar effect on all agencies receiving federal funds. On October 26, 2010, the United States Department of Education, Office of Civil Rights specified that any hazing bearing the resemblance of harassment was a violation of Title IX: “the school employees failed to recognize that the ‘hazing’ constituted sexual harassment. The school did not comply with its Title IX obligations when it failed to investigate or remedy the sexual harassment” (U.S. Department of Education, Office of Civil Rights, 2010, p. 7). Therefore, an institution’s federal funding could be placed in jeopardy if such hazing incidents are not recognized and dealt with in an appropriate manner.

### Interaction Between Variables

#### *Interaction Between SNS, Age, Sense of Community, and Technology*

The Net Generation longs for community in the educational environment as well as their lives outside of the classroom (Oblinger, 2008; Strauss & Howe, 2007a). Educators can attempt to meet this need by integrating social multimedia technologies in courses, especially Web 2.0 content, social bookmarking, blogging, and photo sharing with other students (Oblinger, 2008). Net Geners are prepared and eager to engage in online learning assignments that employ interaction and collaboration. This generation grew up with search engines and instant messaging, and they are now becoming engrossed in emerging multimedia technologies such as social bookmarking, podcasting, vodcasting, and virtual worlds. New technologies and communication opportunities are altering e-learning (Dabbagh & Bannan-Ritland, 2005). Spanier (2003) implored

teachers to explore multimedia technologies that utilize interactivity because Net Geners prefer this type of technology.

Simultaneously, some researchers have argued that a sense of community is an essential part of the e-learning environment (Yuen & Yang, 2010). This body of research is driving educators to look for a solution to a missing link (i.e., community) in the current e-learning environment, which LMS is driving. The growth of SNSs reveals the Net Generation's desire for community. SNSs represent a solution to this dilemma, and educators might begin to embrace Web 2.0 technologies as a panacea as they become familiar with such technologies (Hung & Yuen, 2010).

As noted in the introduction, students' everyday use of technology is completely different from the way they use technology in an educational setting (Repman et al., 2010). Unfortunately, LMSs function within the closed confines of the learning system itself. The Web 2.0 technologies the Net Generation favors stand in juxtaposition to this closed context (Repman et al., 2010). In fact, Craig (2007) challenged whether or not LMSs could promote collaboration and innovation; still, many institutions mandate the use of LMSs in online instruction. Administrative support is the primary focus of LMSs. Innovative tools that would foster collaborative and creative learning activities are not currently integrated into LMSs (Repman et al., 2010).

Because of this lack of integration, many educators have jettisoned LMSs and are looking elsewhere to meet the needs of students in an e-learning environment. For example, virtual classrooms are gaining attention and offering an alternative platform for online course delivery. While some of these virtual classrooms are contained within an LMS, many others are derived from the creation of a virtual world outside of LMS in which online learners interact with each other and the teacher (Beldarrain, 2006).

Perhaps the most promising of the LMS alternatives is SNSs, which the researcher discussed above in the larger context of *systems* and *transduction*.

All teachers aim to be effective in their practice. Therefore, it follows that the best teachers assume responsibility for identifying the technologies that enhance learning. They should also stay informed concerning emerging technologies. Within this framework, the focus on e-learning is gravitating toward effective virtual pedagogy that incorporates emerging technologies in order to enhance student success (Held, 2009). The reasons why e-learning is now gaining prominence among educators stem directly from the current accessibility, delivery, and interactivity of technology (Held, 2009).

#### *Interaction Between SNS and Community*

Several studies demonstrate the value of social networking tools to facilitate learning via community (Hung & Yuen, 2010). Mason and Rennie (2007) established that Web 2.0 applications that facilitate interaction were ideal for building community and improving users' emotional connectedness. Tu, Blocher, and Ntoruru (2008) revealed that a social networking tool (i.e., Diigo) helped create collective intelligence through community collaboration and discussion. Russo, Watkins, and Groundwater-Smith (2009) described how SNSs encouraged informal learning in the context of a CoP. In relationship to this research topic, four studies represent those researchers that have attempted to use SNS to build a sense of community in an e-learning environment.

First, Hung and Yuen (2010) studied the use of SNSs to enhance the sense of community among 72 students in four hybrid courses. Their results indicated an overwhelmingly positive response among learners. Specifically, Hung and Yuen (2010) found that SNS enhanced informal learning and blurred the boundaries of classroom community in a traditional setting. The courses studied in Hung's and Yuen's (2010)

project were technology courses, and the majority of students were majoring in an instructional technology area. The SNS used in this study was Ning.

Second, Marsh and Panckhurst (2007) explored the use of a bilingual SNS with a group of 19 graduate students on the master's level. They found that using an SNS in e-learning promoted collaborative learning, interest among learners, critical thinking, and goal attainment. The courses studied in their project were technology courses, and the majority of students were majoring in an instructional technology area. These researchers also employed Ning as the SNS.

Third, Oradini and Saunders (2008) employed a different approach that was less pointed but larger in scale. The two previous studies (i.e., Hung & Yuen, 2010; Marsh & Panckhurst, 2007) employed an approach that was confined to a few classes and students. Researchers were directly involved in the SNS, and Ning was the SNS used. Oradini and Saunders (2008) adopted a hands-off approach that allowed students to form their own social networks, and the study included 2,300 students and over 700 staff. The university in their study enrolled around 24,000 students. Each class was already enhanced with a virtual learning environment, which primarily contained static text and course content. The researchers embedded a SNS into these virtual environments that allowed students to autonomously form social networks. Instead of using Ning, the SNSs in this study were part of the university's virtual learning environment. The results of this study revealed that less than 10.0% of the student body logged into the SNS, and half of those that did log in only did so once. Students that offered a positive response in relationship to the SNS described opportunities for social interaction that primarily had little to do with coursework.



These underwhelming results fall into line with the insight of some researchers. Panckhurst and Marsh (2008) argued that educators should employ tasks that were specific and focused when attempting to effectively employ a SNS for the purpose of learning. In this scenario, the teachers are “in a facilitating role, stressing the importance of guidance rather than management in forming ‘communities of practice’” (Oradini & Saunders, 2008, p. 6). Panckhurst and Marsh (2008) also declared that the future of learning will probably give autonomy to learners through carefully designed and integrated networks.

Fourth, Yuen and Yang (2010) sought to use an SNS to nurture a sense of community among 30 graduate students. The students were taking technology courses at a university in either Hong Kong or the southern United States. The researchers designed the courses in a hybrid format so that instruction took place both online and face-to-face. The results of the study revealed that students felt favorable and positive about the community spirit, cohesion, interdependence, and trust in both classes. The courses studied in Yuen’s and Yang’s (2010) project were technology courses, and the majority of students were majoring in an instructional technology area. Ning was employed as the SNS for this study.

A limited amount of research exists on the ability of SNSs to develop community in an e-learning environment. This is primarily a result of the newness of this concept. Therefore, several areas of inquisition have gone untapped. Three of the four studies discussed above focused on classes that were in and of themselves technology related. The fourth study was so broad-based that pointed findings could not be derived as it relates to a CoP. Therefore, no study has been conducted on a CoP drawn from the general population of a university that measures sense of community in e-learning. In

addition, the three technology-related studies investigated graduate students; the broad-based study focused on the entire student body (i.e., undergraduate, graduate, and professional). Therefore, no study has been reported that inspected undergraduate students, including community college students. This paper considers a subset of a range of communities (i.e., undergraduate classroom communities in a community college) and examines the learning value of a SNS with a focus on students' perceived sense of classroom community.

### Justification

Several studies have demonstrated that a sense of community is an essential part of learning, including traditional and online settings (Chavis, Hogge, McMillan, & Wandersman, 1986; Hung & Yuen, 2010; McMillan & Chavis, 1986; Moore, 1994; Pretty, 1990; Sarason, 1974; Yang & Liu, 2008; Yuen & Yang, 2010). This body of research is driving some education scholars to look for a missing link in the current e-learning environment, which many identify to be community (Yuen & Yang, 2010). Adding to the gravitation toward social learning is evidence that a strong sense of community is imperative for the Net Generation. Strauss and Howe (2007a) described several iterations of Net Geners' proclivity to conform and gravitate toward what is good for the group. Yuen and Yang (2010) argued convincingly for the use of SNSs to meet this communal void. A major factor in this argument is based on the pervasive standing of SNS.

The research on communities functioning as a social network actually dates back to Bender's (1978) study of social change and communities in America. Sarason (1974) conducted one of the earliest social-psychological studies of sense of community.

Moving beyond the traditional view of community, Sarason (1974) described community

as an individual's perception of interdependence and similarity with others within a stable structure. Palloff and Pratt (1999) added that virtual communities and environments (i.e., online) have transformed traditional definitions of community, which were based on geography and interests.

Creating an environment in which collaborative learning thrives is vital for student learning. As Vygotsky (1986) argued, students will not progress through their ZPD if collaborative learning is not implemented in an effective manner. Spinks (2007) added that in a scenario where collaboration was impeded, students could not exhaust their full potential for gaining knowledge on the topic in question. The growing demand for e-learning courses implores educators to explore the importance of community in the online environment and investigate learner-instructor and learner-learner interactions (Jinks, 2009; Rovai, 2001).

Sense of community in the classroom is the perception of the classroom community according to learners and the teacher. Rovai (2002b) listed the elements that comprise classroom community: trust, spirit, interactivity, shared goals and values, trade, and connectedness. Having identified these core elements, some researchers argue that the sense of community is dynamic; it transforms from one environment to another (Hill, 1996; Rheingold, 1991). The classroom environment represents one such environment in which learning is the objective (Rovai, 2002b). Rovai (2001) warned that postsecondary organization should offer more than mere access to knowledge; instead, educators should design classes that facilitate the construction of knowledge among students and within each learner.

Wallace (2003) listed three current trends that have encouraged the study of community in e-learning classes over the last decade. First, new technologies encourage

collaboration and interaction in an online environment. Second, several learning theories have emerged that are based on collaboration and interaction among learners. Third, some classes are now being designed around this improved technology and emerging learning theories.

In order to employ best practices in instructional design, educators should understand the development of community in e-learning courses (Jinks, 2009). Researchers (Liu et al., 2007) have discovered that building community in an e-learning environment is not as intuitive as enthusiasts have advocated. For example, Liu et al.'s (2007) study indicated that community development in an e-learning environment requires intentionality, support, and planning on the part of the teacher.

A myriad of studies have demonstrated that sense of community in the classroom is positively related to key factors in learning: social support, coping skills, higher self-esteem, social skills, flow of information, group cooperation, intrinsic motivation, interest in academic and social activities, academic satisfaction, emotional and academic support, academic self-efficacy, and commitment to obtaining group and individual academic goals (Battistich et al., 1997; Dede, 1996; Pretty et al., 1996; Rovai, 2000; Rovai et al., 2004; Vieno et al., 2005). McElrath and McDowell (2008) argued that building community in e-learning classes alleviates isolationism for both the learners and the teachers. In addition, sense of community has successfully been used as a predictor for performance on exams, perception of learning, and students' classroom attitudes (McKinney et al., 2006). Palloff and Pratt (2004) discovered that community learning led to an enhanced learning experience and overcoming tendencies toward isolation.

One major theme in the research on community is a focus on the retention of students. Picciano (2002) revealed that classroom community is more vital in online

courses versus traditional because of low retention rates in online classes. Tinto (1975, 1993) contended that learners that acquire a strong sense of community are more likely to continue than those learners that feel alone or alienated. In regard to traditional classes, he concluded that an instructional approach that facilitated community in the classroom would lead to less attrition. Bean and Metzner (1985) adapted Tinto's (1975) theory on community to non-traditional environments; Kember (1995) and Rovai (2003) tested Tinto's (1975, 1993) theory in the e-learning environment. Similar research has identified the absence of sense of community as a primary predictor of high student attrition in online courses (Ferguson, 2010).

What is missing in the literature is a specific comparison between e-learning formats (i.e., LMS and SNS) and their relationship to sense of classroom community, connecting, learning, and performing. In addition, the literature demonstrates the importance of sense of community, but little research has been conducted on how class format affects sense of community in the online environment. Therefore, the problem is that while research has demonstrated the vital role of sense of community in the e-learning classroom, little is known about how to improve the sense of community in e-learning classes. This study attempts to shed light on this unexplored area of e-learning instruction.

## CHAPTER III

### METHODOLOGY

#### Overview

This study sought to compare the educational efficacy of using social networking systems (SNS) versus learning management systems (LMS) to improve sense of community, connecting, learning, and performing in an e-learning environment. The research was quantitative and employed a pre-posttest quasi-experimental design. The researcher also measured the influence of age, gender, ethnicity, and general class format (i.e., traditional versus LMS and SNS) as an ancillary component of the project. This study addressed four research hypotheses and four research questions.

#### *Research Hypotheses*

H<sub>1</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of community* as measured by a pretest and posttest of the Classroom Community Scale (CCS).

H<sub>2</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of connectedness* as measured by a pretest and posttest of the subscale for connectedness in the CCS.

H<sub>3</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *sense of learning* as measured by a pretest and posttest of the subscale for learning in the CCS.

H<sub>4</sub>: Within the context of e-learning, class format makes a significant difference in community college students' *performance* as measured by course final grade.

### *Research Questions*

RQ<sub>1</sub>: Does a relationship exist between students' *sense of community* and their age, gender, ethnicity, and/or general course format (i.e., traditional versus LMS and SNS) in a community college course?

RQ<sub>2</sub>: Does a relationship exist between students' *connectedness* and their age, gender, ethnicity, and/or general course format in a community college course?

RQ<sub>3</sub>: Does a relationship exist between students' *learning* and their age, gender, ethnicity, and/or general course format in a community college course?

RQ<sub>4</sub>: Does a relationship exist between students' *classroom performance* (i.e., course final grade) and their age, gender, ethnicity, and/or general course format in a community college course as measured by course final grade?

### Research Design and Procedures

The variables were derived from four specific tenets of chaos theory: LMS and SNS—systems; gender, age, ethnicity, and CCS pretest—initial effects; performing (i.e., course final grade) and CCS posttest in regard to sense of community, connectedness, and learning—bifurcations; and LMS and SNS—transduction. All variables were measured twice in a pre-posttest design. Course final grade was the only caveat because it had no pretest equivalent. These variables were divided into four dependent variables and five independent variables.

The four dependent variables were sense of community, connecting, learning, and performing. Sense of community, connecting, and learning were derivatives of the CCS. Sense of community represents “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9).

Connectedness represents the feeling of respondents in respect to the classroom “connectedness, cohesion, spirit, trust, and interdependence” (Rovai, 2002b, p. 206). Learning represents the feelings of respondents in respect to “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” (Rovai, 2002b, p. 207). All four of the dependent variables were primary components of this study (i.e., not ancillary).

The five independent variables were age, gender, ethnicity, time of measurement (i.e., pre-posttest), and general course format. Age consisted of four groups divided according to year of birth: 1925-1945, 1946-1964, 1965-1980, and 1981-1994. Gender was divided between male and female. Ethnicity was divided five ways to appropriately represent ethnic diversity: Caucasian, African American, Hispanic, Asian, and Native American. General course format examined face-to-face Art Appreciation courses versus e-learning versions of this class (i.e., LMS and SNS).

### *Setting and Participants*

*Setting and population.* The participants in this study were community college students enrolled in six Art Appreciation classes. These classes linked into a Southeastern state’s virtual community college, referred to as SSVCC. SSVCC allows any community college student enrolled at any of the 15 community and junior colleges of that respective state to enroll in classes offered through the SSVCC system. The population from which this study was drawn potentially encompassed all community and junior college students in the state considered in this study, which numbered 80,550 during the fall 2009 semester (State Board for Community and Junior Colleges, 2010). The sample was drawn from this population of students.



One instructor taught the six classes in this study through SSCC, which is the community college in this study. The community college awards associate degrees under the authority and accreditation of the Commission on Colleges of the Southern Association of Colleges and Schools (SACS). SSCC was enlisted for this study because each semester the college provides a wide variety of web-based classes to a large number of students—300 online courses during each semester. The fall 2010 enrollment for the community college was 10,415 (SSCC, 2011a).

*Sample.* The sample consisted of a mix of women and men attending community and junior colleges in one state in the Southeastern United States. This sample included people from a variety of cultural and ethnic backgrounds ranging in age from 18 to 66. Because the classes in this study were online, no central geographic location existed for these students; they were located all over the state considered in this study.

*Effect size.* G\*Power analysis was employed to help to determine effect size. In order to detect a moderate effect size (e.g.,  $\alpha$  of .05 and .80 power), the researcher determined that a sample of approximately 150 students would be necessary. Therefore, the required sample size was approximately 75 for both the control and treatments groups. The researcher needed to invite approximately 180 students in the study to proactively deal with attrition.

*Control and treatment groups.* The researcher reported on the demographics of the control and treatment groups to demonstrate representation of the population. In both groups, the primary participants shared the attribute of being online students. The control and treatment groups were randomly assigned by class format (i.e., LMS versus SNS). The factors of age, gender, and ethnicity were representative of the population.

*Instructor.* The criteria for choosing the instructor was based on a demonstrated level of competency in employing instructional technology within D2L, a minimum of three years of online teaching experience, and evaluations in regard to online classes. The researcher chose the instructor during the semester before the study. The instructor attended a face-to-face training session that covered the technical creation of a course in Ning – the SNS used in this study. The training was comprehensive and lasted four hours. The same instructor taught all six classes involved in the study. Limiting the number of instructors to one decreased the number of extraneous variables.

#### *Procedures*

*Preparatory process.* The researcher sought permission to conduct the survey from the community college, state's Association of Community and Junior College Presidents, and The University of Southern Mississippi (Appendix C). In the semester prior to the study, the instructor built an Art Appreciation class in Ning (i.e., the SNS) that replicated exactly the Art Appreciation class in Desire2Learn (i.e., the LMS). The teacher mirrored all material, assignments, and instructional design elements in both e-environments. In other words, the only difference in the two classes was the class format: LMS versus SNS. The researcher provided technical support throughout the semester in both formats to address unforeseen delivery problems that may arise.

*Research process.* Students chose their courses for the spring 2012 semester during the open enrollment period. Therefore, the control and treatment groups being examined in this study enrolled themselves in the courses. Students had no foreknowledge that they would be asked to be involved in this study because the classes appeared as all other e-learning courses on the schedule.

The six e-learning Art Appreciation classes served as the environment for this study. Three of these classes learned through an LMS (i.e., Desire2Learn), and three learned through a SNS (i.e., Ning). Before classes began, the researcher randomly assigned three LMS classes and three SNS classes from the six considered in the study. On the first day of class, participants received electronically an email that invited them to participate in the study; the email contained a secure link to Lime Survey (see Appendix D). If students clicked on the secure link, then they were taken to a secure area in Lime Survey. The survey began with an informed consent form along with a cover letter that described the scope of the project (see Appendix E). Students were asked to click the *accept* button on the electronic consent form, which served as the signature. Students who waived or refused to sign the informed consent were excluded from the study. Students had the option to withdraw from participation in the study at any point.

Students who signed the consent form proceeded to the next page within Lime Survey, which began the CCS survey including the demographic questions (see Appendix F). Demographic information was gathered through three questions attached to the beginning of the survey; this information provided a description of the sample: gender, age, and ethnicity. Respondents could complete the CCS in less than 15 minutes. Each student received a valid token as he or she took the survey; this token eliminated duplication and randomly assigned a confidential identification number to each participant. Lime Survey generated unique tokens for each student in the form of a unique universal resource locator (url); therefore, each student was sent a unique url via email through which the survey could be taken. The confidential identification number (i.e., token) was embedded in the administrative portion of Lime Survey within the account of the survey's designer (i.e., the researcher). Therefore, only the researcher had

direct access to these numbers. This identification number allowed the researcher to connect pretest and posttest results as well as final grades. Participants who completed and submitted the CCS as a pretest were entered in a drawing to win one of two \$50 gift certificates.

For ancillary interests of this research project, face-to-face Art Appreciation classes taking place during the same semester at SSCC also took the CCS as a pre-posttest. The CCS was delivered through Lime Survey for the face-to-face classes in order to ensure equity in response from traditional and e-learning environments. The face-to-face class participants were entered into the drawing for the \$50 gift certificates.

The amount of time students were in class was a confound for which the researcher had to account. The researcher maintained that equivalent time in class was more important than the place pretest and posttest were given in the semester. According to SSCC's and SSVCC's academic calendar, e-learning courses ended one week before face-to-face classes. Therefore, all participants in the study (i.e., LMS, SNS, and face-to-face) were asked to complete the CCS as a posttest within the window of two weeks to three days before the end of the e-learning semester. This approach ensured that students were in their respective course approximately the same amount of time—waiting until the end of the face-to-face classes would have given that group an extra week to build community. The request to complete the posttest was delivered through email, just as the pretest invitation was delivered. The survey process for the posttest was identical to the pretest through Lime Survey, except for the consent form that was signed previously. Respondents who filled out and submitted the CCS as a posttest were entered in a drawing to win one of two \$50 gift certificates.

Students in the treatment group (i.e., SNS) were able to interact (i.e., communicate through the course) with one another, and students in the control group (i.e., LMS) were able to interact with one another. However, the treatment group was not able to interact with the control group within the confines of the course because the course shells were separate and password protected. However, students from both groups could have interacted with one another outside of the course shells. A threat of nonequivalence between these groups was assumed to be minimal because both groups had the same instructor, were given the same assignments, and were taught with the same instructional design elements. Both the LMS and SNS classroom settings were password protected so that students could only access the information for their own class. At the end of the semester, the instructor provided the researcher with the class final grades. For each respondent, the class final grade was associated with the results of the CCS pretest and posttest.

*Confidentiality.* All survey data were collected through Lime Survey and kept confidential. The only individuals with possible access to the information were the researcher; members of the dissertation committee; and the community college's Vice-President of Instruction, Student Services, and Related Technologies. Lime Survey was password protected and was a secure application for delivering and retrieving survey data. The final grade was associated with the confidential identification number so that student names were not included in any reporting of the data. The researcher had the ability to match class final grade to the results of the CCS because the tokens generated through Lime Survey identified each respondent's answers on the CCS through their school identification numbers. That is, the school identification number was linked to both final grades and CCS results. All data were housed on a password-protected

computer in the researcher's office and remained there until the results were published. Any publication resulting from the study would omit identifiable student data.

### Instrumentation

Three measurement tools were used in this study: demographics, course final grades, and CCS. A demographics survey was attached to the beginning of the CCS and provided a description of the sample: gender, age, and ethnicity. At the end of the semester, the teachers provided the researcher with course final grades of students to help measure academic performance. The grades ranged from A to F and were reported in terms of grade point average (GPA) for the course.

### CCS

The CCS was employed as a pretest and posttest. Rovai (2002b) created the CCS in order to measure sense of classroom community, connectedness, and learning in e-learning classes. The CCS is a five-point Likert scale survey and contains 20 items. The CCS measures sense of community from a holistic viewpoint. The survey has two interpretable subscale factors: connectedness and learning. Rovai (2002b) developed the CCS from data collected from 28 separate online courses and 275 students. Rovai (2002b) vetted this instrument via a study, establishing validity and reliability. Appendix G is a chart of pertinent studies that have employed the CCS.

*Validity.* Rovai (2002b) established content and construct validity for the CCS. Initially, the CCS contained 40 questions. These questions were based on a literature review that identified the core characteristics of community, including community in various settings (e.g., face-to-face class): cohesion, spirit, trust, interdependence among members, and feelings of connectedness. Rovai (2002b) negatively worded half of the questions. Three experts—professors of educational psychology—examined content

validity in the original set of 40 questions; they ranked each question according to a Likert scale ranging from zero (*totally not relevant*) to four (*totally relevant*). Rovai (2002b) eliminated all questions that the experts did not rate as *totally relevant*. In addition, he vetted the 40 questions through factor analysis and eliminated all irrelevant questions. Rovai (2002b) adopted a threshold for saliency, which was a rotated factor loading of more than 0.3; this threshold indicated that the factor accounted for at least 9.0% of the variance.

The final version of the CCS included 20 items (Appendix F). Ten questions dealt with feelings of connectedness, and ten questions dealt with learning: “feelings regarding the use of interaction within the community to construct understanding and the extent to which learning goals are being satisfied within the classroom setting” (Rovai, 2002b, p. 202). By adding all 20 items together, one can obtain the overall sense of community. Odd numbered questions represent the connectedness subscale, and even questions represent the learning subscale. The grade level score for the CCS was a Flesch-Kincaid score of 6.6, and the questions were given a Flesch Reading Ease score of 68.4.

*Reliability.* Rovai (2002b) demonstrated reliability via Cronbach’s coefficient  $\alpha$  and the split-half coefficient, which was adjusted according to the Spearman-Brown prophecy formula. The overall reliability for the CCS was a Cronbach  $\alpha$  of 0.93 and an equal-length split-half coefficient of 0.91. Rovai (2002b) also reported the reliability of each subscale. The Cronbach  $\alpha$  and equal-length split-half coefficient was 0.92 for the connectedness subscale. The learning subscale had a Cronbach  $\alpha$  of 0.87 and equal-length split-half coefficient of .80. These results indicated excellent reliability for the CCS as a whole and for each subscale.

*Factor structure.* In addition to validity and reliability, Rovai (2002b) conducted a factor analysis. The remaining 20 questions did not violate the assumption of no multicollinearity because the Kaiser-Meyer-Olkin score was 0.94, which measures sampling adequacy. Rovai (2002b) also demonstrated that the questions were acceptable for factor analysis through Bartlett's test of sphericity that produced a chi-square of 3883.85,  $p < .001$ . He determined the number of factors to extract via three criteria: the solution interpretability, the Kaiser-Gutman Rule, and the scree plot. Three factors retained eigenvalues of more than 1.0. Rovai (2002b) determined the correlation between factors by rotating them using the direct oblimin method. As a result, two of the factors explained all of the significant loading: connectedness and learning. The factor labeled *connectedness* accounted for 42.8% of the variance in community; *learning* accounted for 11.2% of the variance in community. In combination, these factors were highly interpretable solutions representing over half of the variance in community.

*CCS in the literature.* At least 20 studies have used the CCS since its inception in 2002. In each study, reliability was either confirmed or not reported. These studies ranged from middle school and high school students (Rovai et al., 2004) all the way to graduate students (Ouzts, 2003). Among these studies, the tool was used most often among graduate and undergraduate courses—14 studies for each level, some of which included both groups (see Appendix G). Although Rovai (2002b) originally developed the CCS to measure sense of community in online classes, the type of classes studied have included traditional, hybrid, and completely online—primarily for the purpose of comparison (Rovai et al., 2004; Ouzts, 2003). The variety of studies helps to establish the CCS as a valid and reliable instrument on several educational levels (e.g., undergraduate) and in different formats (e.g., e-learning).



As it relates to the environment of this project, four studies have focused on two-year institutions, and the CCS was proven to be reliable in community college and technical college settings (Ferguson, 2010; Shea, Li, Swan, & Pickett, 2005; Shea, Li, & Pickett, 2006; Smith, 2008). Shea et al. (2005) found that a positive relationship exists between teaching presence and the sense of community; that is, the teacher's active presence increases students' sense of connectedness and learning. This finding was confirmed by Shea et al. (2006) who added that sense of community is increased when teachers offer their own knowledge and encourage students' contributions. Smith (2008) recorded that students' learning preferences significantly influenced their sense of community. Ferguson (2010) found that imbedding podcasting in an e-learning course significantly increases feelings of connectedness but has no impact on students' perception of learning.

As it relates to the subject matter of this project, three studies have used the CCS to study SNS and learning, and reliability was verified in all three studies (Dawson, 2008; Hung & Yuen, 2010; Yuen & Yang, 2010). Dawson (2008) established that students' pre-existing experience with SNS influenced the type of exchanges and support required; thus, sense of community is influenced by students' previous experience with SNS. Hung and Yuen (2010) reported that using SNS to enhance face-to-face classes offers opportunities for professional and informal learning. Yuen & Yang (2010) added that SNS can build learners' sense of community by promoting collaboration and learning-centered activities. None of these studies were conducted in a community college setting.

#### Limitations and Delimitations

Two potential limitations and three delimitations were associated with this study. First, a certain level of self-selection was active in the final sample population because

the students chose the class, although they had no foreknowledge of the study. Therefore, the sample for the study was in a cluster (i.e., nonrandom). Second, participants may have experienced anxiety about reprisal from the instructor or answered questions with influence from the *halo effect*.

In regard to delimitations, the sample for this study was from community and junior college students from one state in the Southeastern United States. Second, the instructor used a specific computer-mediated instructional interface for the LMS (i.e., Desire2Learn) and the SNS (i.e., Ning). Third, the data collected for this study were confined to one semester. These limitations and delimitations minimized the scope of this research and diminished generalizability. Therefore, generalization of the findings to all online learners would be inappropriate. Generalization to similar settings might be appropriate as clarified in the discussion in the literature review on fractals, which is a tenet of chaos theory.

#### Data Analysis

PASW Statistics GradPack 18 software executed the statistical analysis on the raw data. An examination of descriptive statistics, analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and multiple regression analysis answered the research hypotheses and questions. The primary focus of this study was the research hypotheses, and the research questions were ancillary.

For the research hypotheses and questions, three different approaches were employed. The design for the first and fourth hypotheses was a one-way ANOVA. The second and third hypotheses employed a mixed model MANOVA with one between (platform – LMS, SNS) and one within (time – Pre, Post) factor. The four research questions employed multiple regression analyses. Multiple regression was used for the

research questions because each question had four independent variables and one dependent variable.

The survey data were entered into PASW Statistics GradPack 18 software. The values for sense of community, connecting, and learning were entered using the guidelines offered by Rovai. That is, the data in regard to sense of community were taken from the overall score on the CCS. The data on connectedness were taken from the odd numbered items on the CCS. The data on learning were taken from the even numbered items on the CCS. The instructors provided class final grades for each student to the researcher. Demographic data were also garnered through the survey: gender, age, and ethnicity. The researcher connected pretest and posttest results as well as final grades.

## CHAPTER IV

### ANALYSIS OF DATA

#### Introduction

The purpose of this study was to assess the educational efficacy of learning management systems (LMS) and social networking systems (SNS). Specifically, the researcher examined the extent to which these e-learning formats facilitated sense of community, connecting, learning, and performing (i.e., course final grade) in a community college online course (i.e., Art Appreciation). The researcher adopted a quantitative approach with a pre-posttest quasi-experimental design, which compared a control (LMS) and treatment (SNS) group. As an ancillary component of the study, the researcher gauged the influence of age, gender, ethnicity, and general class format (i.e., traditional versus LMS and SNS). The instrument used in this study was the Classroom Community Scale (CCS).

The students surveyed in this study were community college students enrolled in one of six Art Appreciation classes during the Spring 2012 semester. These classes linked into a Southeastern state's virtual community college, referred to as SSVCC. One instructor taught all six e-learning classes. Limiting the type of course (i.e., Art Appreciation) and instructor to one decreased the number of extraneous variables and confounds. For ancillary purposes, the researcher surveyed also students enrolled in face-to-face Art Appreciation classes at SSCC during the Spring 2012 semester.

After the pre-posttest survey data were collected from the students during the Spring 2012 semester, it was entered into a SPSS data file. At the end of the Spring 2012 semester, the instructor of the six Art Appreciation classes and teachers of the face-to-face classes provided each student's course final grade to the researcher. The researcher

concatenated the course final grades into the same SPSS data file for analysis. A total of 91 students were considered for the final statistical analyses of sense of community, connecting, and learning because they completed both the pretest and posttest. The course final grades of all students enrolled in the LMS, SNS, and face-to-face Art Appreciation course were considered, which came to 517 students.

### Descriptive Statistics

This section analyzes the descriptive findings of the data that were collected: the pretest scores, posttest scores, and course final grades. The pretest and posttest data are reported for each construct of the CCS. The sample is discussed first, followed by the survey questions.

#### *Sample, Course Format, and Course Final Grade*

The participants in this study were representative of the population (i.e., SSVCC) and covered a wide variety of demographics. The majority of the respondents were from the Net Generation (i.e., born 1981-2000), comprising 70.6% of all participants on the pretest and 65.9% on the posttest. As the generations progressed higher in age, there were fewer participants in the study. There were no respondents from the Silent Generation (i.e., born 1925-1945), so that generation was not included in the results.

The majority of the participants were females, and the two most reported ethnicities were Caucasian and African American. Females represented 78.4% of the sample on the pretest and 79.1% on the posttest. Pretest and posttest participants were primarily Caucasian, 71.2% and 75.8% respectively. African Americans comprised the second most frequent ethnic group in the pretest (22.9%) and the posttest (17.6%). Table 2 indicates age, gender, ethnicity, and course format for participants.

Table 2

*Age, Gender, Ethnicity, and Course Format*

		Pretest		Posttest	
		n	Percentage	n	Percentage
<b>Age</b>					
	Net Generation	108	70.6%	60	65.9%
	Generation X	35	22.9%	22	24.2%
	Baby Boomers	10	6.5%	9	9.9%
<b>Gender</b>					
	Female	120	78.4%	72	79.1%
	Male	33	21.6%	19	20.9%
<b>Ethnicity</b>					
	Caucasian	109	71.2%	69	75.8%
	African American	35	22.9%	16	17.6%
	Hispanic	4	2.6%	3	3.3%
	Asian	3	2.0%	2	2.2%
	Native-American	2	1.3%	1	1.1%
<b>Course Format</b>					
	Face-to-Face	89	58.2%	48	52.7%
	SNS	39	25.5%	27	29.7%
	LMS	25	16.3%	16	17.6%

The participants were primarily taking face-to-face classes versus LMS and SNS. The researcher invited students in all three groups to participate in the study: 376 face-to-face, 90 SNS, and 78 LMS students. Of the 544 students invited to take the survey, 160 students participated in the pretest, but only 153 of the surveys were usable. The seven surveys that were excluded lacked so much data that any approach to salvaging the data would have compromised the integrity of the data. For example, five of the excluded survey participants filled out only the demographic data, and they did not complete any of the survey questions. The other two participants answered no more than four of the CCS questions.

The 160 responses to the pretest of the CCS represented a 29.4% response rate. Of these 160 pretest respondents, 91 of them participated in the posttest—a 56.8% response rate. Both of these response rates were within the normal range (Baruch & Holtom, 2008). The researcher used a variety of techniques to promote the rate of return including pre-notification (email invitation), incentives (a chance for two \$50 gift certificates), reminders (two reminders after the initial invitation), and survey feedback (congratulatory email). The rate of return did differ among the course formats, and the fewest number of respondents came from the LMS environment on the pretest (16.3%) and the posttest (17.6%).

Student performance (i.e., course final grade) was reported in terms of grade point average (GPA) for the course. Over half of the respondents earned a 2.00 (i.e., C) or higher in the course for the face-to-face (78.1%) and SNS (67.0%) formats. LMS and SNS had equivalent withdrawal rates, but the face-to-face offerings had lower withdrawal rates (12.9%). However, LMS had the highest failure rate (30.3%). Table 3 presents detailed information for GPA for the course according to each course format.

Table 3

*Course Final Grades Within Each Course Format*

Performance <sup>a</sup>	Face-to-Face		LMS		SNS	
	n	Percentage	n	Percentage	n	Percentage
Withdrawal	47	12.9%	12	15.8%	13	15.3%
0.00 (F)	19	5.2%	23	30.3%	11	12.9%
1.00 (D)	14	3.8%	5	6.6%	4	4.7%
2.00 (C)	46	12.6%	11	14.5%	11	12.9%
3.00 (B)	96	26.3%	8	10.5%	13	15.3%
4.00 (A)	143	39.2%	17	22.4%	33	38.8%

a. Performance represents course finale grade listed in terms of GPA for the course. It does not reflect overall GPA.

*Items on the Classroom Community Scale*

For analysis, the researcher grouped the CCS items according to the constructs they measured and calculated descriptive statistics for each item. Responses ranged from *Strongly Disagree* (0) to *Strongly Agree* (4), and half of the questions were worded negatively. The results of the negatively worded questions were recoded; thus, higher numbers always indicates a stronger sense of community, connecting, or learning.

*Sense of Community.* By adding all 20 items on the CCS together, one can obtain the overall sense of community. Sense of community represents “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9). Results are reported according to pretest and posttest.

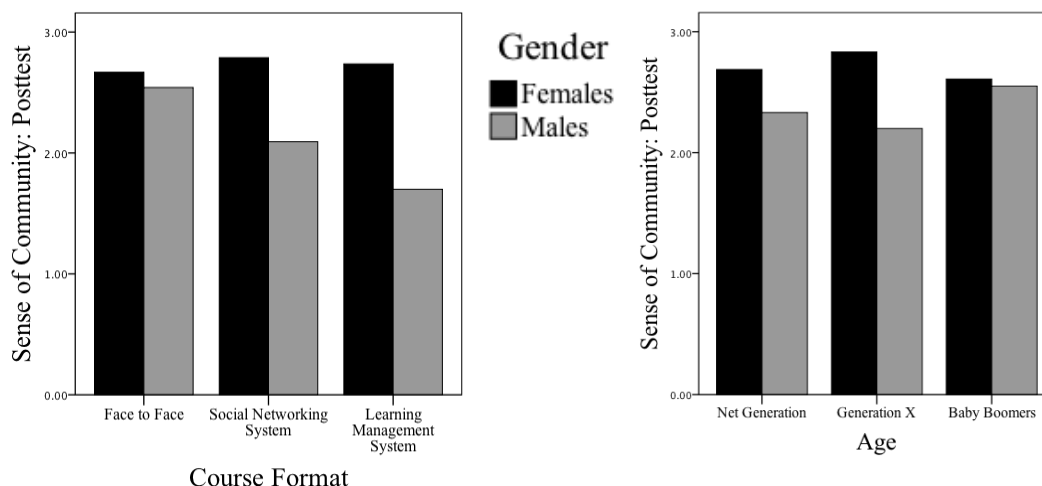


For the pretest results, the means of the items related to sense of community represented normal variability and were all above 2.0, except for item 15 ( $M = 1.379$ ): *I feel that members of this course depend on me*. Item number 16 had the highest pretest mean ( $M = 3.177$ ) and measured the feeling students had of being given ample opportunities to learn. However, the standard deviations of the items related to sense of community were positively skewed and leptokurtic.

The posttest results of items related to sense of community mirrored the pretest results; the means varied normally. The means of the items were all above 2.0, except for item 15 ( $M = 1.473$ ). Item number 6 had the highest posttest mean ( $M = 3.110$ ) and measured the feeling students had that they received timely feedback. The mean standard deviations were once again positively skewed and leptokurtic. Detailed information for all of the pretest and posttest items on the CCS can be found in Appendix H.

In regard to sense of community and gender, females indicated a higher sense of community than males on the posttest regardless of course format or age—see Figure 2. This pattern did not emerge among females on pretest results according to age. Females' trends on the posttest were consistent with the literature.

*Connectedness.* Odd numbered questions on the CCS comprised the connectedness subscale. Connectedness represents the feeling of respondents in respect to the classroom “connectedness, cohesion, spirit, trust, and interdependence” (Rovai, 2002b, p. 206). The results are divided according to pretest and posttest scores.



*Figure 2.* Sense of community: Posttest comparison of gender. The black indicators represent females, and the gray indicators represent males. Females indicated a higher sense of community than males on the posttest in all three course types and all age categories.

The means for pretest items on connectedness signified normal variability, but the standard deviations were slightly positively skewed and leptokurtic. Pretest items measuring connectedness had means that ranged from 2.105 to 2.850. The only exception was item 15 – *I feel that members of this course depend on me* – which was 1.379. Item nine – *I feel isolated in this course* – had the highest mean and was worded negatively. Thus, a score of 2.850 actually indicates that most students did not feel isolated. Table 4 illustrates descriptive statistics for pretest items concerning connectedness.

For the posttest, items measuring connectedness had a similar range in scores to the pretest, from 1.473 to 2.901. The scores for this construct varied normally, but the standard deviations were slightly leptokurtic. The highest (i.e., item 9) and lowest (i.e., item 15) scored questions on the posttest were identical to the pretest for connectedness. Table 5 delineates the descriptive statistics for posttest items regarding connectedness.

Table 4

*Pretest Items Listed Highest to Lowest for Connectedness*

	n	Mean	SD
9. Feel isolated in course	153	2.850	1.056
17. Feel uncertain about others	153	2.569	0.930
19. Others will support me	153	2.549	0.946
5. Feel a spirit of community	153	2.516	1.033
11. Trust others in course	153	2.425	0.817
1. Care about each other	153	2.405	0.892
3. Feel connected to others	153	2.288	0.908
13. Can rely on others in course	153	2.275	0.954
7. Course is like a family	153	2.105	0.968
15. Members depend on me	153	1.379	0.903

Table 5

*Posttest Items Listed Highest to Lowest for Connectedness*

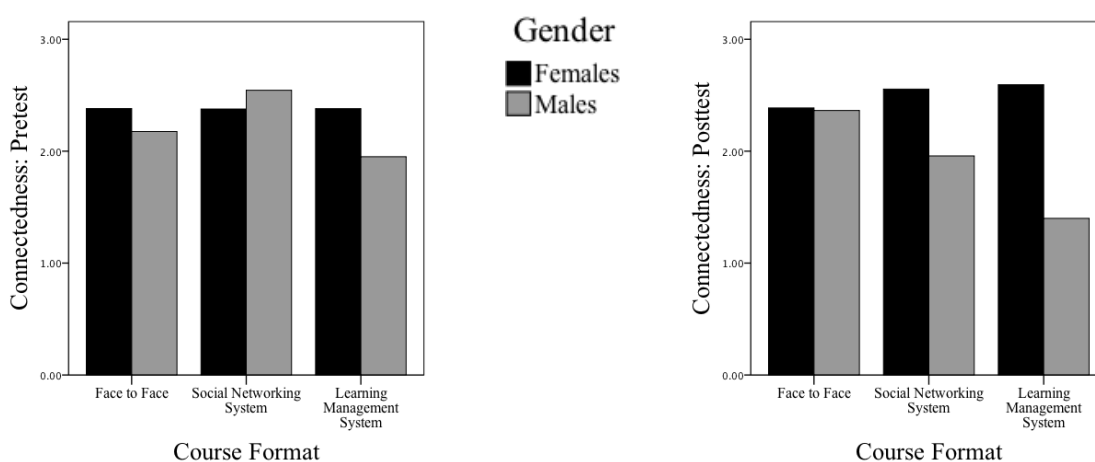
	n	Mean	SD
9. Feel isolated in course	91	2.901	0.989
19. Others will support me	91	2.637	0.961
5. Feel a spirit of community	91	2.593	1.164
11. Trust others in course	91	2.593	0.919

Table 5 (continued).

*Posttest Items Listed Highest to Lowest for Connectedness*

	n	Mean	SD
1. Care about each other	91	2.582	0.920
13. Can rely on others in course	91	2.429	1.087
17. Feel uncertain about others	91	2.418	0.932
3. Feel connected to others	91	2.396	1.053
7. Course is like a family	91	2.088	1.092
15. Members depend on me	91	1.473	1.015

Females indicated a greater sense of connectedness regardless of course type on the posttest, but females' scores on the pretest did not match this pattern—see Figure 3. This result was consistent with the literature.



*Figure 3.* Connectedness: Posttest comparison of gender and course type. The black indicators represent females, and the gray indicators represent males.

*Learning.* Even numbered questions on the CCS covered the learning subscale.

Learning represents the feelings of respondents in respect to “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” (Rovai, 2002b, p. 207). The results are presented according to pretest and posttest responses.

For the pretest, the means of the items related to learning were negatively skewed; means ranged from 2.360 to 3.177. Standard deviations were positively skewed—ranging from 0.917 to 1.192. Table 6 depicts descriptive statistics for pretest items pertaining to learning. Item 12 had the lowest mean and asked students if they felt that

Table 6

*Pretest Items Listed Highest to Lowest for Learning*

	n	Mean	SD
16. Given ample opportunities to learn	153	3.177	0.933
20. Does not promote desire to learn	153	3.157	0.940
2. Encouraged to ask questions	153	3.118	0.959
18. Educational needs are not being met	153	3.098	1.044
6. Timely feedback	153	3.026	0.917
4. Hard to get help	153	2.987	1.112
10. Reluctant to speak openly	153	2.732	1.192
8. Uneasy exposing gaps	153	2.719	1.035
14. Other students do not help me learn	153	2.490	0.994
12. Course results in modest learning	153	2.360	1.068

*this course results in only modest learning.* Item 16 had the highest mean and measured the feeling students had of being given ample opportunities to learn.

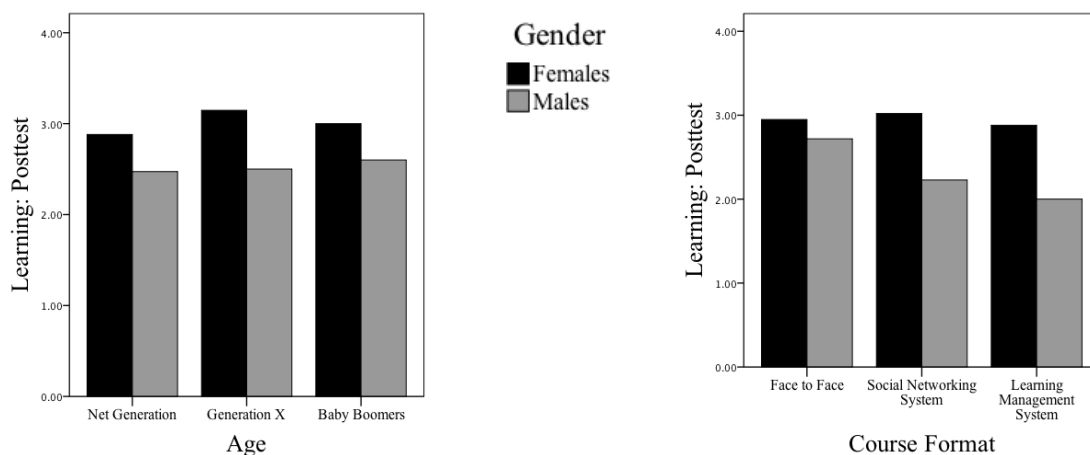
For the posttest, items measuring learning had means that ranged from the mid 2s to the low 3s. Item 12 (i.e., modest learning) had the lowest score on both the pretest and posttest. Item six had the highest mean on the posttest and asked about timely feedback ( $M = 3.110$ ). The means were negatively skewed, but the standard deviations were normal on the posttest. Table 7 portrays the descriptive statistics for posttest items germane to the learning subscale.

Table 7

*Posttest Items Listed Highest to Lowest for Learning*

	n	Mean	SD
6. Timely feedback	91	3.110	1.059
16. Given ample opportunities to learn	91	3.033	1.038
18. Educational needs are not being met	91	3.022	1.075
20. Does not promote desire to learn	91	3.011	1.038
2. Encouraged to ask questions	91	3.000	1.075
4. Hard to get help	91	2.967	1.140
8. Uneasy exposing gaps	91	2.802	1.067
10. Reluctant to speak openly	91	2.714	1.138
14. Other students do not help me learn	91	2.505	1.068
12. Course results in modest learning	91	2.429	1.045

On the posttest, females indicated a higher mean for learning than males across all age groups and course formats—see Figure 4. Pretest frequencies demonstrated this same pattern in regard to gender and age groups. However, females did not have higher scores on learning for all course formats on the pretest—a change occurred from pretest to posttest.



*Figure 4.* Learning: Posttest comparison of gender with age and course format. The black indicators represent females, and the gray indicators represent males. Females indicated a higher sense of learning than males on the posttest in all three age categories and course types.

### Reliability Measures

The researcher analyzed the data to gather information about the reliability of the CCS with the sample in this study. The researcher calculated a reliability coefficient for each of the constructs (i.e., sense of community, connectedness, and learning) on the pretest and posttest using Cronbach's alpha. Coinciding with high reliability in the literature, the results were a consistent pattern of high reliability. Cronbach's alpha values ranged from 0.834 (Learning on the pretest) to 0.923 (Sense of community on the posttest). The Cronbach's alpha values for each construct are given in Table 8. The posttest replicated the findings of high reliability found on the pretest. Importantly, the two subscales (i.e., connectedness and learning) are redundant with the data for sense of

community because they are drawn from the same source. That is, sense of community includes all 20 items from the CCS, while each subscale includes ten of the items.

Table 8

*Reliability Statistics*

Construct <sup>a</sup>	Pretest		Posttest	
	n	Cronbach's Alpha	n	Cronbach's Alpha
Sense of Community	153	0.899	91	0.923
Connectedness	153	0.876	91	0.908
Learning	153	0.834	91	0.889

a. The constructs listed here are the three constructs measured by the CCS.

The mean scores for each CCS construct are given below for the pretest and posttest—see Table 9. Mean values ranged from 2.336 (Connectedness on the pretest) to 2.886 (Learning on the pretest). This indicates that one of the pretest constructs (i.e., learning) had the highest mean among all constructs for this study, including posttest means. Although some authors have used summative scores for reporting CCS data, the researcher follows the lead of Yuen and Yang (2010) and others in reporting the mean scores in terms of a 4.0 scale. This was done for comparative purposes and ease of interpretability.



Table 9

*Descriptive Statistics*

Construct <sup>a</sup>	n	Mean	Minimum Mean	Maximum Mean
Sense of Community				
Pretest	153	2.611 <sup>b</sup>	1.379	3.177
Posttest	91	2.635 <sup>b</sup>	1.473	3.110
Connectedness				
Pretest	153	2.336 <sup>c</sup>	1.379	2.850
Posttest	91	2.411 <sup>c</sup>	1.473	2.901
Learning				
Pretest	153	2.886 <sup>c</sup>	2.360	3.177
Posttest	91	2.859 <sup>c</sup>	2.429	3.110

a. The constructs listed here are the three constructs measured by the CCS.

b. The mean includes all 20 items on the CCS.

c. The mean includes the 10 items related to connectedness or learning, respectively.

### Statistical Results

Three approaches were employed in order to answer the research hypotheses and questions. The first and fourth hypotheses were analyzed through a one-way Analysis of Variance (ANOVA). The design for the second and third hypotheses was a mixed model Multivariate Analysis of Variance (MANOVA). For the four research questions, the researcher employed multiple regression analyses. A brief overview and detailed report is given below for the research hypotheses and questions.

*Equivalent Groups on the Pretest*

The researcher wanted to ensure that individuals in the two primary course formats (i.e., LMS and SNS) were equivalent on the pretest of the CCS so that any significant difference on the posttest could not be attributed to pretest results (i.e., unequal groups). An independent samples t-test was generated in order to accomplish this task, and this t-test compared the means of LMS students versus SNS students on CCS pretest scores for community. The means were calculated on a 4.0 scale. Because the assumption of homogeneity of variance was violated, separate variance estimations were used, yet there was not a significant difference in the CCS pretest scores for community between LMS ( $M = 2.544$ ,  $SD = 0.546$ ) and SNS ( $M = 2.553$ ,  $SD = 0.737$ ),  $t(60.616) = .053$ ,  $p = .958$ , two-tailed.

The constructs of connectedness and learning were also measured with the independent samples t-test. Equal variance was confirmed on the connectedness subscale. There was not a significant difference in the CCS pretest scores for connectedness between LMS ( $M = 2.216$ ,  $SD = 0.702$ ) and SNS ( $M = 2.415$ ,  $SD = 0.720$ ),  $t(62) = 1.092$ ,  $p = .279$ , two-tailed. In addition, the CCS pretest scores for learning were also nonsignificant between LMS ( $M = 2.872$ ,  $SD = 0.549$ ) and SNS ( $M = 2.690$ ,  $SD = 0.866$ ),  $t(61.999) = -1.030$ ,  $p = .307$ , two-tailed. Using a separate variance test to compensate for the lack of homogeneity of variance. Therefore, no significant preexisting differences were present between the two course formats on any of the dependent measures, so the groups were considered equivalent.

#### *Four Research Hypotheses*

*Hypothesis 1. Within the context of e-learning, class format makes a significant difference in community college students' sense of community as measured by a pretest and posttest of the Classroom Community Scale (CCS).*

Using class format as the grouping variable and gain in sense of community as the dependent variable, the researcher conducted a one-way ANOVA to determine if statistically significant differences existed in sense of community based on the two e-learning groups. Results of an evaluation of assumptions of normality, linearity, and homogeneity of variance were satisfactory. The hypothesis that there would be a statistically significant difference between students' sense of community in LMS versus SNS was not supported in this study,  $F(1, 41) = 0.53$ ,  $p = .818$ , two-tailed. However, students in the LMS and SNS classes reported higher mean scores on the posttest versus the pretest for their sense of community, so gains were made, albeit nonsignificant.

*Hypothesis 2. Within the context of e-learning, class format makes a significant difference in community college students' sense of connectedness as measured by a pretest and posttest of the subscale for connectedness in the CCS.*

*Hypothesis 3. Within the context of e-learning, class format makes a significant difference in community college students' sense of learning as measured by a pretest and posttest of the subscale for learning in the CCS.*

In these hypotheses, the dependent variables were gain in connectedness and gain in learning, and the grouping variable was course format (i.e., LMS and SNS). For Hypotheses 2 and 3, the researcher used a MANOVA to determine if statistically significant differences existed between connectedness and/or learning based on the two e-learning groups. The Box's Test revealed that equal variances could be assumed,  $F(3,$

32803.365) = 1.274,  $p = .282$ ; therefore, the researcher employed Wilks' Lambda as the test statistic. The Wilks' Lambda criteria revealed that there was not a statistically significant group difference in course format with respect to connectedness and learning (i.e., collectively), Wilks'  $\Lambda = .938$ ,  $F(2, 40) = 1.315$ ,  $p = .280$ , partial  $\eta^2 = .062$ .

Therefore, the hypothesis that there would be a statistically significant difference between students' connectedness and learning in LMS versus SNS was not supported in this study.

The univariate analyses of each construct revealed similar results. Connectedness was not significant,  $F(1, 41) = 0.830$ ,  $p = .368$ , two-tailed; and learning was also nonsignificant,  $F(1, 41) = .095$ ,  $p = .760$ , two-tailed. Although nonsignificant, students in the LMS reported higher mean scores for their connectedness over time: pretest mean was 2.216 and posttest mean was 2.519. However, students in the SNS reported lower mean scores for their connectedness over time: pretest mean was 2.415 and posttest mean was 2.400. In contrast, the results for students' learning had an inverse relationship with the results for connectivity. Students in the LMS reported lower mean scores for learning on the posttest ( $M = 2.872$ ) versus the pretest ( $M = 2.825$ ). SNS students reported higher mean scores on the posttest ( $M = 2.814$ ) than the pretest ( $M = 2.690$ ).

*Hypothesis 4. Within the context of e-learning, class format makes a significant difference in community college students' performance as measured by course final grade.*

Using class format as the grouping variable and course final grade as the dependent variable, the researcher employed a one-way ANOVA to determine if statistically significant differences existed in course final grade based on course format. The assumptions of normality, linearity, and homogeneity of variance were not violated. There was a statistically significant difference between students' performance (i.e.,

course final grade as measured by GPA for the course) in LMS versus SNS,  $F(1, 134) = 10.714$ ,  $p = .001$ , two-tailed. In addition, the mean differential spanned almost an entire letter grade (0.877). The mean course final grade for LMS students was 1.859, while the mean course final grade for SNS students was 2.736.

#### *Four Research Questions*

Moving forward with all of the independent variables, a series of multiple regression analyses were executed to examine each of the four research questions. The researcher sought to explain the percentage of variability in each dependent variable (i.e., sense of community, connecting, learning, and performing) that could be explained by the independent variables of age, gender, ethnicity, and general course format. Results of an evaluation of assumptions of normality, linearity, and homoscedasticity were satisfactory. In order to investigate further the data used in the multiple regressions, four diagnostic examinations were also employed: multicollinearity, studentized residuals, leverage, and standardized DFFIT. The results indicated no problematic data.

The R-squared statistic is reported for each research question, which represents the percent of variability in each construct that the models explain. Table 10 lists the multiple regression model summaries for all four research questions. Accounting for all variables, the models explained 8.7% of variability in sense of community, 10.1% of variability in connectedness, 6.8% of variability in learning, and 12.6% of variability in performing (i.e., course final grade). In addition, the regression coefficients were studied to determine whether or not the coefficients for each predictor variable were statistically significant ( $\alpha = .05$ ), including an interpretation of the coefficients if they were found to be significant.

Table 10

*Multiple Regression Model Summaries for the Four Research Questions*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Research Question 1 (Community)	0.294 <sup>a</sup>	0.087	-0.015	0.533
Research Question 2 (Connectedness)	0.317 <sup>a</sup>	0.101	0.001	0.564
Research Question 3 (Learning)	0.261 <sup>a</sup>	0.068	-0.035	0.640
Research Question 4 (Performance)	0.357 <sup>a</sup>	0.127	0.110	1.266

a. Predictors: (Constant), LMS, SNS, Male, African Am., Native Am., Asian, Hispanic, Baby Boomer, Generation X

Next, the F-statistics were examined in order to determine whether or not the models were significant. Table 11 illustrates the F-statistics and the Sum of Squares and Mean Squares. Research Question 4 (i.e., performing) was the only significant result among the research questions.

Table 11

*ANOVA—Multiple Regression Models for the Four Research Questions*

Model	Sum of Squares	df	Mean Square	F	Sig.
Research Question 1					
Regression	2.176	9	0.242	0.853	.571 <sup>a</sup>
Residual	22.969	81	0.284		
Total	25.145	90			

Table 11 (continued).

*ANOVA—Multiple Regression Models for the Four Research Questions*

Model	Sum of Squares	df	Mean Square	F	Sig.
Research Question 2					
Regression	2.877	9	0.320	1.007	.442 <sup>a</sup>
Residual	25.722	81	0.318		
Total	28.600	90			
Research Question 3					
Regression	2.431	9	0.270	0.660	.742 <sup>a</sup>
Residual	33.144	81	0.409		
Total	35.575	90			
Research Question 4					
Regression	103.923	9	11.547	7.201	.000 <sup>a</sup>
Residual	711.980	444	1.604		
Total	815.903	453			

a. Predictors: (Constant), LMS, SNS, Male, African Am., Native Am., Asian, Hispanic, Baby Boomer, Generation X

*Research Question 1. Does a relationship exist between students' sense of community and their age, gender, ethnicity, and/or general course format (i.e., traditional versus LMS and SNS) in a community college course?*

The dependent variable in this question was gain in sense of community over time, and the predictor variables were age, gender, ethnicity, and/or general course

format. Table 12 illustrates the coefficient table for the first research question. The multiple regression model for research question one explained 8.7% of the variability in Table 12

*Research Question 1: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized			Correlations	
	Coefficients		Coefficients				
	b	SE <sub>b</sub>	$\beta$	t	Sig.	Partial	Part
1 (Constant)	.110	.098		1.125	.264		
Generation X	-.204	.138	-.167	-1.479	.143	-.162	-.157
Baby Boomers	-.016	.196	-.009	-.082	.935	-.009	-.009
Male	-.072	.145	-.055	-.495	.622	-.055	-.053
African Am.	-.078	.155	-.056	-.501	.618	-.056	-.053
Hispanic	-.263	.321	-.089	-.818	.416	-.090	-.087
Asian	-.425	.389	-.119	-1.093	.278	-.121	-.116
Native Am.	.551	.546	.109	1.009	.316	.111	.107
SNS	-.113	.132	-.099	-.855	.395	-.095	-.091
LMS	.098	.162	.069	.606	.546	.067	.064

a. Dependent Variable: Gain in sense of community as measured by the CCS.



students' sense of community but was not at a statistically significant level,  $F(9, 81) = 0.853$ ,  $p = .571$ , two-tailed. The predicted value is a gain in sense of community of 0.110—on a 4.0 scale—for white females that belong to the Net Generation and are enrolled in a traditional class. Neither age, gender, ethnicity, nor course format played a significant role in predicting the gain score for sense of community from pretest to posttest.

*Research Question 2. Does a relationship exist between students' connectedness and their age, gender, ethnicity, and/or general course format in a community college course?*

In this question, the predictor variables were age, gender, ethnicity, and/or general course format, and the dependent variable was gain in connectedness over time. The coefficient table for the second research question is listed in Table 13. The multiple

Table 13

*Research Question 2: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized			Correlations	
	Coefficients		Coefficients				
	b	SE <sub>b</sub>	β	t	Sig.	Partial	Part
1 (Constant)	.117	.104		1.133	.260		
Generation X	-.202	.146	-.155	-1.383	.170	-.152	-.146
Baby Boomers	-.061	.208	-.032	-.294	.770	-.033	-.031

a. Dependent Variable: Gain in the connectedness subscale of the CCS.

Table 13 (continued).

*Research Question 2: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized		Sig.	Correlations	
	Coefficients		Coefficients			Partial	Part
	b	SE <sub>b</sub>	β	t			
Male	.019	.154	.014	.124	.902	.014	.013
African Am.	-.084	.164	-.057	-.515	.608	-.057	-.054
Hispanic	-.251	.340	-.080	-.739	.462	-.082	-.078
Asian	-.768	.412	-.201	-1.863	.066	-.203	-.196
Native Am.	.311	.578	.058	.539	.592	.060	.057
SNS	-.169	.140	-.140	-1.215	.228	-.134	-.128
LMS	.135	.171	.089	.789	.432	.087	.083

a. Dependent Variable: Gain in the connectedness subscale of the CCS.

regression model for research question two explained 10.1% of the variability in students' connectedness but was not statistically significant,  $F(9, 81) = 1.007$ ,  $p = .442$ , two-tailed. The predicted value is a gain in connectedness of 0.117—on a 4.0 scale—for white females that belong to the Net Generation and are enrolled in a traditional class. None of the independent variables (i.e., age, gender, ethnicity, and course format) played

a statistically significant role in predicting the gain score for connectedness from the pretest to the posttest.

*Research Question 3. Does a relationship exist between students' learning and their age, gender, ethnicity, and/or general course format in a community college course?*

In this question, the dependent variable was gain in learning over time, and the predictor variables were age, gender, ethnicity, and/or general course format. Table 14 provides the coefficient table for the third research question. The multiple regression model for research question three explained 6.8% of the variability in students' learning but was statistically nonsignificant,  $F(9, 81) = 0.660$ ,  $p = .742$ , two-tailed. The predicted value is a gain in learning of 0.103—on a 4.0 scale—for white females that belong to the Net Generation and are enrolled in a traditional class. Age, gender, ethnicity, and course format were statistically nonsignificant in relationship to the learning gain score from the pretest to the posttest.

Table 14

*Research Question 3: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized		Sig.	Correlations	
	Coefficients		Coefficients			Partial	Part
	b	SE <sub>b</sub>	β	t			
1 (Constant)	.103	.118		.874	.385		

a. Dependent Variable: Gain in the learning subscale of the CCS.

Table 14 (continued).

*Research Question 3: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized			Correlations	
	Coefficients		Coefficients				
	b	SE <sub>b</sub>	β	t	Sig.	Partial	Part
Generation X	-.206	.166	-.141	-1.243	.217	-.137	-.133
Baby Boomers	.029	.236	.014	.122	.903	.014	.013
Male	-.163	.174	-.106	-.932	.354	-.103	-.100
African Am.	-.071	.186	-.043	-.381	.705	-.042	-.041
Hispanic	-.274	.386	-.078	-.710	.480	-.079	-.076
Asian	-.083	.468	-.019	-.178	.860	-.020	-.019
Native Am.	.792	.656	.132	1.206	.231	.133	.129
SNS	-.056	.158	-.041	-.353	.725	-.039	-.038
LMS	.061	.194	.036	.315	.754	.035	.034

a. Dependent Variable: Gain in the learning subscale of the CCS.

*Research Question 4. Does a relationship exist between students' classroom performance (i.e., course final grade) and their age, gender, ethnicity, and/or general course format in a community college course as measured by course final grade?*

In this question, the predictor variables were age, gender, ethnicity, and/or general course format, and the dependent variable was course final grade. The multiple

regression model for research question four was statistically significant,  $F(9, 444) = 7.201$ ,  $p < .000$ , two-tailed; the model explained 12.7% of the variability in students' performance (i.e., course final grade).

Several of the independent variables were statistically significant as predictors of course final grade. The coefficient for Generation X students was statistically significant,  $t(73) = 2.062$ ,  $p = .040$ , two-tailed. Similarly, the coefficients for Baby Boomers was significant,  $t(15) = 2.335$ ,  $p = .020$ , two-tailed. Among the ethnic groups, the African American classification was statistically significant,  $t(113) = -2.216$ ,  $p = .027$ , two-tailed. In addition, both e-learning groups were good predictors. SNS was statistically significant,  $t(83) = -2.681$ ,  $p = .008$ , two-tailed; and LMS was statistically significant  $t(69) = -6.939$ ,  $p < .000$ , two-tailed.

The following discussion is an interpretation of the coefficient data. This discussion includes the constant and unstandardized coefficients. The standardized coefficients were not interpreted because all of the predictor variables were nominal. The predicted GPA for the course (i.e., course final grade) is 3.125 for white females that belong to the Net Generation and are enrolled in a traditional class. Table 15 illustrates the coefficient table for the fourth research question.

The predictors ranked in the following order from most influential to least in terms of course final grade: LMS (-1.210), Baby Boomer (0.788), SNS (-0.461), Generation X (0.385), and African American (-0.324). Generation X students scored 0.385 higher on course final grade than Net Generation students, controlling for all other variables. Baby Boomer students scored 0.788 higher on course final grade than Net Generation students, controlling for all other variables. Students who are African American scored -0.324 lower on course final grade than Caucasians, controlling for all

Table 15

*Research Question 4: Coefficients<sup>a</sup> for the Multiple Regression Model*

Model	Unstandardized		Standardized			Correlations	
	Coefficients		Coefficients				
	b	SE <sub>b</sub>	$\beta$	t	Sig.	Partial	Part
1 (Constant)	3.125	.101		31.022	.000		
Generation X	.358	.174	.094	2.062	.040	.097	.091
Baby Boomers	.788	.338	.105	2.335	.020	.110	.103
Male	-.179	.123	-.066	-1.455	.146	-.069	-.065
African Am.	-.324	.146	-.100	-2.216	.027	-.105	-.098
Hispanic	-.419	.526	-.036	-.796	.426	-.038	-.035
Asian	.616	.454	.060	1.355	.176	.064	.060
Native Am.	1.336	1.277	.047	1.046	.296	.050	.046
SNS	-.461	.172	-.126	-2.681	.008	-.126	-.119
LMS	-1.210	.174	-.314	-6.939	.000	-.313	-.308

a. Dependent Variable: Course final grade reported as GPA for the course.

other variables. Students enrolled in a SNS class scored -0.461 lower on course final grade than students in a traditional class (i.e., face-to-face), controlling for all other

variables. Students taking a LMS class scored -1.210 lower on course final grade than students in traditional classes, controlling for all other variables.

Each of these variables demonstrates powerful predictive capabilities, but it is the combination of these variables that can have an even larger impact. Certain cohorts of students might be at-risk to receive lower GPAs for the course. For example, an African American from the Net Generation that is enrolled in an LMS class is at a major disadvantage. African American students' GPA for the course was generally -0.324 lower than white students. Among the age groups, Baby Boomers and Generation X students had a major advantage on course final grade, 0.788 and 0.385 respectively. In addition, students taking a LMS class had a -1.210 lower GPA for the course than students taking traditional classes. Not accounting for gender or age, this student is at a -1.534 disadvantage (i.e.,  $-0.324 + -1.210$ ). This cohort may be identified as an at-risk population for this course.

#### Additional Findings

Based on the previous results, the researcher decided to pursue two additional findings, one quantitative and one qualitative. Based on the literature and findings of the descriptive statistics, the researcher examined further the gender differences in regard to gain scores on sense of community, connecting, and learning. From a qualitative standpoint, a group of students withdrew from the SNS after forming a coalition against the teacher.

#### *Quantitative Additional Finding: Gender Differences*

The researcher sought to determine which of the ancillary independent variables (i.e., age, gender, and ethnicity) was the best predictor of sense of community, connecting, and learning. All of these independent variables were nonsignificant in the

multiple regression analyses of sense of community, connecting, and learning. However, the descriptive statistics demonstrated a clear preference according to gender. The literature supported differences in sense of community according to gender. Therefore, the researcher proceeded with the investigation. Similar to the first three hypotheses, the researcher employed an ANOVA to measure gender differences in sense of community and a MANOVA to measure gender differences in connecting and learning.

Using gender as the grouping variable and gain in sense of community as the dependent variable, the researcher conducted a one-way ANOVA to determine if statistically significant differences existed in sense of community based on gender. Results of an evaluation of assumptions of normality, linearity, and homogeneity of variance were satisfactory. Gain in sense of community differed significantly according to gender,  $F(1, 41) = 8.705, p = .005$ , two-tailed.

For the MANOVA, the dependent variables were gain in connectedness and gain in learning, and the grouping variable was course format. The researcher used a MANOVA to determine if statistically significant differences existed between connectedness and learning based on gender. The Box's Test revealed that equal variances could be assumed,  $F(3, 2101.683) = 1.398, p = .242$ ; therefore, the researcher employed Wilks' Lambda as the test statistic. The MANOVA results revealed significant differences between the gender categories with respect to connectedness and learning, Wilks'  $\Lambda = .823, F(2, 40) = 4.306, p = .020$ , partial  $\eta^2 = .177$ . Therefore, the additional question of whether or not there would be a statistically significant difference between students' connectedness and learning based on gender was supported in this study.

The univariate analysis of each construct supported this finding further. Connectedness was significant,  $F(1, 41) = 7.602, p = .009$ , two-tailed; and learning was



significant,  $F(1, 41) = 6.895$ ,  $p = .012$ , two-tailed. In terms of gain in the connectedness score, females' mean improved by 0.129 points, but males' mean actually decreased by -0.462. Similarly, females reported a gain in learning of 0.100, while males indicated a decrease in learning of -0.6500.

*Qualitative Additional Finding: Student Coalition*

An unintended qualitative result arose within the SNS (i.e., Ning) during the midst of the research project. A group of students were spearheading a petition against the instructor within the Ning environment. The fact that students were banding together to start a petition against the teacher is a significant qualitative finding, albeit a negative outcome. This collaboration is qualitative evidence of connectivity among students and coincides with the literature. The literature demonstrated that building community in e-learning classes could alleviate isolationism for learners (McElrath & McDowell, 2008). Palloff and Pratt (2004) also identified community learning as a means to overcome isolationism.

The researcher became aware of this issue when the instructor of the course sent the researcher an email stating the following: "I've just received an email from ... in the Ning Art Appreciation. Apparently, a fellow student ... is petitioning fellow students via email to sign a petition concerning my 'poor teaching'" (Instructor, personal communication, March 28, 2012). In the ensuing weeks, some administrators at the community college in this study received complaints from this group of students in the Ning environment until one of the primary participants of this revolt withdrew from the Art Appreciation class. The student in question had a cumulative GPA of more than 3.0 at SSCC, so the withdrawal of this one student probably did not skew the course final

grades for the SNS students. If anything, the student in question would probably have improved the overall mean of the SNS course final grades.

Historically, the teacher in question had high evaluations each year, and the administration had received no complaints from her students. In addition, no student in the LMS environment issued a complaint against this same instructor during this term; the coalition was isolated within the SNS (i.e., Ning). Furthermore, SSCC offers over 300 online classes each semester, but no other e-learning class had this type of collaborative effort among students that gained the attention of the administration.

## CHAPTER V

### DISCUSSION

#### Summary

This study compared the educational efficacy of using learning management systems (LMS) versus social networking systems (SNS) in community college online classes. The researcher assessed students' sense of community, connecting, learning, and performing. The study focused on students enrolled in six e-learning Art Appreciation classes during the Spring 2012 semester and taught through a Southeastern state's virtual community college, referred to as SSVCC. For ancillary purposes, data were also collected from students enrolled in face-to-face Art Appreciation classes during the Spring 2012 semester at SSCC. The researcher compared data that were gathered from the Classroom Community Scale (CCS) survey and course final grades, and the analyses of the data were presented in the previous chapter. All hypotheses and questions were tested successfully. The following is a summary and interpretation of the results.

#### Conclusions and Discussion

The findings of this study indicate that SNSs have great potential to improve student performance (i.e., course final grade) in e-learning. The potential to predict performance can be further leveraged in combination with other significant factors: age and certain ethnicities (i.e., African American). The results also demonstrated that females made greater gains in sense of community, connecting, and learning than males within the context of e-learning. In addition, the outcomes of this study helped to establish the CCS as a reliable instrument in the community college e-learning environment. Considering all results of this study, the findings align with portions of the

literature on learning through online classes and add ambiguity for sense of community, age, gender, and ethnicity.

#### *SNSs as a Vehicle to Build Sense of Community*

The ability of SNSs to build community was not on trial in this study. By definition, SNSs are designed to promote social communication and collaboration regardless of whether students perceive that this interaction is occurring (Facebook, 2012; Yuen & Yang, 2010). The global online communities that have recently been formed are evidence of the value and importance of SNSs; Facebook had 901 million users eight years after its creation (Ewbank et al., 2010; Facebook, 2012). In this study, the researcher compared the ability of SNS versus LMS to build community in e-learning classes. The literature indicated that LMSs were not good at building community in e-learning, while SNSs were poised to accomplish this task. The results of this study do not coincide with this supposition in the literature, which requires explanation.

*Course format quandary.* Concerning course format, Craig (2007) challenged whether or not LMSs could promote collaboration and innovation because administrative support is the primary focus of LMSs. LMSs do not currently integrate innovative tools that would foster collaborative and creative learning activities (Repman et al., 2010). Researchers have found that SNSs promote sense of community and fill this void (Hung & Yuen, 2010; Marsh & Panckhurst, 2007; Yuen & Yang, 2010). According to Yuen and Yang (2010), SNSs can increase students' sense of community by promoting learner-centered activities and collaboration.

However, all of the previous studies on SNS and sense of community were either qualitative in nature or relied primarily on descriptive statistics (Hung & Yuen, 2010; Marsh & Panckhurst, 2007; Oradini & Saunders, 2008; Yuen & Yang, 2010). From that

perspective, students in both groups of this study reported a gain in sense of community. However, this study was the first to analyze the data in a comparative setting (i.e., LMS versus SNS) and report inferential statistics.

The results of this study did not support the presupposition in the literature that SNS would promote sense of community better than LMS. Considering the results in retrograde inversion, SNS and LMS provide the same level of sense of community, connecting, and learning as face-to-face classes. The possibility of achieving the same sense of community in LMS and SNS environments as students in face-to-face settings experience is in itself an important finding. More research is needed to expand this examination to a variety of settings and levels.

*Explanation of disparate findings.* Based on the results of this study, this researcher reconsidered some of the literature on building sense of community through SNSs. In 2007, researchers established that Web 2.0 applications that facilitate interaction were ideal for building community and improving users' emotional connectedness (Mason & Rennie, 2007). However, Oradini and Saunders (2008) clarified that students offering a positive response to SNS primarily described opportunities for social interaction that had little to do with coursework.

Therefore, the connectivity described in the literature may not improve collaboration on curricular issues. The one qualitative finding of this study was that a group of SNS students formed a coalition to start a petition against the teacher. This scenario does seem to indicate an elevated sense of connectivity among students and represents an important finding of this study, albeit negative. In this study, students did connect as evidenced by the coalition, but that connection obviously expanded beyond the content of the class. One caveat to the explanation above is that research has shown

that learners autonomously use SNSs to collaborate on course topics despite SNSs not being employed as part of the course itself (Smith & Caruso, 2010).

The population of this study provides another explanation for the contrasting findings of the research. The population studied in previous research on SNS and community was comprised of technology majors taking technology courses, often graduate students. In juxtaposition, this study examined the general undergraduate population taking a course from the general education core. The disconnect between the literature on community and the findings of this study is partially soldered by acknowledging the differences between the populations of this study and previous studies.

Furthermore, the pretest scores of the CCS presented a source of concern for the researcher. The idea of a pre-posttest design is that a baseline is established at the beginning of the pretest. Therefore, students indicating their sense of community at the very beginning of a class should probably not mark high scores because they have had little to no opportunity to build community within the context of the class. However, the pretest results in this study do not seem to lend themselves to this presupposition. For example, Appendix H demonstrates that five of the twenty items on the CCS had a mean score of more than three—on a 4.0 scale—on the pretest, which indicates a high level of community. When pretest scores are this high, there is little room for improvement.

This scenario could explain why sense of community, connecting, and learning were not significant in this study. Conversely, the researcher considered that the CCS might lack validity. This is possible, but the literature seems to indicate that validity is not likely the problematic factor. Instead, social desirability (i.e., students answer in a way that is favorable to others) seems to be a primary explanation for the high scores on

pretest data. For example, if a strong desire for connectedness exists among learners, then even the suggestion of such a possibility in an online environment might result in relatively high scores for the pretest. Furthermore, if that desire was great, then the suggestion that social interaction might be a primary factor in content delivery— through a pretest—may lead to possibly unrealistic expectations of what should occur in the end.

The ability of these external influences to alter the outcomes of this study is accounted for in the philosophical foundation of this study, specifically the tenet of chaos theory known as transduction. In short, the intervention of a system (e.g., LMS or SNS) by minor external factors (e.g., social desirability) may have major consequences on a system. Transduction describes a situation in which a stimulus has created an effect that causes a transformation in the object upon which it is acting in a qualitative or dimensional manner. This explanation is strengthened when one considers that the groups were found to be statistically equivalent on the pretest. However, the researcher may not be privy to all of the reasons for the nonsignificant results.

### *Age*

Researchers have stated that the Net Generation longs for community in the educational environment as well as their lives outside of the classroom (Oblinger, 2008; Strauss & Howe, 2007a). Oblinger (2008) encouraged faculty to meet this need by integrating social multimedia technologies in courses, especially Web 2.0 content. That same year, however, Smith (2008) did not detect a significant difference in sense of community based on age. Smith's finding has been confirmed in other studies (e.g., Yuen & Yang, 2010), where age had no significant difference in regard to sense of community. The results of this study further support the literature that has found no significant difference in sense of community based on age, to the chagrin of some who

have made inferences based on cultural trends (e.g., Oblinger, 2008; Strauss & Howe, 2007a). The equivalent satisfaction levels between the different age groups may be evidence that e-learning environments are able to meet a variety of expectations and needs. For instance, some Net Geners may prefer the asynchronous and text-based interaction, and some Generation X students may prefer the flexibility of e-learning (Shea et al., 2006). However, the lack of research in regard to age and sense of community still beckons further research. In this study, older learners did perform better, which is discussed below within the context of performance.

### *Ethnicity*

Sanchez and Gunawardena (1998) heralded that the population of higher education is increasingly becoming diverse. A sizable portion of the research on connectedness and learning as it relates to ethnicity in the e-learning environment has focused on African American students. In 2005, Rovai and Ponton (2005) found that African American students in their study scored lower than Caucasian students on both subscales of the CCS and on overall sense of community. Two other studies supported the finding that African Americans scored significantly lower on the connectedness and learning subscales of the CCS (Rovai & Gallien, 2005; Rovai & Wighting, 2005).

The noted differences between African American students and Caucasian students are especially pertinent to this study because over one-fifth of the population in this study was African American. However, the findings of this study did not support the previous literature. There was no significant difference in sense of community, connectedness, or learning based on ethnicity, accounting for all other variables. However, two of the previous studies (Rovai & Ponton, 2005; Rovai & Wighting, 2005) were conducted at small private colleges in the Upper South, while this study examined a large community



college in the Deep South. In addition, this study focused on undergraduate students at a community college, but the sample for all three of the previous studies on ethnicity and sense of community was comprised of graduate students (Rovai & Gallien, 2005; Rovai & Ponton, 2005; Rovai & Wighting, 2005).

In considering the sample of this study, Caucasians and African Americans are the only two ethnic groups that were well represented. Other ethnic groups (e.g., Asian) only had a few participants, so the results of this study in relationship to those ethnicities may be skewed. The researcher has already alluded to other issues that may have further skewed the results concerning ethnic differences in community: the population of this study versus previous studies, pretest scores, social desirability, and unknown factors. The scant research on ethnicity and sense of community invites more research to be done in this area. As an aside, African Americans did have significantly different course final grades in this study, which is discussed below within the context of performance.

### *Gender*

According to Wolfe (1999), female members of computer-based learning environments indicate a greater desire for collaborative learning and social connectedness than do males. This notion has been substantiated in the literature (Rovai, 2002a; Rovai & Baker, 2005). For example, Rovai (2001) recorded that females indicated a greater sense of community than males at the beginning and end of classes (i.e., pretest and posttest), which coincides with the findings of this study. However, Graff's (2003) research broke this trend by reporting no significant difference between males and females in regard to the connectedness subscale of the CCS. Subsequent research substantiates this lack of gender-based difference in community (Ferguson, 2010; Smith, 2008).

The results of this study add to the inconsistency in the literature on gender and sense of community, connecting, and learning. Initially, the multiple regression analyses did not indicate any gender-based differences for these constructs when accounting for all other variables (i.e., age, ethnicity, and course format). However, gender-based differences were observed in the descriptive statistics associated with this study, so the researcher isolated gender and found a significant difference in sense of community, connecting, and learning. This finding indicated that females gained more than males over time for sense of community, connecting, and learning. Coinciding with the philosophical roots of this study, this result indicates that gender may be an initial effect of community; initial effects are a component of chaos theory described in the Review of Literature.

The conflicting nature of the gender-based findings of this study indicates that the data may have been skewed in some way, which has been discussed. Despite these flaws, the results of this study still showed a difference between the two genders. The results of this study combined with previous research indicate that more examination is needed in regard to gender and sense of community.

### *Performance*

In this study, students in the SNS environment performed better than students in the LMS environment. The difference was almost an entire letter grade. This is perhaps the most significant and influential finding of this study. In addition, the performance of the SNS students made dramatic gains toward achieving the performance level of traditional students. All students in this study chose their own class, and the groups were shown to be equal on the pretest. However, a possibility exists that there may have been

natural cohorts of students (e.g., friends) that gravitated toward one class or another, which may have skewed the results.

Hung and Yuen (2010) declared that several studies demonstrate the value of social networking tools to facilitate learning via community. Russo et al. (2009) described how SNSs encouraged informal learning in the context of a CoP. According to Panckhurst and Marsh (2008), the future of learning will probably give autonomy to learners through carefully designed and integrated networks. For example, researchers have found that a social networking tool (i.e., Diigo) helped to create collective intelligence through community collaboration and discussion (Tu et al., 2008).

The findings in this study support the assertions made by these researchers that SNS students would perform better than LMS students in e-learning, as evidenced by course final grades in this study. When face-to-face classes were included, specific cohorts in this study performed significantly different than other cohorts, which adds to the finding on course format. For example, Generation X students had significantly higher course final grades than Net Geners, accounting for all variables. Baby Boomers performed significantly better than both of those age categories, accounting for all variables. African Americans performed significantly worse than Caucasians, accounting for all variables. The interaction between these variables offers insight. For instance, young African American students taking the LMS class seemed to be at a disadvantage in this study. Conversely, white Baby Boomers taking face-to-face classes performed very well in this study.

No other research has compared the ability of SNS versus LMS to improve grades in the e-learning environment. However, grades are of primary importance to teachers (who give the grades), the federal government (which grants money in relationship to

grades), state governments (which tie accountability and performance-based funding to grades), institutions (which give scholarships based on grades), parents (who often judge their child's performance based on grades), students (who often judge their own performance based on grades), and businesses (which usually desire individuals with good grades). SNSs may not be a panacea for lackluster e-learning performance, but the literature clearly defines a difference between e-learning and face-to-face outcomes. Future research will either confirm or discredit the findings of this study.

#### Limitations and Delimitations

Two potential limitations and three delimitations were associated with this study. First, a certain level of self-selection was active in the final sample population because the students chose the class, although they had no foreknowledge of the study. Therefore, the sample for the study was in a cluster (i.e., nonrandom). Second, participants may have experienced anxiety about reprisal from the instructor or answered questions with influence from the *halo effect*.

In regard to delimitations, the sample for this study was from community and junior college students in one state in the Southeastern United States. Second, the instructor used a specific computer-mediated instructional interface for the LMS (i.e., Desire2Learn) and the SNS (i.e., Ning). Third, the data collected for this study were confined to one semester. These limitations and delimitations minimized the scope of this research and diminished generalizability. Therefore, generalization of the findings to all online learners would be inappropriate. Generalization to similar settings might be appropriate as clarified in the discussion in the literature review on fractals, which is a tenet of chaos theory.

In addition, this researcher did not examine or assist the instructor of the Art Appreciation course regarding the quality or consistency of the course content. Guidelines and training were clearly given at the beginning of the study, and the researcher provided technical support for students and the teacher. However, the researcher did not interfere with course delivery or conduct a review of the course materials. Although both course formats contained the same instructional content delivered by the same instructor, the instructor may have varied in instructional quality from one environment to the other. This may be considered a point of contention in regard to the results of the study because variance in quality may have existed.

#### Contextualization: A Healthy E-learning Ecosystem

The American educational system is changing, and forces both inside and outside this system are stimulating these changes. These *forces* should work together and devise a plan to create a healthy e-learning ecosystem. In order to create a healthy e-learning ecosystem, educators should adopt the best of research-based technology tools. The ecosystem should be relevant to current students while remaining proven and flexible—adaptive to the rapid change of technology (Harris, 2012). In other words, current content delivery forces in the e-learning milieu (e.g., LMS) should transform in response to advances in technology, while emerging technologies themselves should also be embraced autonomously.

However, designers of these current forces (e.g., LMS) should be wary of a metamorphosis that actually leads to diminishing returns. That is, each technology has strengths, but some strengths could be jeopardized while trying to incorporate emerging technologies. For example, LMS may not be able to absorb all emerging technologies and then, in and of itself, represent a healthy e-learning ecosystem. It may be the case

that no single technology platform can offer all of the components necessary to produce a healthy e-learning ecosystem. In contrast, a healthy e-learning ecosystem may simply be an environment that draws on a cornucopia of tools with each playing to its strengths.

Therefore, teachers should seek direction on what technology applications (i.e., tools) are most appropriate for online teaching environments. The sociocentric view of knowledge and learning (SVKL) and the theories of Vygotsky (1978) and Dewey (1938) are helping to drive educators to look for a solution to a missing link in the current e-learning ecosystem, which many identify to be *community* (Yuen & Yang, 2010). Consistent with SVKL and the theories of social constructivists, the pursuit of a tool to enhance sense of community, connecting, learning, and performing in e-learning is justified. This study focused on the ability of SNS to promote these constructs. The findings of this study may be able to offer educators some direction in the pursuit of a healthy e-learning ecosystem.

#### Recommendations for Policy and Practice

The results of this study are applicable to scholars, educators, administrators, and policy makers. Scholars can reflect on the findings of this study, filter the findings through the literature, and take the next step in identifying the role of SNS to improve the quality of learning and student success in e-learning. Educators can use the evidence presented in this study to aid in instructional design, both in approach and curriculum. Administrators might consider the outcomes of this study to help promote student success and the direction of e-learning. Policy makers might consider the results of this research in order to appropriately support instructors and students and for the fiduciary security of their institutions.

The results of this study suggest that SNS is an effective instructional tool to improve course final grades in e-learning courses. Based on the empirical evidence in this study, it is recommended that educators adopt some components of SNS as an instructional tool to improve students' performance (i.e., course final grade) and their sense of community, connecting, and learning. The results support the bulk of the literature in regard to the ability of community to facilitate learning gains. The adoption of some elements of SNS with possible increases in sense of community, connecting, and learning may help educators promote higher levels of learning and improve retention.

### *Scholars*

The impetus for this research was the lack of existing literature addressing SNS as an igniter of classroom community and student success. The results indicated that SNS might be an effective mechanism to improve student performance, which may indicate improved learning. This presupposition coincides with SVKL and the theories of Vygotsky (1978) and Dewey (1938) discussed in the literature review.

The results of this study provide empirical evidence to expand the use of SNS to promote student success. SVKL and the theories of social constructivists identify social interaction as a necessary component of learning (Vygotsky, 1978; Dewey, 1938). Therefore, environments that significantly impact the growth of connectedness and sense of community may help facilitate an ecosystem that nurtures increased levels of learning. Based on the empirical results of this study and the literature, several suggestions can be made.

*Employing SNS in e-learning.* If future research continues to show the advantages of using SNS in e-learning, then scholars should consider testing components of SNS to enhance the e-learning environment because it naturally facilitates communication and

connectedness. This could be accomplished by embedding elements of SNS within the LMS environment, or this could be accomplished by adding SNS as a tool in an e-learning ecosystem. Alongside Hung and Yuen (2010), the researcher contends that SNSs “blur the boundaries of classroom community as conventionally conceived” (p. 712). In addition, SNS is also alluring because it is user-friendly and open. The researcher is not suggesting a total revolution in the e-learning environment; rather, the researcher is pointing out that a growing number of studies have indicated that SNS can add value to the current e-learning environment, which is primarily driven by LMS.

*Improvements on the CCS.* Based on this study, the researcher has several suggestions for scholars who employ the CCS in future research. First, previous researchers using the CCS often reported the constructs of the instrument using a metric that was hard to decipher. For example, the range for sense of community is based on 20 Likert-scale questions, so one could report the mean of all these questions added together (summative), which may come to a score such as 57. However, this score in and of itself has no interpretable meaning. Instead, researchers using the CCS should consider presenting statistical data on the three constructs in a more understandable manner, which is easily accomplished by dividing the total score by the number of items included in the construct. In the example given above, a score of 57 would be reported as 2.85 on a 4.0 scale, which is a commonly accepted metric in education.

Second, the pretest scores of the CCS were very high in this study and presented a source of concern for the researcher. However, a solution to this dilemma may exist. If one were to consider all of the studies that employed the CCS, then a baseline could be established that took into account a larger population (i.e., a variety of e-learning environments). Establishing a baseline on the pretest of the CCS could help account for



variations in the initial condition of a sample. This idea directly relates to the theoretical and philosophical foundation of this study. Initial effects is a primary tenet of chaos theory and states that altering the initial condition of a system can lead to radical change or transformation. Helping to standardize pretest results on the CCS may help produce more reliable posttest results of the CCS by stabilizing the initial effects. Eliminating the need for the pretest may also help eliminate any expectation regarding what students were supposed to experience in the class.

### *Educators*

Educators have cautioned that e-learning tends to lead to feelings of alienation and isolation from the college, instructor, and other students. At the same time, researchers have warned that online learning may deprive students of a sense of community, which is vital to learning success and satisfaction (Smith, 2008). If teachers have a myopic focus on instruction, memorization, and *doing it by the book*, then this focus may impede their embrace of SNS as an instructional tool and inhibit young students' focus on the quest for knowledge (Peters, 2007). Educators' acceptance of and attitude towards technology are important in determining how successful they are in using that technology (Yuen & Ma, 2008). This study indicates that an environment designed to promote community and connectedness may result in statistically significant improvement in student grades. This researcher holds that students' performance is influenced by student connectivity and course format.

*SNS as a teaching tool.* Using SNS as a teaching tool is complicated, seemingly chaotic in some respects. Educators employing SNS need to be aware of the power this tool wields for social interaction and transformation. The same tool (i.e., Facebook) that garnered the praise of President Barak Obama in his 2011 State of the Union address also

led to the *Arab Spring* in 2011 revolution in Egypt that ousted President Hosni Mubarak. In this study, the same tool that may have led to significantly higher student course final grades also led a group of students within the SNS to form a coalition against the teacher. SNSs appear to be a powerful tool to affect learning and societal change in the e-learning environment.

The volatility of SNS to affect change aligns with the philosophical foundation of this study, specifically a tenet of chaos theory called bifurcation. A bifurcation (i.e., splitting of something into two pieces) may occur when the oscillation of a system (e.g., oscillation occurring because of SNS) is at a point that is far from equilibrium and threatens the system's structure (Loye & Eisler, 1987). Trygestad (1997) clarified that neither the critical point of splitting nor direction of change is predictable. If nonequilibrium transpires in a system, then the result can be dramatically different from the homogenous state. Students' individual decisions are examples of the unpredictable nature of bifurcations in education. Teachers should recognize that the critical point in the process of learning is the crossroads of disequilibrium and bifurcation. This critical point is often referred to as the *aha!* moment (i.e., abrupt understanding of a concept) (Trygestad, 1997).

In addition, Dewey (1916) described how learning often occurs in a collateral manner, which he termed indirect learning. He recognized that indirect learning requires educators to create environments where cognitive growth can be nurtured through connectedness and collaboration: "We never educate directly, but indirectly by means of the environment. Whether we permit chance environments to do the work, or whether we design environments for the purpose makes a great difference" (Dewey, 1916, p. 19). In this study, the researcher intentionally placed students in the SNS environment in order to

naturally facilitate connectedness in the hopes that gains in learning would take place; the SNS environment does appear to have made a difference, at least in terms of grades.

The researcher of this study contends that SNSs have the ability to create bifurcations and facilitate indirect learning in online classes, which accounts for the disparate outcomes and volatile nature of SNS. That is, SNSs may have the ability to push students to disequilibrium in e-learning, which has explosive potential in a variety of directions including indirect learning. In this study, the SNS led to significantly higher grades and a revolt by some of the students against the teacher. Thus, SNSs appear to have real potential to affect learning and societal change in the e-learning environment. While educators must account for the volatility of SNS, the potential of this tool to facilitate powerful improvements in e-learning is quickly becoming a supposition not easily ignored.

However, faculty members must guard against technology being viewed as a tool to increase merely productivity and cut cost (Harris, 2012). They must be vigilant that *technopoly* not take hold (Postman, 1992). Postman warned that a technopoly would place humans at the disposal of technology and make efficiency the primary outcome of human labor. Human capital is perhaps the most valuable asset of any community and state and should not be subservient to technology. The same automation in LMS that many online teachers cherish (e.g., adaptive release, sequencing, automatic test grading and rolling) may soon take the place of faculty members. That is, if the entire class can be automated, then what is left for the teacher to do other than answer emails and do a few other administrative tasks. This is the antithesis of the art of teaching. Just as Socrates trained philosophers while Sophists taught philosophy (Manus, 1996), online

educators need to be wary of technology tools that weaken their ability to *train philosophers* (e.g., automation).

Hung and Yuen (2010) voiced concerns about phishing attacks and spam when using public SNSs (e.g., Facebook) for educational purposes. Private SNSs (e.g., Ning) seem to be a viable answer to this dilemma. Public SNSs may not be the best tool to fully leverage the power of SNS in education because of legal, advertisement, and privacy issues. SNSs are often inexpensive or free.

In addition, educators employing SNS also need to be aware that the tool has the potential to be time consuming. Therefore, teachers should have a framework to use efficiently SNS in the classroom and direct students to stay within that framework (Hung & Yuen, 2010). Giving clear boundaries might also help to prevent mutinies from occurring. This framework could be incorporated into teacher training.

*Professional development.* In order to facilitate sense of community and connectedness, organizations should train instructors in how to promote effectively community and connectedness in their e-learning classes. In turn, instructors should proactively communicate to students on how to participate effectively in course discussions and activities. This instruction should include parameters for what is appropriate and inappropriate, including acceptable *netiquette* (i.e., appropriate interaction). In order to promote further connectedness, training for e-learning instructors should include best practices in structuring and developing conversations in the e-learning environment:

Gaining insight into how to support the development of learner's sense of connectedness and learning will allow us to make intelligent decisions about online course design, pedagogy and faculty development in the service of

enhancing the quality of online learning environments. (Shea et al., 2006, p. 185)

Colleges and universities often provide training for online instructors, but this training may only be an orientation of the interface of that institutions LMS (e.g., discussions, tests, and announcements). This technical training is important but may be inadequate to promote classroom community and a quality e-learning environment. Training for e-learning teachers should address appropriate elements of instructional design and best practices.

The key to a successful e-learning classroom may lie in options and tools rather than mandates (e.g., discussion boards or group projects) (Smith, 2008). Sanchez and Gunawardena (1998) clarified this at the dawn of online education:

In general, when trying to accommodate a variety of learning styles in the instructional design, it is always best to design alternative activities to reach the same objective and give the students the option of selecting from these alternative activities those which best meet their preferred learning style. (Sanchez and Gunawardena, 1998, p. 59)

Stated differently, the aim of e-learning should be to uphold demanding assignments and thorough content in a manner that allows margin for erratic life events, rather than being unrealistically restrictive.

The outcome should aim to be a platform that is relevant and agile. In the end, agility is maintained via flexible management. In other words, instructors should be allowed to choose from the tools they prefer in an e-learning ecosystem so that they can configure their own e-learning environment. In turn, teachers should also allow students to have some flexibility within a framework specified by the teacher (Harris, 2012).

Based on the findings of this study, the researcher holds that SNSs offer great potential as

a supplemental learning tool to enhance the e-learning ecosystem. More research on educators' use of SNS in e-learning needs to be conducted to better understand better this new Web 2.0 juggernaut.

### *Administrators*

Institutional relevance may soon be determined by how and to what extent colleges meet the social expectations of students. Pragmatically speaking, in order to reach students that no one else is reaching, institutions must do things no one else is doing. Harris (2012) listed the *red flags* that academicians should look for that indicate individuals do not understand social media. First, individuals begin talking about SNS in terms of what the kids use. Second, in a knee-jerk reaction, they ban access to SNS because someone may make a negative comment about the institution. Third, decision makers put students in charge of developing the SNS for the organization. Fourth, every communication must be approved. While none of these issues may be fatal alone, these problems could be catastrophic to an organization's relevance when combined.

Incorporating SNS in e-learning may lead to a positive fiduciary impact. According to Ferguson (2010) studies have shown that students are motivated to complete courses when they possess a strong sense of community, and student retention is increased when students complete e-learning courses (McElrath & McDowell, 2008). This study positioned some students in an e-learning environment designed to promote community (i.e., SNS), and students in this enhanced environment performed better. Mississippi funding for higher education is based on enrollment, so higher retention rates would definitely result in a larger portion of state allocations in this study.

Harris (2012) disclosed that a disruption in media has occurred over the last decade as the balance of control has shifted from providers being in charge to consumers

driving the market (a.k.a., consumerization). In order to navigate through this evolving technology in education, organizations must first assess where they are in e-learning and then consider implementing promising opportunities and trends (Harris, 2012). First, organizations should take an inventory of all resources available in their e-learning ecosystem (e.g., email, grade book, announcements). Second, institutions should survey stakeholders to identify resources that are available outside of the e-learning ecosystem (e.g., social media, Twitter, mobile communication). Third, officials should identify resources that are not in the current e-learning ecosystem but need to be; this step should help to ensure that no redundancies are adopted (e.g., two email systems). However, new technologies may offer a better option for some of the redundancies that are discovered. In this study, the needed resource was a tool to build community in the e-learning environment. Fourth, educators should identify emerging technology tools that can meet the expectations of the needed resource. In this study, that emerging technology tool was SNS, specifically Ning.

The results of this study may offer guidance to administrators that are trying to achieve some of the completion agendas being pushed by educational entities, such as the College Completion Challenge (American Association of Community Colleges, 2012). Completion agendas are not only being pushed by national education organizations but also the federal government (U.S. Department of Education, 2011). However, students cannot graduate or complete certificates if they do not have passing grades. In addition, online classes accounted for 29.0% of all college student enrollment in 2009 (Allen & Seaman, 2010). Therefore, the results of this study may help organizations meet the demands of the new completion agendas by improving online grades.

### *Policy Makers*

Several major challenges exist to the development of healthy e-learning ecosystems. Any attempt to change a LMS that has been in place for years will probably draw a polarizing reaction. As with any initiative, a natural resistance to change may occur. However, higher education officials should seek to understand the direction in which vendors are heading; this awareness might prevent officials from blindly signing annual contracts with e-learning providers. Institutions should ponder a change when their mission, needs, and goals no longer correspond to the direction in which a provider is moving (Harris, 2012). In relationship to this study, if community and connectedness is viewed as an essential component of e-learning, then e-learning vendors that have no interests in community or connectedness may not be the best option as an e-learning platform or provider.

Harris (2012) also argued that future e-learning ecosystems are outside the scope of current school policies, fiduciary priorities, and organizational structure. Current school policies do not allow for some elements of future e-learning ecosystems. For example, some schools have banned the use of SNS because of its potentially volatile nature. The current mindset on capital expenditures also needs to change; budgets need to shift from physical capital to virtual capital. Finally, policy makers need to organize the governance of e-learning environments so that end users (i.e., faculty and students) are given control to ensure that the e-learning ecosystem is relevant and agile.

### Recommendations for Future Research

Future researchers should examine the potential value of SNS to improve the quality of learning in e-learning courses. Although this study indicates that SNS does enhance students' performance, more research is needed to substantiate or refute this



claim. Future researchers need to investigate the relationship between sense of community and performance in online learning and other variables in the e-learning ecosystem such as demographics, instructional design, teacher training, pedagogical methods, and/or instructional approach. Among the demographic predictors, this study implores more research on the relationship between age, gender, and ethnicity in relationship to sense of community; gender appears to be the most influential according to the findings of this study. Future studies should also consider the instructor's role in using SNS as an embedded part of the curricular strategy (e.g., embedding elements of SNS in a LMS). One nuance that could be added to this study would be to measure the level of students' technical skills versus their social media skills. In addition, this study could be replicated in settings that lengthen the time period students are involved in the research or settings where other pedagogical approaches are employed (e.g., flipped classrooms).

More qualitative and quantitative research should be pursued in order to contribute to the body of evidence to disprove or justify the inferences this researcher made. Specifically, rigorous research should be conducted that employs research design models that measure cognitive awareness and mental concepts in an accurate manner, per Vygotsky's (1978) guidance. Vygotsky clarified that the development of cognitive awareness and mental concepts are important elements of learning quality; the researcher did not seek to gauge the efficacy of e-learning course format (i.e., SNS or LMS) to facilitate these constructs. This gap may need to be filled by future research because it is outside of the parameters of this study.

A meta-analysis of all studies that have utilized the CCS may help to establish a baseline for sense of community, connectedness, and learning for e-learners. Helping to

standardize pretest results on the CCS may help produce more valid results on the CCS. Eliminating the need for the pretest may also help remove any student community expectation on the part of the student. This baseline data may be an important piece of information as the research on community in e-learning moves forward.

The researcher plans to present and publish this study so that appropriate stakeholders understand the finding of this research. Many administrators, policy makers, and educators at both SSCC and SSVCC will receive the results of this study. It is the desire of this researcher that educators, researchers, and other institutions will investigate, evaluate, and apply the findings of this study where relevant. Future analyses could validate the use of SNS to enhance students' classroom performance as well as sense of community, connecting, and learning.

## APPENDIX A

### EMERGING TECHNOLOGIES FROM 2005-2010

The researcher described the emerging technologies showing the most potential for education below in chronological order by year; the years 2005 through 2010 were covered. The following years do not necessarily represent the year of creation but of emergence. The researcher gathered this list from a variety of sources, which is detailed in the researcher's blog cited alongside each year below. EDUCAUSE was the primary source as they produce a monthly publication that reviews new technology, but the researcher also included a variety of other sources (e.g., Beldarrain, 2006; Facebook, 2012; Linden Research, 2011).

#### Emerging Multimedia Technologies in 2005

##### *Social Bookmarking*

Bookmarking occurs when a user saves the URL address of a Web site to a local computer. Social bookmarking takes place when a user saves a bookmark to a public Web site and *tags* each location with keywords. The ability to tag information resources with keywords and access these bookmarks through the Internet has the potential to alter how individuals find and store information. Knowing where information is found may become less important than knowing how to retrieve information using a collaborative framework designed by colleagues (Woodward, 2010).

##### *Clickers*

Class size and human dynamics have traditionally restricted student engagement and feedback (e.g., a limited number of students dominate the interaction). Clickers help to more efficiently facilitate engagement and interaction, which can be modified to any discipline and most teaching environments (e.g., small groups or partners). A clicker is a

small device that uses radio frequencies to communicate with a centralized computer in a classroom setting, such as the teacher's or presenter's computer (Woodward, 2010).

### *Podcasting/Vodcasting*

Podcasting describes any hardware and software amalgamation that automatically allows audio files to download to an MP3 (i.e., Motion Photographic Experts Group Audio Layer 3) player. This ability allows users to listen to or watch digital media content at their convenience. Educators can use podcasting as an asynchronous learning tool that students can use anywhere, anytime. If users add a video to a podcast, then it becomes a vodcast (Woodward, 2010).

### *Wikis*

Wikis are powerful tools to promote collaboration. The term *wikis* refers to Web pages that an individual can view and alter through Internet access and a Web browser. This technology supports group collaboration and asynchronous communication (Woodward, 2010).

### *Video Blogging*

Similar to a blog, a video blog (vlog) employs video instead of text or audio. Obviously, educators can use this technology to record lectures or special announcements. In some instances, video blogs are used as an outlet for self expression or opinions (Woodward, 2010).

### *Blogs*

A blog is simply an online journal, and viewers of a blog can respond. The technology is similar to e-mail. Students usually employ blogs to complete assignments and for self expression. Educators use blogs to support teaching and learning, promote dialogue, and express ideas or opinions (Woodward, 2010).

### *Augmented Reality*

Augmented Reality focuses on real space or objects and uses contextual data to expand students' knowledge of that space or object. It differs from virtual reality in that it does not generate a simulated reality (Woodward, 2010).

### *Instant Messaging*

Instant Messaging (IM) allows for real-time communication through mobile computing devices or personal computers using the Internet. IM now supports communication in the form of text, audio, video, images, and other attachments. While IM has been around since the late 1990s, the functionality of IM is now ubiquitous with the advent of many new applications and mobility. Learners using IM appear to feel connected with the faculty and peers in a way that is difficult using other multimedia. Higher education has the opportunity to embrace this new medium of communication that requires little cost (Woodward, 2010).

### *Collaborative Editing*

Collaborative editing allows several individuals to edit a document simultaneously. In other words, this tool allows a user to edit a file or observe someone else editing the file in real time. This technology is similar to instant messaging in that changes are seen instantly, and it resembles a wiki in that all participants can delete, change, or add content. Collaborative editing provides a good platform for supporting groupwork in a distance learning environment; students can work together despite being separated by time and space (Woodward, 2010).

## Emerging Multimedia Technologies in 2006

### *Virtual Meetings (aka, Virtual classrooms)*

Virtual meetings are synchronous interactions that use the Internet as the medium to communicate through chat tools, application sharing, audio, and video. In a virtual classroom, learners can encounter interactive discussions and lectures as well as classmate and teacher interaction. Virtual classrooms can also be woven into a LMS. One of the most prominent examples of virtual classrooms is Second Life, which is the Web's biggest "user-created, 3D virtual world community" (Linden Research, 2011, p. 1). Another option for delivering course content in this manner is virtual conferencing. In a virtual conference, students can learn from any location in a synchronous format or anywhere, anytime in an asynchronous format (Woodward, 2011a).

### *Screencasting*

A screencast allows users to record the actions taking place on a computer screen, and this recording occurs as a video accompanied by audio. Screencasts allow users to access in-depth course material even when they may not be present in class. They can distribute this technology as a vodcast (Woodward, 2011a).

### *Remote Instrumentation*

Remote instrumentation allows individuals to control scientific equipment from a remote location. Some examples of this type of equipment include spectrometers, astronomical tools, and other electronic instruments. Educators can use remote instrumentation to provide authentic experiences to a large audience. This initiative helps to move students beyond a textbook knowledge and offer real experience (Woodward, 2011a).

### *Google Jockeying*

A Google jockey is a contributor to a class who searches the Internet for Web sites, ideas, resources, or terms that are presented during a given class. The jockey's role coincides real-time with the presentation in order to expand learning opportunities and refine the core topics (Woodward, 2011a).

### *Virtual Worlds*

*Residents* of a virtual world immerse themselves in an online environment through avatars, which represent individuals. Several educational institutions are implementing and experimenting with virtual worlds as a platform in which to conduct class. This environment is poised to cultivate constructivist learning by positioning students in a learning environment without overt learning objectives (Woodward, 2011a).

### *Facebook*

Facebook is a major Website for social networking. This site is a prime example of the challenges associated with information literacy (i.e., one's ability to deal with the risks and opportunities the Internet age creates). Facebook gives users the ability to create profiles that represent their individuality and post any materials or links they wish (Woodward, 2011a).

### *YouTube*

Users of this video-sharing service have the ability to share, upload, and store professional or personal videos. In addition, users control who may view their videos by allowing anyone to access the content or to form communities. Viewers can comment and rate videos if they wish (Woodward, 2011a).

### *Google Earth*

This interactive mapping technology permits consumers to navigate virtually the entire earth by viewing landscapes, mountains, buildings, roads, and similar structures. Visual literacy can be improved and assessed using this application. In addition, this tool can aid students' awareness of cultural differences (Woodward, 2011a).

### *E-books*

E-books discard the belief that books should always be read from cover to cover. This tool encourages readers to employ a self-directed and interactive role in how they learn. E-books support new approaches to interact with the content of books. Various learning styles can be accommodated by incorporating simulations, movies, or audio files (Woodward, 2011a).

## Emerging Multimedia Technologies in 2007

### *Digital Storytelling*

Digital storytelling combines a narrative with sound, video, graphics, or other digital content. The stories usually incorporate an emotional section and are often interactive. Digital storytelling creates a bridge between purely technical content and fields of study that may not view technology as a natural fit in their programs. Digital storytelling can improve information literacy, and this application offers a promising platform for e-portfolios (Woodward, 2011b).

### *Open Journaling*

Open journaling employs an open access model in which the publishing process is streamlined through online submission, review, publication, and archiving. This approach serves as an alternative to traditional peer-reviewed publishing techniques. Open journaling provides an infrastructure where students can learn the basics of



publishing, communication with journals, the peer review process, and tagging (Woodward, 2011b).

### *Creative Commons*

Creative Commons is actually the name of a nonprofit organization that offers an alternative to traditional copyright. From a legal standpoint, original works automatically maintain specific rights. Creative Commons allows authors to maintain some rights while releasing others; the intent of the company is to increase the distribution of and access to intellectual property. The freeflow of information has the potential to enhance greatly all aspects of education (Woodward, 2011b).

### *RSS*

Subscribers of a Real Simple Syndication (RSS) protocol can access online material using an *aggregator* or *reader*. The tendency of most Internet users is to choose primary sources of information. RSS provides consumers the ability to generate a list of those preferred sources so that updates and information are automatically sent to the subscriber (Woodward, 2011b).

### *Wikipedia*

This online source is a free encyclopedia that allows anyone to contribute to or edit entries. Wikipedia was initially launched in 2001 and is one of the most frequented Web sites in the United States. College students are using Wikipedia as a primary research tool, with millions of articles in a multitude of languages. Higher education faculty question this resource's reliability as a research tool because entries are editable and are not subject to expert review (Woodward, 2011b).

### *Twitter*

This online technology is a hybrid mix of social networking, blogging, and instant messaging from a cell phone. Users have 140 characters or less to depict their thoughts or convey what they are doing. Interaction between students and educators can be fostered through Twitter in areas such as metacognition or ideas about an issue (Woodward, 2011b).

### *Cyberinfrastructure*

Cyberinfrastructure merges human resources, data, and technology into one, and this technology is most often used in high power computer hardware and applications. In education, this tool encourages students and faculty to share methods, tools, and experiences to enhance learning (Woodward, 2011b).

### *Haptics*

This technology allows users to feel what is happening on the computer screen. Haptics applications present force feedback to consumers concerning the movements and physical properties of virtual objects displayed by a computer. This technology allows users to move beyond traditional human-computer interactions, which have primarily been limited to images, data, or words (Woodward, 2011b).

### *Data Visualization*

Data visualization illustrates information visually in a new format. It is the visual approach that helps one discover relationships and trends that could be advantageous or significant. This application allows students to process information quickly and see patterns that otherwise they might overlook (Woodward, 2011b).

### *Skype*

Skype allows consumers to make free phone calls between computers and low-

cost calls between telephones and computers by using a voice-over-Internet Protocol (VoIP). This technology allows educators to maintain contact between collaborators and colleagues in different locations at a minimal cost, if any. An additional capability of Skype is to host videoconferencing from distant locations (Woodward, 2011b).

### Emerging Multimedia Technologies in 2008

#### *Lulu*

Lulu provides tools to publish, print, and design original content. Educators and students have the ability to publish content (e.g., reports, books, or posters) with nominal expense (Woodward, 2011c).

#### *Flickr*

Anyone can upload, view, mark, or tag pictures on this photo-sharing website. Flickr embodies many elements of Web 2.0 applications and relies on user content to promote community among consumers. Users have the ability to provide a setting for developing relationships or shared events, and in order to help enhance relationships, groups can be formed (Woodward, 2011c).

#### *Google Apps*

This online suite of file storage and web-based programs operates within a web browser. In Google Apps, individuals can share content by granting someone permission to view that content. The ability to share easily content promotes peer review of material and collaboration. The programs featured on Google Apps include productivity tools (e.g., word processor or spreadsheet), communication tools, (e.g., calendar or Google Talk) and web development tools (Woodward, 2011c).

### *Ning*

This online social networking application allows consumers to generate their own network or take part in another individual's network. Each creator is given the opportunity to personalize completely the functionality and appearance of the SNS. This technology is similar to Facebook with the exception that users can create their own closed network. Ning provides a neutral setting where teachers can harness the power of social networks, such as the promotion of a strong sense of community among a cohort of students (Woodward, 2011c).

### *Multi-Touch Interfaces*

These input devices distinguish various touches on the surface of the screen such as pinches, rotations, swipes, and other actions that facilitate instantaneous interface with digital content. Multi-touch interfaces also allow several users to collaborate simultaneously with digital content (Woodward, 2011c).

### *Second Life*

Second Life is a modern day virtual world hosting over 13 million *residents*, a flourishing economy, and a great deal of virtual land. Consumers can create or alter virtual space with ease, and this scenario has encouraged experiments in creating space designs. For example, Second Life often hosts virtual field trips or serves as a platform to display student media. There are a number of social dynamics that promote teamwork and self-directed learning (Woodward, 2011c).

### *Wii*

This gaming console allows participants to interact with the game applications through physical gestures and movement. Academic researchers have employed this technology to create applications such as an interactive whiteboard or collaborative

choreography tools. Researchers can use Wii and similar gaming consoles to test how active learning exercises can improve the performance of students with various learning styles. Wii can stimulate physical activity (Woodward, 2011c).

### *Geolocation*

This application links digital content with a physical location. Geolocation is also called geotagging. A common use of geolocation is the association between a picture and its geographic location. Geolocation can help to coordinate resources and information, which can add a new layer of understanding to research (Woodward, 2011c).

### *Zotero*

This online research tool offers automated bibliographic resources to users. Zotero runs in the browser, so the citation process becomes seamless and easy. All the bibliographic information of a Web page is stored in the consumer's library of sources (Woodward, 2011c).

### *Ustream*

Users of Ustream can broadcast a personalized channel on this interactive Web streaming platform. Consumers can promote their own shows, have conversations, and host events on this platform. Educators can employ the free streaming video and initiate a variety of authentic assessments using this tool (Woodward, 2011c).

### *Flip Camcorders*

Flip video camcorders allow consumers to shoot, capture, and produce video content with this petite, economical, and user-friendly device. For faculty members, these devices present new opportunities for authentic assessment and foster visual learning. Because this process is user-friendly and inexpensive, teachers and students

might find it palatable to produce video content that can enhance learning (Woodward, 2011c).

### *Lecture Capture*

This technology enables teachers to record classroom activities and lectures and then make them accessible for students in a digital format. Educators can limit lecture capture to audio, but video recordings that feature the lecturer, an electronic whiteboard, or screen capture are gaining in popularity. Lecture capture further expands on screencasting (Woodward, 2011c).

## Emerging Multimedia Technologies in 2009

### *Alternate Reality Games (ARGs)*

This application intertwines real objects with puzzles and hints that are virtually hidden anywhere (e.g., stores, movies, Websites, or printed materials). The ARGs are the devices used to gather clues. These games facilitate creative problem solving using real-world scenarios and materials (Woodward, 2011d).

### *QR Codes*

These codes are bar codes that are two-dimensional. QR codes feature both alphanumeric characters and a URL that links consumers directly to a Website that describes or gives information about a product. Individuals could scan a QR code on a product with their mobile phone and gather a great deal of information on that product quickly (Woodward, 2011d).

### *Location Aware Applications*

Applications using location-aware technology can provide online content to individuals based on physical location. These applications can also send an individual's location to a third party, such as a friend or teacher. Location-based information can

enhance learning. Scientific information, historical narratives, and interactive geographic content are examples of how educators can use this tool (Woodward, 2011d).

#### *Live Question Tool*

This Web-based application allows participants in a presentation to post questions for the lecturer. As participants post questions, fellow participants can share remarks and vote on what questions they would like to see addressed. This technology gives lecturers constructive feedback upon which they may choose to alter their presentation (Woodward, 2011d).

#### *Personal Learning Environment*

A personal learning environment (PLE) is a scenario in which individuals direct their own learning through personalized tools, services, and communities. A PLE is best understood in contrast to an LMS. A PLE is *learner-centric*, while a LMS is *course-centric*. However, PLE and LMS are not necessarily exclusive of one another because a learner can choose to include several elements of a LMS in his or her PLE. The notion of a PLE alters the role of resources and stems from the idea that information is ubiquitous. In a PLE, teachers place the emphasis on access to and assessment of information in addition to metacognition (Woodward, 2011d).

#### *VoiceThread*

VoiceThread allows individuals to aggregate media into one Web site, including media contributions from guests and users. Initially, a creator places an artifact (e.g., graphic) on the site. The ensuing discussion about this artifact allows users to comment on the artifact using a variety of media (e.g, video, audio, or text). Then they can view comments in an interactive manner. Voicethread provides teachers and students with an avenue for presenting visual media in an interactive manner (Woodward, 2011d).

### *Microblogging*

Microblogging is a term referring to a small quantity of digital content users place on the Internet, such as links, short videos, pictures, text, or other media. Twitter is probably the most popular microblogging site currently used. In education, students often use microblogging for backchannel communication during a live class; teachers can also send notifications and reminders to students using this application (Woodward, 2011d).

### *Telepresence*

This complex application of video technologies allows geographically separated participants to feel as if everyone involved in the presentation were in the same location. High-definition (HD) cameras send signals to HD displays that are life size, and high-fidelity acoustics localize the sound to each image in order to simulate the effect of each participant's voice emanating from that participant's respective display (Woodward, 2011d).

### *Collaborative Annotation*

This tool broadens the notion of social bookmarking by permitting participants to move beyond merely sharing bookmarks by allowing each member to share annotations of a web page. Collaborative annotations allow users to add notes that explain their ideas on a Web resource or highlight specific areas on the Web page (Woodward, 2011d).

### *Google Wave*

In Google Wave, a user creates an online space termed as a *wave*. The wave is simply a running document that is conversational, and contributors can offer isolated messages within a wave, which are called *blips*. Google wave can house an entire conversation in one location. E-mail has been in existence for 40 years and remains



virtually unchanged, so this web-based application attempts to redefine electronic communication. Google Wave seems well-suited for PLE because it offers a single location for collecting data from a variety of sources and allows for an array of formats (Woodward, 2011d).

## Emerging Multimedia Technologies in 2010

### *Next-Generation Presentation Tools*

Electronic presentations are evident at all levels of the educational arena, and new presentation tools are emerging that give teachers the ability to customize presentations in a way that more closely resembles new methods of learning and teaching. Many of these tools use nonlinear sequencing or branching, which allows a teacher to take students' questions and follow them through to finality without disturbing the sequence of the overall presentation. Some of these new tools promote collaboration between authors. These alternative presentation applications could cause educators to revisit the nature of information sharing and presentation (Woodward, 2011e).

### *Backchannel Communication*

The term backchannel communication refers to a secondary electronic conversation that occurs simultaneous to a lecture, learning activity, or conference session. This form of communication takes place informally through applications such as Twitter or chat tools, but backchannel communication is formally being cast into the foreground by some educators. These pioneers encourage students to interact with one another during activities or lectures; this communication occurs without disrupting the speaker (Woodward, 2011e).

### *E-Readers*

These electronic tools are high-resolution, low-power, and portable. E-readers are designed to display written material in a digital format, such as newspapers or books. Some of these devices allow users to access other electronic material (e.g., websites or blogs). E-readers have the greatest potential to alter traditional approaches to the acquisition of content (i.e., buying a textbook). These devices could also transform classroom interaction because students would have more real-time access to information through the Internet (Woodward, 2011e).

### *Analytics*

Analytics applications statistically evaluate data in order to discern patterns. These tools allow organizations to make informed decisions and recommendations. Schools can use this technology in order to inform financial decisions, tweak course offerings, and alter recruiting practices. Analytics can also help colleges align resources with needs. In addition, these tools could be used in LMS to provide meaningful data (Woodward, 2011e).

### *Mobile Apps for Learning*

Any educational interaction that takes place via mobile technology can be referred to as mobile learning (m-learning). A variety of devices are available for m-learning, ranging from mobile phones to the iPad. However, the most popular medium for m-learning is currently cell phones. Mobile software applications allow students and teachers to access course content and a number of resources from any location that has the Internet; a large portion of this data can also be uploaded onto a mobile device, which eliminates the need for Internet access (Woodward, 2011e).

### *Open Educational Resources*

Resources that are available to the public at little or no cost are termed as open educational resources (OER). A plethora of free educational material can be found on the Internet, including simulations, syllabi, tests, and textbooks. OER provides access to instructional resources to a much larger group of learners. Instructors can also choose components from OER to enhance their courses. Extremists foresee a day when learners will construct their own courses from OER (Woodward, 2011e).

### *LMS Alternatives*

LMS currently serve as the primary platform for online education by providing a set of tools to deliver content and manage courses. Emerging Web 2.0 applications now offer a host of applications that rival, if not surpass, the educational tools offered through LMS. The new applications include social networking sites, document sharing tools, cloud-based media options, timeline tools, and social bookmarking sites. Many educators are adopting these alternative tools because they teach students real-world skills that will be used in the workplace. In this scenario, the LMS simply becomes a hub from which other applications can be accessed. The new Web 2.0 tools also encourage active learning, effective collaboration, and student engagement (Woodward, 2011e).

### *Online Team-Based Learning*

Online team-based learning takes place when learners work in small groups to accomplish learning outcomes. This approach shows a great deal of promise in online courses because the forum promotes social interaction in an environment that often lacks this crucial element. This method often emphasizes the learning process rather than the final outcome, especially as it relates to assessment (Woodward, 2011e).

### *Online Media Editing*

Anyone with a suitable computer and Internet access can edit graphics, audio, and video using cloud-based media editing tools. These Web 2.0 applications offer several advantages, including the flexibility to work on any machine or platform; in addition, these tools are usually free or inexpensive. Open access to these online editing applications helps to promote equal opportunity for all learners to use the same technology tools. These applications are also user-friendly, so educators can devise a number of ways to incorporate new kinds of activities in almost all disciplines (Woodward, 2011e).

### *The HyFlex Course Model*

The HyFlex course design model offers the elements of a hybrid class (i.e., a combination of online and traditional) in a flexible manner that allows students the option of participating online, attending class, or choosing both. In this model, teachers offer course material in a traditional and online format, while students choose their learning preference for each meeting. However, this model is not self-paced. Ultimately, the point of the HyFlex approach is to eliminate the barrier between the physical and virtual classroom. This model promotes a more customized learning environment than traditional hybrid approaches (Woodward, 2011e).

### *Android*

Android is an open-source operating system created for use in mobile phones, tablet computers, e-readers, and similar mobile devices. Android is owned by Google and integrates well with Google applications such as Google Calendar and Gmail. In addition, Android allows smart phone users to seamlessly access social networking sites. A large number of free applications exist for the Android. Android and similar mobile

operating systems make mobile learning and teaching practical. At this point, these tools promote information gathering (e.g., listening to a lecture) better than information creation (e.g., writing a paper). Interconnectivity between smart phones, the Internet, and personal computers allows individuals to work with others and easily share content (Woodward, 2011e).

## APPENDIX B

### FIVE PROMINENT EMERGING TECHNOLOGIES FROM 2005-2010

Five emerging technologies represent applications that are gaining a great deal of attention from teachers, researchers, and reviewers: virtual classrooms, lecture capture, podcasting/vodcasting, mobile learning, and social networking systems (SNS). More importantly, these technologies are representative of the preferences students indicated on the 2009 and 2010 EDUCAUSE Center for Applied Research (ECAR) study (Smith et al., 2009; Smith & Caruso, 2010). An in-depth discussion of each of these five prominent technologies is beyond the scope of this paper. A brief summary, advantages, and disadvantages for each of the five prominent technologies is offered below.

#### Virtual Classrooms

Some researchers contend that quality instruction revolves around real time learning that focuses on human dialogue, relationships, and individuals (Oblinger, 2005). Virtual classrooms feature real time opportunities for interactive discussions, tutoring, and lectures (EDUCAUSE, 2006b). These synchronous online learning systems are employed to generate live, web-based teacher-led instruction. Synchronous online education began in the mid 1990s. The moniker *virtual classroom* represents the desire to recreate a traditional classroom in a virtual environment. The emergence of virtual classrooms expanded educational delivery options in order to fill a need (Hyder, Kwinn, Miazga, & Murray, 2007). Virtual classrooms are considered a category of Internet-based virtual meetings that employ chat tools, interactive learning events, application sharing, video, and audio. These sessions conveniently scale from a small group of users to a sizeable group. Webinars represent one example of this type of classroom (EDUCAUSE, 2006b).

Virtual classrooms connect students at various geographical locations by using applications to simulate a traditional process, which creates a synergistic learning environment. Users can record and view virtual classes in an asynchronous manner, but this is not the purpose or strength of virtual classrooms (Hyder et al., 2007).

#### *Advantages*

Virtual classrooms have the ability to encapsulate the essence of traditional interactions and deliver this content over a distance. Effective, synchronous learning environments are “live, real-time, interactive, collaborative, participatory, versatile, multi-modal (combining text, audio, video, graphics, etc.)” (Hyder et al., 2007, p. 20). Virtual classrooms allow students and teachers to interact as if they were in the same physical location. Hyder et al. also revealed that virtual classrooms promote student collaboration, community, and retention.

#### *Disadvantages*

One concern associated with synchronous learning stems from time zone differences, especially if students are located in various parts of the world. In addition, vendors of virtual classroom applications typically charge a high cost to use their products (EDUCAUSE, 2006b). The quality of the video and audio is sometimes affected by outside issues such as technical limitations, improper setup, and network activity. Similarly, some students will be limited because they do not have access to adequate equipment (Held, 2009).

### Lecture Capture

Lecture capture systems (LCS) employ available technologies that permit faculty to record what occurs in the classroom using a digital system, and learners have access to these recordings 24 hours a day, on or off campus. Universities are learning quickly the

possibilities of LCS to provide opportunities for learners that are absent, students that need remediation, and the development of hybrid or online course content. Presently, instructors can record lectures digitally and use the Internet to stream these videos live. The ability to stream videos has emerged from fast computer processors and high-speed Internet. Some LMS incorporate a convenient form of screencasting that allows students to access a video-on-demand portion of a lecture. This attribute is especially beneficial for academic courses (e.g., physics, computers, or math) in which learners would like to view specific steps or concepts presented in a lecture (EDUCAUSE, 2008).

#### *Advantages*

Lecture capture provides students with constant opportunities for review and an alternative for students that are absent from class. Teachers have the ability to invite guest lecturers or present information to learners from any location as long as proper equipment is accessible. Another advantage for both students and teachers is that the lectures conform to a variety of applications, such as mobile devices, high definition presentations, laptops, or podcasts. The flexibility of this technology allows users to access the lectures anywhere, anytime. LMS can facilitate cooperation between teachers on a campus or around the world, enabling leading experts to contribute to multidisciplinary classes (EDUCAUSE, 2008).

#### *Disadvantages*

Administrators' monetary concerns and the potential of an increased load on the faculty are two major concerns associated with lecture capture (Held, 2009). Access is also a concern associated with lecture capture technologies, specifically policies that manage use, storage space for the videos, questions about the pedagogical benefits of watching a lecture more than once, and who should be able to view the videos and for



what length of time. Legal concerns are also associated with lecture capture, such as copyright ownership. The high cost of lecture capture storage and delivery is an impediment to the growth of this technology (EDUCAUSE, 2008).

### Podcasting and Vodcasting

Since its introduction in 2005, podcasting has gained more recognition than most of the other Web 2.0 technologies, excluding SNS. Podcasting offers digital audio files (e.g., MP3) to consumers, often through online subscriptions with no fee (Essex, 2007). The creation of podcasting resulted from Apple Computer Corporation's iPod. This device is one of many mobile digital audio players that enable consumers to download audio, video, graphic, and other media files from their computer to the device for later access (EDUCAUSE, 2005). Any device can receive podcasts if the device allows automatic downloading of music or audio from a computer, such as personal digital assistants (PDAs) or cell phones (Essex, 2007).

A distinction needs to be made between podcasts and broadcasts. Podcasting is unique because of the way it offers published content to consumers via the World Wide Web. Podcasting employs the Internet's Real Simple Syndication (RSS) protocol. Broadcast and webcast send audio through a central audio stream, but podcasting directs audio files straight to an MP3 player or iPod. In other words, podcasts are recorded and then transmitted to users, while broadcasts and webcasts are streamed to users live but not recorded. The ability to create podcasts has been extended to consumers through recording software such as Audacity, and users can then upload a recorded audio file to a podcast's hosting site such as iTunes (EDUCAUSE, 2005).

Vodcasting is merely podcasting with video. The principal distinction between screencasting/lecture capture and vodcast is the ability granted to students to reciprocate

the media. Students can generate their own audio and video content and submit it to the teacher or fellow students (EDUCAUSE, 2005). The speed and ease of generating videos and sharing them with a class “promotes a community that is willing and capable of critiquing the work of peers” in an asynchronous format (Held, 2009, p. 69). Podcasting and vodcasting lack interactivity because they are media-delivery applications. However, the advent of wifi-enabled and touch screen devices has enhanced the potential of podcasting and vodcasting in distance learning (Held, 2009).

### *Advantages*

Searchers can use podcasts to deliver edited lectures to students, which can be played as needed. Similarly, podcasts empower students to generate audio recordings in order to communicate with fellow students or the instructor, and learners can create their own podcasts in order to meet the requirements of an oral assignment. Auditory learners benefit from this application because it employs a technology that many of them use frequently. Casey (2008) confirmed this scenario in describing podcasting as a natural fit for Net Generation students because it affords students the opportunity to discuss topics of a class, capture their ideas, and share this recording with the class (Casey, 2008). Faculty have the ability to give students in-depth feedback using podcasting (Essex, 2007). Vodcasts take podcasting to the next level by giving everyone in a class both a face and voice (EDUCAUSE, 2005).

### *Disadvantages*

Similar to most applications, there are a number of drawbacks associated with podcasting. EDUCAUSE (2005) listed several downsides to employing podcasts: (1) it is not intended for two-way communication; (2) significant bandwidth is necessary for downloading a podcast; (3) space is necessary to archive large audio files; and (4) the

audio content is not adequate for the hearing impaired.

Several of the concerns shared about podcasting are even more severe in relation to vodcasting. Large videos (i.e., vodcasts) take up even more space than audio files (i.e., podcasts) and require more bandwidth to download. Those learners and educators that are not tech-savvy might experience frustration as they learn how to generate a vodcast and upload the files to a video-sharing site. Teachers have no way of preventing students from viewing inappropriate material from these video-sharing sites (EDUCAUSE, 2005). Also, copyright policies need to be clarified between institutions and teachers as to ownership of the presentations (Essex, 2007).

### Mobile Learning

The mobile revolution has swept across the United States and most of the world in the last decade. From senior adults to children, this technological wave has influenced every demographic; each year 1.2 billion new phones are sold (Johnson et al., 2009). The genesis of mobile technologies produced new options in the delivery of learning content through new mobile devices such as laptops, PC tablets (i.e., laptops intended for handwriting as opposed to a keyboard interface), PDAs, and mobile phones (Peters, 2007). Peters labeled this delivery method as *m-learning*, and he classified m-learning as being a subset of e-learning (i.e., Web-based teaching).

A recent study by the Pew Internet and American Life Project indicated that many experts believe that by 2020 mobile devices will serve as “the primary connection tool to the Internet for most people in the world” (Anderson & Rainie, 2008, p. 2). This mobile insurgency is appearing increasingly in a number of educational institutions, offering student services and classes online. Recent changes in mobile devices have stimulated a plethora of mobile services for students’ use. Several of the major LMSs have created

mobile versions (Johnson et al., 2009). For example, Blackboard, Desire2Learn, and Moodle all have mobile versions. Mobile class offerings are no longer an anomaly in education.

### *Advantages*

M-learning will likely become a common part of education as the learning management systems (LMS) adopt mobile platforms. Mobile devices have the potential to impact field activities and distributed learning because these devices are always connected to data sources and naturally evolve with market trends and societal needs. Eventually, the ubiquity of mobile devices among learners could provide the impetus for their use in education (EDUCAUSE, 2010).

In addition, mobile learning can already be seen in the workforce and businesses. Peters (2007) described a major electronics retailer that used a mobile learning approach to train new employees. Previously these sales associates were trained off the job via reading material. However, in the new training program, employees were equipped with a barcode scanner and a PDA. Therefore, workers were able to learn about the products in the context of the store (i.e., situated learning).

### *Disadvantages*

Mobile learning does present a number of issues as it relates to hardware (e.g., screen sizes, functionality, or platforms). These issues can be difficult for colleges to address. Standards for m-learning will probably develop slowly because of the number of phone manufacturers and network providers in existence. Also, mobile learning activities are subject to frequent interruptions, so students might be less prone to engage in a mobile activity that requires a long period of time. In addition, the cost of data plans

and smartphones limits the number of users in m-learning, and battery life is a concern (EDUCAUSE, 2010).

Kukulska-Hulme (2007) argued that usability is one of the shortcomings of existing computer technology and software. Having said that, one caveat in mobile technology is that it develops at such a rapid pace that users barely get to know current devices before a new version appears on the market. She also pointed out that some extraneous issues are a hindrance to m-learning (e.g., memory limitations or charge time).

## APPENDIX C

## INSTITUTIONAL REVIEW BOARD APPROVAL



**INSTITUTIONAL REVIEW BOARD**  
118 College Drive #5147 | Hattiesburg, MS 39406-0001  
Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

**PROTOCOL NUMBER: 11111503**  
**PROJECT TITLE: Social Networking Systems as a Vehicle to Promote Sense of Community in Online Classes**  
**PROJECT TYPE: Dissertation**  
**RESEARCHER/S: Jonathan Woodward**  
**COLLEGE/DIVISION: Colleg of Education & Psychology**  
**DEPARTMENT: Educational Studies & Research**  
**FUNDING AGENCY: N/A**  
**IRB COMMITTEE ACTION: Exempt Approval**  
**PERIOD OF PROJECT APPROVAL: 11/30/2011 to 11/29/2012**

**Lawrence A. Hosman, Ph.D.**  
**Institutional Review Board Chair**

## APPENDIX D

## EMAIL INVITATION TO PARTICIPATE IN STUDY

From: Jonathan Woodward [jonathan.woodward@xxxxx.edu]  
Sent: Friday, January 6, 2012 8:00 AM  
To: student@xxxxx.edu  
Subject: Student Survey on Classroom Community

Dear "Student Name,"

You have been invited to participate in the survey *Student Survey on Classroom Community*. You are being asked to participate in the study because you are currently enrolled in an Art Appreciation course at xxxxx. All students that participate in the study will be entered to win one of two \$50 gift certificates.

Your responses will be kept confidential. Thank you in advance for your consideration to participate.

Click here to do the survey:

<http://research.xxxxx.edu/limesurvey/index.php?lang=en&sid=56579&token=ss688cmj95wv5yw>

All the best,

**Jonathan Woodward**

xxxxxxx

P.O. Box 100

xxxxx, xx xxxxx

xxx.xxx.xxxx

jonathan.woodward@xxxxx.edu

Fax: xxx.xxx.xxxx

APPENDIX E  
INFORMED CONSENT FORM AND COVER LETTER  
THE UNIVERSITY OF SOUTHERN MISSISSIPPI  
CONSENT FORM  
AUTHORIZATION TO PARTICIPATE IN RESEARCH PROJECT

Consent is hereby given to participate in the study titled:  
Social Networking Systems as a Vehicle to Promote Sense of Community and  
Performance in Online Classes

1. **Purpose:** The purpose of this study is to assess students' sense of community, connectedness, learning, and performing in a community college online courses. The study will compare the effect of using social networking systems (SNS) and learning management systems (LMS). You are being asked to be in the study because you are currently enrolled in an online Art Appreciation course at xxxxx. The intent of the study is to improve online instruction, and the results may be published.
2. **Description of Study:** This study will not interfere with class time. Each participant will be asked to complete the Classroom Community Scale at the beginning of the semester and end of the semester, as a pretest and posttest. The Classroom Community Scale should take no longer than 15 minutes to complete. A link to the survey will be delivered to each participant's school email account. The survey will take place in Lime Survey, and each participant will be issued a confidential number after they complete the survey. All information will be maintained in a confidential manner. The confidential number will allow the researcher to connect pretest and posttest results as well as final grades.
3. **Benefits:** Participants of the study have at least two benefits. First, students may experience a higher quality online class because of the delivery method. Second, all students that participate in the study will be entered to win one of two \$50 gift certificates for the pretest and one of two \$50 gift certificates for the posttest. Participants must complete the survey in order to be eligible for the gift certificates.
4. **Risks:** This study will not pose any immediate or long-term risks to participants greater than those faced in normal life.
5. **Confidentiality:** All survey data will be collected through Lime Survey. The only individuals with possible access to the information will be the researcher, members of the dissertation committee, and xxxxx's Vice-President of Instruction, Student Services, and Related Technologies. Lime Survey is a secure application for delivering and retrieving survey data. Lime Survey is password protected. The data for this study will be kept confidential. All data will be housed on a password-protected computer in the researcher's office and will remain there until the results are published.
6. **Alternative Procedures:** Several remedies exist for a participant that does not wish to participate in the study. The individual may remain in the class and simply not participate. The individual may ask to be transferred to a different



section of the class. The individual could withdraw from the class altogether.

7. **Participant's Assurance:** Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted) the researcher will take every precaution consistent with the best scientific practice. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to Jonathan Woodward at xxx-xxx-xxxx. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. A copy of this form will be given to the participant.
8. **Signatures:** In conformance with the federal guidelines, the signature of the participant must appear on all written consent documents. By choosing to accept below, that action will constitute your electronic signature.

---

Signature of Research Participant

Date

---

Signature of the Person Explaining the Study

Date

## APPENDIX F

## CLASSROOM COMMUNITY SCALE AND DEMOGRAPHIC DATA

*Directions:* Please click the button beside the appropriate response.

	1 = 18 to 30 years of age	2 = 31 to 50 years of age	3 = 51 to 70 years of age	4 = 71+ years of age
What is your age?	(1)	(2)	(3)	(4)

	1 = Male	2 = Female
What is your gender?	(1)	(2)

	1 = Caucasian	2 = African American	3 = Hispanic	4 = Asian	5 = Native American Indian	6 = Other
What is your ethnicity?	(1)	(2)	(3)	(4)	(5)	(6)

*Directions:* Below, you will see a series of statements concerning an Art Appreciation course you are presently taking or have recently completed. Read each statement carefully and click the button to the right of the statement that comes closest to indicate how you feel about the course. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, click the button 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.*

	<b>Strongly agree (SA)</b>	<b>Agree (A)</b>	<b>Neutral (N)</b>	<b>Disagree (D)</b>	<b>Strongly disagree (SD)</b>
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)

APPENDIX G  
CHRONOLOGICAL SKETCH OF PERTINENT STUDIES

Author	Year Published	Sample Size/Population	Reliability	Results
Rovai	2002c	n=314/ Undergraduate & Graduate: Face-2-face-Mix of majors	0.93-CCS	43% of variance in perceived cognitive learning accounted for by the two subscales of the CCS.
Graff	2003	n=60/ Undergraduate: Hybrid-Business majors	Not reported	Students with intuitive cognitives styles reported a lower sense of community than students with an intermediate or analytic style. Gender made no difference.
Ouzts	2003	n=227/Graduate & Undergraduate: Hybrid & Online-Mix of majors	0.93-CCS 0.92-connect 0.91-learning	Significant correlations were found between the SCLS and the CCS.
Rovai & Lucking	2003	n=120/ Undergraduates: Traditional & Online- Education majors	0.96-CCS	Significantly lower sense of classroom community among learners in the distance education course (studio audience) versus traditional classroom.
Rovai, Wighting, & Lucking	2004	n=341/Middle school, high school, under-graduate, & graduate: Traditional & Online-Mix of majors	0.84-classroom 0.83-school	Established validity and reliability of the CSCI.

Author	Year Published	Sample Size/Population	Reliability	Results
Rovai & Ponton	2005	n=108/Graduate: Online-Education majors	0.93-community 0.92-connectness 0.87-learning	Student learning and sense of community were highly related in e-learning; African American students scored significantly lower across all five variables than their Caucasian peers, suggesting that the achievement gap that existed in many traditional educational programs also exists in graduate ALN programs and that this gap extended to sense of community.
Rovai & Gallien	2005	n=97/Graduate: Online-Education majors	0.92-community	African-American students had a greater sense of community when in classes that were exclusively made up of African-Americans versus a mixed-race class.
Rovai & Wighting	2005	n=117/Graduate: Online- Research methods classes	0.89-community	Inverse relationship existed between the feeling of community and the feeling of alienation.
Shea, Li, Swan, & Pickett	2005	n=2,036/Undergraduate (4- year & Community College): Online-Mix of majors	0.94-community 0.91connectedness 0.90-learning	A positive relationship existed between teaching presence and the sense of community; this study revealed that a strong and active presence on the part of the instructor was related to students' sense of both connectedness and learning.

Author	Year Published	Sample Size/Population	Reliability	Results
Dawson	2006	n=464/Graduate & Undergraduate: Hybrid-Mix of majors	0.86-connectedness 0.84-learning	Students who communicate more with their peers and teachers felt a higher degree of community.
Ouzts	2006	n=227/Graduate & Undergraduate: Online-Mix of majors	0.93-community 0.90-connectedness 0.89-learning	Web 2.0 technology & constructivist strategies facilitated connectedness. Sense of community was related to satisfaction.
Shea, Li, & Picket	2006	n=1,067/community colleges, 4-year colleges, technical colleges, & graduate students: Online-Technology majors	0.93-community	Relationship existed between teaching presence & the sense of community; increased sense of community when the instructor reinforced student contributions, confirmed student understanding, & injected their own knowledge.
Liu, Magjuka, Bonk, & Lee	2007	n=27/Graduate: Online-Business majors	0.91-community	Positive relationships between sense of learning community and perceived learning engagement, course satisfaction, and learning outcomes.
Spinks	2007	n=58/Undergraduate: Online-Mix of majors	0.85-community 0.94-connectedness 0.88-learning	Overall sense of community had no direct effect on GPA, but it did have indirect effect on GPA when mediated by academic self-efficacy; the model accounted for 22% of variance in GPA. Learning subscale of CCS had both indirect & direct effect on GPA.

Author	Year Published	Sample Size/Population	Reliability	Results
Dawson	2008	n=464/Graduate & Undergraduate: Hybrid-Education majors	0.90-community 0.86-connectedness 0.84-learning	Individual's pre-existing external SNS experience influenced the type of support and information exchanges an individual required and, therefore, the degree of sense of community ultimately experienced.
Smith	2008	360/ Community-Technical College: Hybrid/Computer Mediated Instruction: (CMI)-Mix of majors	0.88-connectedness 0.81-learning	Significant difference in the perception of social community in CMI environment by learners possessing different learning preferences; this perception was a self-fulfilling phenomenon.
Jinks	2009	115/Graduate & Undergraduate: Online-Education majors	Multiple linear regression, correlation, t-test, & ANOVA	Teaching presence and the sense of community had the ability to predict 45.1% of the variance of perceived student learning.
Ferguson	2010	n=184/ Community-Technical College: Online-Humanities & Science	Not reported	Podcasting had a significant impact to improve perception of connectedness and continuing in course. Podcasting had no impact on student perception of learning.

Author	Year Published	Sample Size/Population	Reliability	Results
Hung & Yuen	2010	n=72/Taiwan University (Level not given): Hybrid-technology majors	Not reported	Participants had an overwhelmingly positive response toward SNS as a supplement to regular face-to-face courses. SNS opened opportunity for informal and professional learning, which led to additional learning opportunities.
Yuen & Yang	2010	n=30/Graduate (1/2 American & 1/2 Hong Kong): Hybrid-technology majors	0.93-community 0.92-connectedness 0.87-learning	Using a SNS in a class built a sense of community among learners and was a positive experience for students; SNS was user-friendly & gave students a sense of belonging; students were more actively involved in course. SNSs promoted collaboration & learning-centered activities.



## APPENDIX H

## DESCRIPTIVE STATISTICS FOR ITEMS ON CLASSROOM COMMUNITY SCALE

	Pretest			Posttest		
	n	Mean	SD	n	Mean	SD
1. Care about each other	153	2.405	0.892	91	2.582	0.920
2. Encouraged to ask questions	153	3.118	0.959	91	3.000	1.075
3. Feel connected to others	153	2.288	0.908	91	2.396	1.053
4. Hard to get help	153	2.987	1.112	91	2.967	1.140
5. Feel a spirit of community	153	2.516	1.033	91	2.593	1.164
6. Timely feedback	153	3.026	0.917	91	3.110	1.059
7. Course is like a family	153	2.105	0.968	91	2.088	1.092
8. Uneasy exposing gaps	153	2.719	1.035	91	2.802	1.067
9. Feel isolated in course	153	2.850	1.056	91	2.901	0.989
10. Reluctant to speak openly	153	2.732	1.192	91	2.714	1.138
11. Trust others in course	153	2.425	0.817	91	2.593	0.919
12. Course results in modest learning	153	2.360	1.068	91	2.429	1.045
13. Can rely on others in course	153	2.275	0.954	91	2.429	1.087
14. Other students do not help me learn	153	2.490	0.994	91	2.505	1.068
15. Members depend on me	153	1.379	0.903	91	1.473	1.015
16. Given ample opportunities to learn	153	3.177	0.933	91	3.033	1.038

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	Pretest			Posttest		
	n	Mean	SD	n	Mean	SD
17. Feel uncertain about others	153	2.569	0.930	91	2.418	0.932
18. Educational needs are not being met	153	3.098	1.044	91	3.022	1.075
19. Others will support me	153	2.549	0.946	91	2.637	0.961
20. Does not promote desire to learn	153	3.157	0.940	91	3.011	1.038

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