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Exploring the relationship between attitude towards collaborative learning and sense of community among college students in online learning environments: A correlational study

by

Ritushree Chatterjee

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Education (Curriculum and Instructional Technology)

Program of Study Committee:

Ana-Paula Correia, Major Professor
Larysa Nadolny
Michael Thompson

Iowa State University

Ames, Iowa

2015

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DEDICATION

I would like to dedicate this thesis to my beloved Mom whose memories I will forever cherish in my life, whose strength and grit I will forever yearn to imbibe and whose selflessness, I will always strive for. I so very miss you, Mumma!

I would also like to dedicate this to my loving Grandmother, my Thakuma, whom I lost as I was writing this thesis. Both these wonderful women have left behind an irreplaceable mammoth emptiness. I will always look up to them for comfort and solace to move ahead in this journey of life.

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ABSTRACT

As online courses become increasingly common, we must ensure that the students in the virtual classroom experience a nurturing sense of community. Feelings of community increase information flow, cooperation, available support, and a sense of commitment towards group goals. Many studies have explored the significance of sense of community and collaborative learning activities in an online learning environment. The aim of this study, however, was to find a relationship between student attitude toward online collaborative learning and their sense of community in an online environment.

Using a correlational study, the relationship between students' sense of community and their attitude toward online collaborative learning was determined. Collaboration and sense of community were moderately correlated, whereas, Pearson's product-moment correlational coefficient was, $r(198)=0.672$, $p<0.01$. As collaboration increased, students' sense of community increased proportionally. Moreover, it was also noticed that the degree of correlation between sense of community and collaborative learning was higher among graduate students when compared to that of undergraduate students. Furthermore, a higher degree of correlation also existed between a positive attitude towards collaborative learning and the dimensions of sense of community when compared to that between a negative attitude towards collaborative learning and sense of community.

The findings in this study will aid educators and instructional designers to rethink the design of their online courses to incorporate elements of collaborative learning and

strategies to develop a sense of community, which, in turn will help in increasing the learner satisfaction and learning outcomes in such courses.

CHAPTER 1

INTRODUCTION

Online learning has revolutionized the learning sector with new paradigms, pedagogies, and technologies employed to enhance student learning through course design and development. The proportion of students in higher education taking at least one online course is at an all-time high at 33.5% (Allen & Seaman, 2014). Many research studies show that a well-designed online course is no different than a face-to-face experience regarding its effectiveness (Clark, 1983; Russel, 1999; Johnson, Aragon, & Shaik, 2000). However, there are different perceptions among learners regarding their experience with online learning. These perceptions, if negative, can contribute to higher dropout rates (Carr, 2000), low motivation (Keller & Suzuki, 2004; Maltby & Whittle, 2000) as well as lower learner satisfaction in an online learning environment (Kenny, 2003). It is, therefore, paramount to look into the aspects of online learning that positively influence student retention, and learner motivation and satisfaction.

Research has shown that online learning is more successful when learners and instructors engage in participation and collaboration (Bento & Schuster, 2003). The results of a study by Fredericksen, Picket, Shea, Pelz, & Swan (2000), indicated three factors for effective online learning. There are (1) interaction with the teachers; (2) levels of participation when compared to a face-to-face class; and (3) interaction with classmates. This is further supported by another study that was spread over a period of three years and involved 26 online courses (Hiltz, Coppola, Rotter, Turoff, & Benbunan-Fich, 2000). Findings

of this study indicated that learners in asynchronous learning networks and working in teams increased the overall perception of learning than learners who were working alone and online. Additionally, semi-structured interviews with experienced instructors in asynchronous online learning, indicated a strong association between online discussions and learning outcomes of the student, as good or better than those in face-to-face class. It can be concluded that the learning outcomes of learners when actively involved in online collaborative activities, can be as good as or better than those in a traditional classroom setting.

It is also equally important to nurture and foster a feeling of sense of community among online learners in order to increase persistence in online learning and enhance learner satisfaction. Such strategies provide students with affective support that decreases the feelings of isolation by means of interaction with fellow learners (Rovai, 2002). Integration of online learning communities into online learning has positive outcomes such as reduction in the attrition rates associated with online learning (DiRamio & Wolveton, 2006). Rovai (2002) explained "Online learners who have stronger sense of community and perceive greater cognitive learning should feel less isolated and have greater satisfaction with their academic programs, possibly resulting in fewer dropouts" (p. 319).

Purpose of This Study

The main purpose of this research was to determine a correlational relationship between students' attitude towards collaborative learning and sense of community among online learners in an online learning environment in higher education. It is assumed that

students who participated in this study were representative of U.S. college students taking online classes. This study was conducted in a large Mid-Western research university. It consisted of three phases. The first phase was the mini-pilot study mainly aimed at testing the mechanics of the research design, specifically, procedures adopted for data collection and analysis. The second phase was the pilot study aimed at validating the questionnaire instrument employed to collect data. The third and the final stage was the main study where a self-reported questionnaire was employed to collect data. Data were analyzed to answer the following research questions:

1. Is there a correlation between students' attitude towards collaborative learning and sense of community in asynchronous online learning environments?
2. What is the nature of the correlation that exists between students' attitude towards collaborative learning and sense of community in asynchronous online learning environments?

Working Definitions Used in the Study

As mentioned above, this study explores two main constructs; namely, students' attitude towards collaborative learning and sense of community and how these two factors co-relate when present in conjunction with each other in an online course.

Collaboration is considered to be a way of life "where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers" (Laal & Ghodsi, 2012, p. 486). Laal and Ghodsi (2012) further stated "The underlying premise of collaborative learning is based upon consensus building through cooperation by

group members, in contrast to competition in which individuals best other group members” (p. 486). Zhu (2012) explained “Collaborative learning is a social interaction that involving a community of learners and teachers, where members acquire and share experience or knowledge” (p. 128).

In an online learning environment mediated by technology, online collaborative tools such as Google Docs, Wikis, and discussion boards are employed by instructors to facilitate such collaboration, specifically among peers. The attitude of learners towards using these tools plays a crucial role in the success of collaborative activities, which drives the collaborative learning. In the context of this study, collaborative learning is equated to the attitude of the learners, both positive and negative, towards online collaborative tools used for peer-to-peer interaction, for accomplishing collaborative activities as part of an online course.

According to McMillan and Chavis (1986) 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). In the online context, sense of community is often termed as the sense of virtual community, defined as “members’ feelings of membership, identity, belonging, and attachment to a group that interacts primarily through electronic communication” (Blanchard, 2007, p. 827).

In this study, the sense of community is equated to sense of virtual community. It is primarily based on the four dimensions cited by McMillan and Chavis (1986); namely,

influence, integration and fulfillment of needs, membership and shared emotional needs as described in detail in Chapter 2.

Definition of Terms

The following terms are commonly used in this study. The working definitions, as appropriate, are also stated:

Asynchronous learning network

“Asynchronous learning networks (ALNs)—people networks for anytime, anywhere learning via the Internet” (Rovai, 2002, p. 320).

Sense of community

For the purpose of this study, sense of community is defined as students’ feelings of connectedness with other learners, in a setting where learners interact primarily through electronic communication specifically using online collaborative tools such as discussion boards, Wikis, blogs, and Google Docs, to accomplish the assigned graded collaborative activity.

Attitude toward collaborative learning

This means students’ attitude, whether positive or negative, towards using online collaborative tools such as Wikis, blogs, and discussion boards, when engaging in peer-to-peer interaction for a graded collaborative activity in an online course.

Online collaborative activities

Graded activities, performed either in groups or as a whole class which necessitates and encourages peer-to-peer interaction using online collaborative tools such as discussion boards, Wikis, blogs, and Google Docs for its successful completion in an online course.

Online cooperative learning application scale (OCLA)

“Online cooperative learning application (OCLA) can be defined as an environment that is a learning-teaching process in an online area. A cooperative learning attitude can be defined as an inward feeling expressed by outward behavior on this strategy which involves students in established, sustained learning groups or teams” (Korkmaz, 2012, p. 1163).

Content validity

Content validity is “the degree to which individual items represent the construct being measured, and cover the full range of the construct” (Field, 2009, p. 12).

Reliability

Reliability refers to “whether an instrument can be interpreted consistently across different situations” (Field, 2009, p. 11).

Internal consistency

Internal consistency refers to “the homogeneity of the items within a scale” (DeVellis, 2003, p. 27).

Questionnaire

It is defined as “a means of eliciting the feelings, beliefs, experiences, perceptions, or attitudes of some sample of individuals. It is a very concise, preplanned set of questions

designed to yield specific information to meet a particular need for research information about a pertinent topic” (Key, 1997, para. 1).

Significance of the Study

Students’ attitude towards collaborative learning and sense of community both play a significant role in online learning, specifically, when it comes to learning outcomes and learner motivation and satisfaction. However, there is a gap in the literature regarding the nature of the relationship between the two said factors. Correlational studies play an important role in educational research exploring the nature of relationship among variables, which, thereafter, can be used to make predictions. Variables that are related can further be examined on cause-effect studies. Furthermore, once a relationship is determined, it can be used to propose a theoretical model (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005). Gay and Airasian (2000) stated “Correlational research involves collecting data in order to determine whether, and to what degree, a relationship exists between two or more quantifiable variables. The purpose of a correlational study is to determine relationships between variables or to use these relationships to make predictions” (p. 321-322). Besides, correlational relationships can further be used to propose theoretical models. Thompson et al., (2005) explained:

Nevertheless, in at least two ways correlational evidence can be used to inform causal inferences and thus evidence-based practice. The first approach is statistically based, and involves statistically testing rival alternative causal models, even though the design is correlational. The second method is logic based and invokes logic and

theory with non- experimental data in an attempt to rule out all reasonable alternative explanations in support of making a single plausible causal inference. (p. 182)

This study aims at identifying and exploring the relationships, if any, between sense of community and students' attitude towards collaborative learning. The study of such a relationship is expected to shed light on the interplay of attitude towards collaborative learning and sense of community and how this influences the online learning experience, specifically related to learner satisfaction and learning outcomes. This will lay a foundation for future research work in this area and inform educators and instructional designers about better online course design to enhance student learning and satisfaction.

Thesis Outline

The rest of the thesis is divided into four chapters each chapter elucidating different aspects related to the research study. Chapter 2 provides the review of relevant literature on collaborative learning, students' attitude towards collaborative learning and sense of community and their available measures when employed in online learning environments. It also describes the gap in the literature and the significance of this study in supplementing the existing literature. Chapter 3 enunciates all the methodology adopted in conducting this study. It discusses the detailed procedures regarding participants' selection and recruitment, data collection, analysis, and the evolution of the questionnaire instrument used in the three phases of this study. Chapter 4 presents the results of the three phases of

this study. Lastly, Chapter 5 discusses the results and concludes this thesis with a summary, limitations of the study, and directions for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

Online education has revolutionized the practices of teaching and learning, opening doors for many new strategies, pedagogies, and technologies as well as presenting educators a vast research potential (Moeller, Foshey, & Huett, 2008). With the advent of the Internet and other web-based technologies, it has become increasingly simple to reach out to learners who are geographically distributed and value learning anywhere and at anytime. Online education provided institutions of higher education a low cost and flexible way to reach out to a global audience (Casey, 2008). Modern day online learning has a vast number of ways to share resources and technologies that make interaction between the instructor and learners as well as among learners seamless. This includes both real-time and asynchronous communication (Branon & Essex, 2001).

According to Allen and Seaman (2014), “The increase from 1.6 million students taking at least one online course in fall 2002 to 7.1 million for fall 2012 represents a compound annual growth rate of 16.1 percent” (p. 15). Furthermore, they stated, “There were 412,000 more online students in fall 2012 than in fall 2011, for a new total of 7.1 million students taking at least one online course” (p. 15). Often times, student enrollment also depends on the availability of online courses and programs (Belcher, 1995; Martin 1996). Along these lines, Cantelon (1995) claimed, “most of higher education will take place off-campus through technological methods of delivery” (p. 5). With this new wave of online

learning sweeping the educational practices, pedagogy, and mode of learning – it becomes necessary to generate an interest among educators and learners regarding the online learning environments and the learning possibilities that can be attained using these.

However, this accelerated growth in online learning is also accompanied by the menace of attrition with ample evidence to support that attrition rates for online courses is much higher than their face-to-face counterparts (Rovai, 2003; Diaz & Carnal, 2006; Patterson & McFadden, 2009). It has been noted that online learners face many challenges such as feeling of isolation, lack of support, and feelings of disconnectedness (Angelino, Williams, & Natvig, 2007; Kanuka & Jugdev, 2006). Many strategies have been employed to reduce and tackle the dropout rates in online courses with one of them being the integration of learning communities in online courses.

Rovai (2002) explained “Research provides evidence that strong feelings of community may not only increase persistence in online courses, but may also increase the flow of information among all learners, availability of support, commitment to group goals, cooperation among members and satisfaction with group efforts” (p. 3). It has been further studied that integrating online communities into the online learning environment has helped reduce the dropout rates and it “can help meet the quality challenges” (DiRamio & Wolverton, 2006, p. 111).

Another contributing factor for student satisfaction and low dropout rates is interaction (Bolliger & Martindale, 2004). An activity in an online course that provides opportunity to learners to work together collaboratively helps reduce the feelings of isolation (Wikeley & Muschamp, 2004). “Access to education should not mean merely

access to content (which is readily available without formal enrollment with an educational provider); rather, it should mean access to a rich learning environment that provides opportunity for interaction and connectedness” (Brindley, Blaschke, & Walti, 2009, p. 2).

Hence, it is seen that interaction and nurturing a sense of community play an important role in an online learning environment. In the following sections, these two aspects of online learning will be discussed in greater depth.

Social Learning

There have been different perspectives and theories that capture the ways people learn. It is equally important to define the term learning. Learning, in the context of this study, is the process of gaining knowledge and/or developing skills through formal or informal practices that lead to cognitive, affective and/or psychomotor changes.

In the beginning of 1900s, the constructivist learning theory gained popularity among educators. This theory postulated that a teacher’s role was that of a facilitator and should assist the learners in gaining experiences rather than merely transferring of knowledge (Duffy & Jonassen, 1992). Learning is the individually and/or socially based construction of knowledge resulting from learners’ interpretations of experiences around them. Instruction is to process of engaging learners in meaning making (knowledge construction)(Jonassen, 1999).

Piaget’s (1953) theory of cognitive constructivism focused on the how an individual constructed knowledge. His theory elucidated that humans could not be flooded with information and left to understand its intended use; rather they must construct their own

knowledge. The constructivist approach moved away from the more traditional knowledge transfer models to more active learner models. However, it still considered the learner to learn in isolation away from others (Edelson, Pea, & Gomez, 1996).

Vygotsky (1978) was the founding father of the social constructivism and sociocultural theory and mainly studied learning in young adults. He stated, "learning is a necessary and universal aspect of the process of developing culturally organized, specifically human psychological function" (p. 90). Vygotsky's (1978) stand on learning was the following:

Learning awakens a variety of internal development processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers...Learning is not development; however, properly organized learning results in mental development and sets in motion a variety of developmental processes that would be impossible apart from learning. Thus learning is a necessary and universal aspect of the process of developing culturally organized, specifically human, psychological functions (p. 90).

Vygotsky further stated "Zone of proximal development" played an important role in Vygotsky's socio-cultural theory. It stated that a learner could not understand a new concept all by himself, rather would require the feedback from a teacher or peer to aid his or her own understanding (Vygotsky, 1978). In other words, he believed that social learning preceded development in a child. He considered social interaction to play an integral part in learning as well as in cognitive development. Vygotsky (1978) further explained that as the relationship between individuals shaped up, it led to the development of higher order

functions. He believed that a grasping and understanding of knowledge occurred more effectively when there was social interaction. Vygotsky's social cultural theory laid emphasis on the role of interpersonal interactions of individuals through cultural tools, language development and social experiences (Schunk, 2008).

Such theories that emphasized on the social perspective of learning also suggested that learning was achieved via dialogues that included both internal dialogues and those through social negotiations (Jonassen & Land, 2000). Garrison (1993) further approached interaction and stressed "learners attempt to interpret, clarify and validate their understanding through sustained dialogue (*i.e.*, two-way communication) and negotiation" (p. 202).

Types of interactions

In the context of online learning, interaction is considered to be paramount for a satisfying learning experience (Swan, 2002). The crux of the seven principles that Chickering and Gamson (1987) laid out regarding best practices in undergraduate education was interaction as well. Thurmond (2003) defined interaction as:

The learner's engagement with the course content, other learners, the instructor, and the technological medium used in the course. True interactions with other learners, the instructor, and the technology results in a reciprocal exchange of information. The exchange of information is intended to enhance knowledge development in the learning environment. Depending on the nature of the course content, the reciprocal exchange may be absent – such as in the case of paper

printed content. Ultimately, the goal of interaction is to increase understanding of the course content or mastery of the defined goals (p. 4).

A meta-analysis by Bernard *et al.*, (2009), summarized the findings from 74 empirical studies and gathered support for the importance of interaction in online learning. Researchers found an overall positive weighted average effect size of 0.38 for learning outcomes favoring more interactive activities over less interaction. Furthermore, their results also supported the importance of three types of interactions: (1) between students and instructors, (2) among students, and (3) between students and the content.

Correia and Yusop (2012) described the following interactions in online learning:

A) Learner-Instructor interaction: meaning the interaction between the instructor and a learner or learners. B) Learner-Learner interaction: as the interaction among the learners. C) Learner –Self interaction: described as the “learner’s reflections on the content, learning process, and new understanding” (Soo & Bonk, 1998, p.3). D) Learner-Content interaction: since the content can “be said to influence and likewise be influenced through people’s creation, action upon, and cognitive interpretation of that phenomenon” (Scheel & Branch, 1993, p. 9) (p. 19).

Moore and Kearsley (1996) also emphasized the presence of the learner-learner, learner-instructor, and learner-content. In addition, interaction between learners and the interface, learner-interface interaction, is also considered important in the online learning environment as the learner needed to interact with the medium as well (Hillman, 1994). Similar categorization was also provided by Choi, Leem, and Lim (2002) who divided the interactions into “content-centered academic interaction which occurs between learners

and instructor or between learners and online resources; collaborative interaction among learners; and social interaction between learners and instructor” (p. 153).

Collaborative learning

Soo & Bonk (1998) rated asynchronous learner-learner interaction as the most important interaction in the online learning. One of the many ways of stimulating a higher rate of interaction among learners in online learning that will also increase the quality of their learning experience is by implementing collaborative learning. Collaborative learning is primarily based on the premise that learning is social rather than an individual endeavor (Bonk & Cunningham, 1998). Dillenbourg (1999) described that collaborative learning is “a situation in which two or more people learn or attempt to learn something together” (p. 1). He further stated “collaborative learning encapsulated four aspects of learning; namely, a situation, interactions, learning mechanisms and measurement of the effects of collaboration” (p. 6).

Collaborative versus co-operative learning

There has often been an inherent conflict with the use of the terms collaborative and cooperative learning. These two teaching strategies are conveniently used interchangeably. Dillenbourg and Schneider (1995) distinguished between collaborative and cooperative learning. They described collaborative learning as situations “in which two or more subjects build synchronously and interactively a joint solution to some problem” (Shared cognitive load, para. 1). In contrast, cooperative learning was “a protocol in which

the task is in advance split into sub-tasks that the partners solve independently”

(Shared cognitive load, para. 1). In cooperative learning, the learners would divide a given task, work independently on their respective parts, and then combine their work for the final product. However, collaborative learning puts greater significance to the quality of exchanges that take place in a collaborative environment between groups of learners. In collaborative space, learning occurs socially through construction of knowledge. The members of the concerned collaborative space engage in group interactions, mainly sharing and negotiations, related to a shared task (Roschell & Teasley, 1995). They engage in valuable discussions related to the shared task. Furthermore, Panitz (1999) defined the terms as:

Cooperation is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through people working together in groups;

Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers (p. 3).

Despite the established differences between collaborative and cooperative learning, it is important to understand that there is no clear universally accepted definition of the two approaches to teaching and learning. It, more often than not, depends on the prerogative of educators and educational researchers, who have different perspectives, goals, and purposes. However, the commonalities between the two concepts are far greater than the differences between them. Kirschner (2001) described some common elements between cooperative and collaborative learning:

Learning takes place in an active mode; the teacher is more of a facilitator than a “sage on the stage”; Teaching and learning are shared experiences between teachers and students; Students participate in small-group activities; Students must take responsibility for learning; Discussing and articulating one’s ideas in a small group setting enhances the ability to reflect on his or her own assumptions and thought processes; Students develop social and team skills through the give-and-take of consensus- building; Students profit from belonging to a small supportive academic community (p. 4).

Essentially, collaborative learning can be viewed as an umbrella approach to teaching and learning that encompasses the essence of cooperative learning as well (Laal & Laal, 2012). Laal and Laal (2012) further explained that collaborative learning proposed a way of dealing with people that emphasized individual abilities and contributions.

There are many benefits of collaborative learning to the learner. It not only promotes learner-learner interaction but also promotes high-level learning, critical thinking, shared understanding, and long-term retention of the learned material (Garrison, Anderson, & Archer, 2001). There are studies where students participating in online collaborative learning were more satisfied with their learning process than the ones who did not participate in online collaborative learning (Jung, Choi, Lim, & Leem, 2002). Laal and Ghodsi (2012) further categorized the benefits of collaborative learning (CL) into social, psychological, academic, and assessment:

Social benefits

- CL helps to develop a social support system for learners;

- CL leads to build diversity understanding among students and staff;
- CL establishes a positive atmosphere for modelling and practicing cooperation, and;
- CL develops learning communities.

Psychological benefits;

- Student-centered instruction increases students' self-esteem;
- Cooperation reduces anxiety, and;
- CL develops positive attitudes towards teachers.

Academic benefits;

- CL Promotes critical thinking skills;
- Involves students actively in the learning process;
- Classroom results are improved;
- Models appropriate student problem solving techniques, and;
- CL is especially helpful in motivating students in specific curriculum

Alternate student and teacher assessment techniques;

- Collaborative teaching techniques utilize a variety of assessments (p. 487).

Online Collaborative Learning

Online collaborative learning was defined as a learning process where two or more people work together to create meaning, explore a topic, or improve skills (Harasim, Hiltz,

Teles, & Turoff, 1995). There are various advantages of online asynchronous collaborative learning such as: it helped learners gain complex concepts and skills (Abrami & Bures, 1996), it gave them the time and flexibility to read, reflect, and compose responses (Abrami & Bures, 1996), and it brought forth various explanations and perspectives (Laurillard, 2002). Technology-mediated tools have been used to support collaboration online, these include, tools such as Wikis, blogs, discussion boards, and Google Docs.

There have been many studies on how such collaborative tools have been used in online learning to enhance student learning (Boulos, Maramba, & Wheeler, 2006; Kai-Wai, Chu, & Kennedy, 2011). Hsu, Ching, and Grabowski (2014) explored “learning through collaboration (LtC)” (p. 747) and stated “From the perspective of LtC, language is the most powerful tool because it serves as the instrument for interpersonal or social means to negotiate and create meaning during the learning process. Learning platforms that allow for exchanging ideas easily regardless of format (*e.g.*, text or audio) during the process would be most ideal from this perspective” (p. 748).

Top (2011) introduced the idea of how students' learning processes are positively influenced by online team blog assignments. Blogging allowed students to process their ideas and exchange information. Wikis have also been explored as a successful medium for online collaboration as well as an e-learning tool (Augur, Raitman, & Zhou, 2004). More recently, Augustus (2010) investigated *VoiceThread* to promote collaboration and social interaction. He found that the online collaborative technology “a) supports students' reflections concerning their own and others' thoughts and emotions, b) supports individual students and integrates them into a work group, and c) develops students' identification

and awareness in relation to self, a task and others” (p. 197). Discussion boards have also been used to implement online collaborative learning. Revere and Kovach (2011) explained that “Discussion boards promote student engagement and peer interaction by providing (1) a mechanism for students to increase their knowledge through student driven content and/or (2) a forum for peer review and exchange that creates a supportive climate within online classes” (p. 115). The established benefits of online collaborative learning include factors such as fostering relationships, building of self-esteem, encouraging critical thinking, and reducing anxiety, among others (Panitz, 1999).

In this study, collaborative learning is defined as the students’ attitude, whether positive or negative, towards using online collaborative tools such as Wikis, blogs, and discussion boards, when engaging in peer-to-peer interaction for a graded collaborative activity.

Measurement of online collaborative learning

Educational researchers have taken various approaches to assessing and measuring collaborative learning in an online learning environment. Conrad (2009) has talked about peers assessment, self-assessments, and multiple perspective assessment, both formative and summative, to evaluate online collaborative learning. Kreijns, Krishner, Jochems, and Buuren (2007) explored the sociability of a computer supported collaborative learning (CSCL) environment. Researchers studied the ability of CSCL to provide a sound social space for collaboration. The study constructed and validated a one-dimensional 10-item sociability scale that measures the sociability of computer supported collaborative environments.

Kreijns *et al.* (2007) defined sociability as “the extent to which a CSCL environment is perceived to be able to facilitate the emergence of a sound social space with attributes as trust and belonging, a strong sense of community, and good working relationships” (p.179). A study on the efficacy of collaborative learning in face-to-face and online environments concluded that online collaborative learning was as efficient as in face-to-face environment in developing social presence, increasing professional competencies, and self-efficacies (Francescato *et al.*, 2006). They adopted many data collection instruments, such as, the Social Presence Scale (Cuddetta, Francescato, Porcelli, & Renzi, 2003), Cooperativeness Scale (Lu & Argyle, 1991) and the Scale of Work Satisfaction (Keyton, 1991).

It is also important to note that implementing collaborative learning online inherently implies the use of Internet based technologies and tools. Such tools include; for example, Wikis, Google Docs, Blogs, and Discussion Boards, which help create a social environment where students can participate actively, understand and improve themselves through collaboration (Biasutti & Deghaidy, 2012). In this regard, it is also important to note that successful collaboration depends on the attitude of learners towards these collaborative tools. However, there is a lack of literature that deals with measurement of such attitudes.

Korkmaz (2012) developed a valid and reliable attitude scale for measuring the attitude of students towards such online tools. He stated “cooperative learning attitude can be defined as an inward feeling expressed by outward behavior on this strategy which involves students in established, sustained learning groups or teams” (p. 1163). He further defined online cooperative learning application as “an environment where learning-teaching

process in an online area” (p. 1163). The author validated the online cooperative learning application scale where he measured students’ attitude towards using online tools. The scale consisted of seventeen items and grouped into positive attitudes and negative attitudes of students towards online cooperative learning tools (see Table 1.1).

Table 1.1: The online cooperative learning application scale by Korkmaz

Factor analysis results of the scale as per factors			Common Factor Variances	F1	F2
Items					
Positive attitude	11	I enjoy solving problems regarding the group project using Online Cooperative Learning Application (OCLA) with my group members.	0.480	0.657	
	12	Being interactive with other group members using OCLA increases my motivation for learning.	0.487	0.640	
	13	I enjoy experiencing cooperative learning using OCLA with my group members	0.558	0.707	
	14	Online group activity increases our creativity.	0.560	0.716	
	15	I believe that the group can work on a document effectively with the online cooperative learning application.	0.436	0.654	
	16	OCLA improves my social skills	0.470	0.676	
	17	I enjoy helping others in OCLA.	0.452	0.641	
	18	OCLA is very entertaining for me.	0.540	0.727	
	19	OCLA helps me feel better psychologically.	0.519	0.700	
	110	More ideas come up as a result of OCLA.	0.486	0.656	
	111	I think that I have had/will have more successful results since I work with a group in OCLA.	0.544	0.659	
Negative attitude	112	Trying to teach something to my group members in OCLA makes me tired.	0.526		0.723
	113	OCLA does not make any sense to me.	0.653		0.773
	114	I cannot develop my own ideas in OCLA.	0.521		0.684
	115	I don't like that people are depending on me in OCLA.	0.483		0.672
	116	I don't think that my interaction with my group members in OCLA will make any contribution to me.	0.469		0.661
	117	OCLA is not suitable for me.	0.570		0.659
Eigenvalue				5.340	3.415
Explained Variance				31.410	20.086

As seen in the above discussion of the literature, the constant denominator in online collaborative learning is interaction between peers. This interaction is a crucial component of another aspect of online learning, that is, a sense of community. Pallof and Pratt (2005) observed that community and collaboration have a cyclical relationship and they support the formation of one another.

Sense of Community

Gusfield (1975) differentiated between the uses of community in two separate contexts. These were the geographical and territorial communities such as towns or neighborhoods. The other being the relational community, concerned with “quality of character of human relationship” (p. 16), without any reference to its physical location. It is also to be noted that these two definitions are not mutually exclusive and, more often than not, they do cross paths. Willmott (1986) also offered three definitions of community which are quite similar to the one mentioned above. He defined community as “Community of locality: defined by where we live, our neighborhood; Community of attachment: a measure of the level of interaction with others, and the sense of identity; Community of interest: a group of people with common interest” (p. 14).

Sense of community, in general, 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 commitments to be together” (McMillan & Chavis, 1986, p. 9). According to McMillan and Chavis (1986), sense of community has four dynamically interacting dimensions; namely, membership, influence, integration and fulfillment of needs, and shared emotional connection. These four dimensions are described as:

- (1) Membership: Membership to a community “has five attributes: boundaries, emotional safety, a sense of belonging and identification, personal investment, and

- a common symbol system. These attributes work together and contribute to a sense of who is part of the community and who is not” (McMillan & Chavis, 1986, p. 11).
- (2) Influence: “Influence refers to the members’ perception of impact on the community (which makes a community attractive for formative members), and the amount of influence the community has over the individual member (which fosters a community’s cohesiveness and conformity)” (Abfalter, Zaglia, & Mueller, 2012, p. 400).
 - (3) Integration and fulfillment of needs: This is primarily based on the idea that reinforcement, benefits, and rewards are necessary to being a part of a community and for a positive sense of togetherness (McMillan & Chavis, 1986).
 - (4) Shared emotional connection: “Shared emotional connection derives from a shared community history, shared events, positive interaction, and identification with the community” (Abfalter *et al.*, 2012, p. 401). McMillan and Chavis (1986) explicated that the more people interact with one another, the greater likelihood of a relationship and subsequent stronger bond.

Some also define sense of community as a result of interaction by people who have common goals and interests (Westheimer & Kahne, 1993). It can also be perceived as an environment where people interact cohesively and reflect upon the work of the members along with respecting the differences various members bring to the table (Graves, 1992).

Sense of community in online learning environments

Studies have indicated that sense of community is an indicator of success of offline communities, in which people interact face-to-face (Chavis & Wandersman, 1990; McMillan & Chavis, 1986; Burroughs & Eby, 1998). It has been found to increase participation and feelings of belonging (Felton & Shin, 1992) along with an increase of involvement and coping with a problem in a focused manner (McMillan & Chavis, 1986). This understanding of the sense of community as an enabler has, in turn, increased the value of sense of community in the online environment, where it is often, termed as sense of virtual community. It is defined as “members’ feelings of membership, identity, belonging, and attachment to a group that interacts primarily through electronic communication” (Blanchard, 2007, p. 827).

Rovai (2002) identified four essential characteristics of sense of learner community; namely, spirit, trust, interaction, and commonality of learning goals and expectation. He further suggested that a sense of community in the virtual world could be proposed by attending to seven factors. These seven factors are described as the following:

- (1) Transactional distance: This is the communication gap between the learners and the instructors in an online learning environment. Transactional distance was the interplay of three factors, which were, course structure, dialogue between instructors and learners and the autonomy of the learner, that is, the ownership of learning by the learner (Moore, 1993). Lesser transactional distance in online course would contribute more towards sense of community among learners.

- (2) Social presence: Gunawardena and Zittle (1997) state that social presence is “the degree to which a person is perceived as a ‘real person’ in mediated communication” (p. 9). Rovai (2002) stated that in computer mediated medium were less personal, lacked social cues and hence diminished social presence than in face-to-face classes. Hence, it was essential that online course instructors take into account strategies that would increase social presence in their courses.
- (3) Social equality: An authoritative and domineering stance by a learner in social interactions could diminish social equality in online course environments and decrease the sense of community. Course instructors should devise mechanisms to counter such a threat.
- (4) Small group activities: Learners working together in smaller groups enhances the interaction between them and leads to a higher sense of community. Rovai (2002) stated “Augmenting individual learning activities with small group activities promotes a sense of community by helping students make connections with each other” (p. 9).
- (5) Group facilitation: Rovai (2002) further stated the importance of facilitating and maintaining a group for achieving a particular task and to promote a sense of community.
- (6) Teaching style and learning stage: The teaching style of the instructor and the expectation of the learner is bound to play a role in building a sense of community. A sense of community would be supported in an environment where there would be an alignment between these two factors (Rovai, 2002).

- (7) Community size: An optimum size of online class is conducive to more interaction and hence, a greater chance of building a sense of community (Rovai, 2002).

Importance of sense of community in online learning environments

Students with a stronger sense of community are likely to stay and complete their online course rather than a student who feels alone and alienated (Tinto, 1993). Swan (2002) indicated the importance of building learning communities that lead to student satisfaction and learning. Without a feeling of community people are on their own, likely to be anxious, defensive, and unwilling to take the risks involved in learning (Wegerif, 1998).

Cliffton (1999) said that a level of trust has to be developed in all educational settings for a sense of community to flourish; “when people do not trust each other, and they do not share norms, obligations and expectations...the community is not likely to form”(p. 75). In a study by Stepich and Ertmer (2003), online students were asked to make connections with at least two other classmates and share common interests. This activity was reported to build a sense of belonging to the online learning community. Moreover, when students shared resources, they become more responsible for their own-learning, and in turn the participation and sense of community is strengthened (Stepich & Ertmer, 2009). When students share commonalities, it promoted the sense of community among them. In another study by Gallagher-Lepak, Reilly, and Killion (2009), undergraduate students shared common interests and experiences, which reinforced a stronger sense of community.

Educators who understand the importance of social bonds in the learning process must formulate a strategy to incorporate this sense of community into asynchronous online classrooms where learners are separated temporally and physically.

Measurement of Sense of Community

Studies regarding building of communities also include the development of communities in the virtual world. The interaction between members is channelized towards well-articulated focus; for example, a common aim, shared interests, or common belongings (Algesheimer, Dholakia, & Herrman, 2005). This is true for both online and offline communities. Chavis, Hogge, McMillan, and Wandersman (1986) were the first ones to measure sense of community by the Sense of Community Index (SCI). This index was based on the four parameters; namely, membership, influence, integration and fulfillment of needs, and shared emotional connection (McMillan & Chavis, 1986). Based on the similarities that both online and offline communities bring forth, SCI has been used by many researchers to study Sense of Virtual Community (SOVC) as well.

However, there are some differences between the two forms of community. The online community can overcome limitations of physical closeness; deploy electronic communication for interaction, overcome social boundaries, as well as can be characterized by anonymity. Blanchard and Markus (2004) further stated that members of the online community might have less influence on its members than face-to-face communities. They further stated that online communities experience better personal relationships and know the personalities of others better. A study by Blanchard (2007) realized that Sense of

Community Index (SCI), in totality, might not be suited for measuring Sense of Virtual Community, as it does not account for such differences between the two types of communities. The study adapted the Sense of Community Index scale and developed an 18-item measure for sense of virtual community, which were evenly distributed between SCI and newly developed measurements.

The SCI has henceforth been also modified and the new instrument is called the Sense of Community Index-2 (Chavis, Lee, & Acosta, 2008). This new instrument better represented the four dimensions put forth by McMillan and Chavis (1986). Abfalter *et al.* (2011) further contributed to the improvement of the Sense of Community Index-2 scale for use in a virtual setting. The scale consisted of eleven items distributed between the four dimensions of sense of community as described by Chavis and McMillan (1986) (see Table 1.2). They validated the scale but concluded that there was still scope for refinement of items in an online environment.

Table 1.2: The Sense of Virtual Community Scale by Abfalter *et al.*, (2012)

Dimensions Items	Mean	SD	Factor Loadings	Indicator Reliability	Cronbach's α	Ave
<i>Membership</i>					0.75	0.53
MEM1: I get important needs of mine met because I am part of this community	1.48	0.77	0.64	0.42		
MEM5: when I have a problem, I can talk about it with members of this community	1.14	0.91	0.70	0.49		
MEM6: People in this community have similar needs, priorities, and goals	0.83	0.89	0.80	0.65		
<i>Influence</i>					0.70	0.53
INFL1: I can trust people in this community	1.29	0.89	0.78	0.61		
INGL3: Most community members know me	1.02	0.87	0.68	0.46		
<i>Integration and fulfillment of needs</i>					0.86	0.56
IFN1: Fitting into this community is important to me	1.29	0.84	0.73	0.54		
IFN2: This community can influence other communities	1.47	0.78	0.70	0.49		
IFN4: I have influence over what this community is like	1.56	0.89	0.83	0.68		
IFN5: If there is a problem in this community, members can get it solved	1.50	0.91	0.75	0.56		
IFN6: This community has good leaders	1.43	0.79	0.70	0.49		
<i>Shared emotional connection</i>					0.86	0.56
SEC1: It is very important to me to be a part of this community	1.05	0.84	0.86	0.74		
SEC2: I am with other community members a lot and enjoy being with them	1.44	0.85	0.66	0.43		
SEC3: I expect to be a part of this community for a long time	1.79	0.83	0.73	0.53		
SEC5: I feel hopeful about the future of this community	1.59	0.92	0.79	0.62		
SEC6: Members of this community care about each other	1.40	0.81	0.70	0.49		
Note: All factor loadings are significant at $p < 0.001$						

Summary

This chapter delves into collaborative learning, which is primarily based on Vygotsky's social developmental theory; social interaction leads to higher-level cognitive development. It is, however, important to note that many researchers have also used the context of cooperative learning to study interaction between peers in the online environment. There are various overlapping characteristics between these two strategies, and often, the terms are used interchangeably for the lack of a standardized definition. However, the commonalities exceed the differences between the two instructional strategies. It can be said that collaborative learning is an umbrella framework that

encompasses the salient features of cooperative learning. To implement collaborative learning, educationists and researchers rely on internet-based technologies such as Wikis, Blogs, Google Docs, and discussion boards.

In this chapter, various contexts and definitions of community have been explored. It also delves into the advantages of building a community in the face-to-face environment where people are in the same geographical proximity and can interact with each other personally. Sense of community is defined as a feeling of belonging that members of the community have towards one another and collectively towards the group as well. Furthermore, the commitment to be together is strengthened by a common goal shared by the members of the community. The four dimensions of sense of community are; namely, influence, membership, shared emotional connection and integration, and fulfillment of needs.

Furthermore, the chapter talks about understanding of the offline community as an enabler and how that has generated interest in building of communities in the online learning environment. Significant amount of research has also suggested the importance of community development to overall student success in higher education (Parcella & Terenzini, 1991; Tinto, 1997).

There are many studies that deal with the many aspects of collaborative learning such as sociability of computer supported collaborative learning environments and the various forms of assessments deployed in collaborative learning. Several studies have also shown that collaborative learning strategies result in more student involvement with the course (Hiltz, 1994), and more engagement in the learning process (Harasim, 1990). There

is a lack of literature dealing with attitudes of learners towards using of online collaborative tools, which are the primary mode of collaboration. Korkmaz (2012) developed a reliable and valid, 5-point, Likert-scale to study the attitudes of learners towards online cooperative tools.

The first scale developed to study sense of community was the SCI (Chavis & Mcmillan, 1986) which has been adapted by many educational researchers to study communities online. This scale was further modified into the Sense of Community Index-2. Abfalter *et al.* (2012), who further adapted the scale and developed the Sense of Virtual Community (SOVC) that better represented the four dimension mentioned by McMillan and Chavis (1986) in an online environment.

Hence, it is noted that both sense of community and collaborative learning are two crucial components of a successful learning experience in an online format, specifically, to address the issues related to student attrition rates, satisfaction, and learning outcomes. The crux of both these factors is online interaction, specifically, learner-learner interaction.

Through this critical analysis of literature, a lack of studies that deal with establishing associations between two of the most significant aspects of online learning, which are, sense of community and collaborative learning was identified. The existence (or lack) of such correlations lays the groundwork for future research involving sense of community and collaborative learning in online learning environments.

CHAPTER 3

METHODOLOGY

Introduction

This chapter presents in detail the methodology in carrying out a correlational study between the two variables; namely, attitude towards collaborative learning and sense of community. Specifically, the chapter expounds the procedures adopted to collect data, the questionnaire instruments used and their design and development, validation of the questionnaire instrument, the mini-pilot, pilot, and the main studies along with the details of data analysis at each stage.

Research Design

This study followed a quantitative approach aimed at investigating the correlation between the two concerned variables; namely, sense of community and collaborative learning by making use of Pearson's product-moment correlational coefficient. This coefficient measures the association between two variables without the distinction between the dependent and the independent variable (Mertler & Vannatta, 2002).

Research plan

The overall research plan is described below (see Table 1.3). However, the nuances of the steps at different stages of the research are explained in greater depth in the concerned sections.

A) This research was carried out in three stages:

Stage 1: The mini-pilot that intended to test the research mechanics.

Stage 2: The pilot that aimed at validating the data collection instrument.

Stage 3: The main study that investigated the existence of a correlation between the variables studied.

Table 1.3: Research plan for conducting the study

	Stage 1: Mini-pilot Study	Stage 2: Pilot Study	Stage 3: Main Study
Purpose	Tested research mechanics	Reliability of the scores of the questionnaire	Addressed research questions
Statistical Analysis (SPSS)		-Cronbach's reliability coefficient, Alpha	-Pearson's product-moment correlation Coefficient, -Cronbach's Alpha
Number of participants	86	100	208

There were procedural modifications made at each stage based on the lessons learned of the previous stage. The details are described in the following sections.

B) The data collection questionnaire used, referred here as the Online Sense of Community-Collaborative Learning Combined Questionnaire, was created by combining two previously reliable and validated instruments and administered to participants in this study.

C) The data, thus, collected was analyzed to answer the following research questions:

- 1) Is there a correlation between students' attitude towards collaborative learning and sense of community in asynchronous online learning environments?
- 2) What is the nature of the relationship that exists between students' attitude towards collaborative learning and sense of community in asynchronous online learning environments?

Context of the study

The study was conducted in a large Mid-Western research university. The university has six different colleges with each college having their respective online programs. The online programs included courses that are offered both as fully online and blended formats. The fully online courses were typically one semester long and have the same academic rigor and quality as any face-to-face courses offered in residential programs.

Participants of the study

The participants were expected to be 18 years and older. This age restriction was to ensure that they do not need any parental guidance to complete the questionnaire and fully understand the pros and cons of it. Secondly, they were expected to be enrolled in at least one fully online course in the semester the questionnaire was administered. The assumption being that students' responses would reflect their experience in their respective online courses. Anyone not meeting these two criteria was asked to forgo taking the questionnaire. A total of 394 students meeting these criteria participated in this study. Table 1.4 shows the number of participants in each of the three stages of this study.

Table 1.4: The number of participants at each stage of the study.

Stage	Number of participants
Stage 1: the mini-pilot	86
Stage 2: the pilot	100
Stage 3: the main study	208

Confidentiality

All data collected was stored in a password-protected file in a password-protected laptop. No identifying information was collected from the participants, except, in the main study. An incentive was added to increase the response rate. For proper delivery of the incentive, contact information was collected from the respondents in the main study. This information was collected in a separate form than the main questionnaire.

Contact with participants

There was no personal contact with any of the participants. The mode of communication was only through the electronic medium, through which a cover message, waived consent form, and the link to the questionnaire were shared. However, in the main study, contact information of the respondents was collected for the delivery of the incentive. This information was collected in a separate web-based form than that of the questionnaire. The recipients of the incentive were selected through a random draw of participants.

Data collection instruments

Two previously established valid and reliable questionnaire instruments; namely, the Sense of Virtual Community Scale (Abfalter *et al.*, 2012) and Online Cooperative Learning

Application Scale (Korkmaz, 2012), were combined to form one single questionnaire for this study. These two instruments are described in detail in below.

The combined questionnaire, named as the Online Sense of Community-Collaborative Learning Combined Questionnaire, mostly consisted of close-ended questions on a 5-point Likert-scale regarding attitude towards collaborative learning and sense of community. The broad categories into which the items of the questionnaire can be divided are as positive attitudes and negative attitudes for the following collaborative learning items; integration, membership, influence and fulfillment of needs, shared emotional connection for the sense of community items (see Figure 1.1). Participation in the questionnaire was voluntary. Answering all the questions in the questionnaire was not mandatory. This clause was, however, altered in the main study, the details of which are discussed in the concerned section. The details of the design and development of the questionnaire are discussed below.

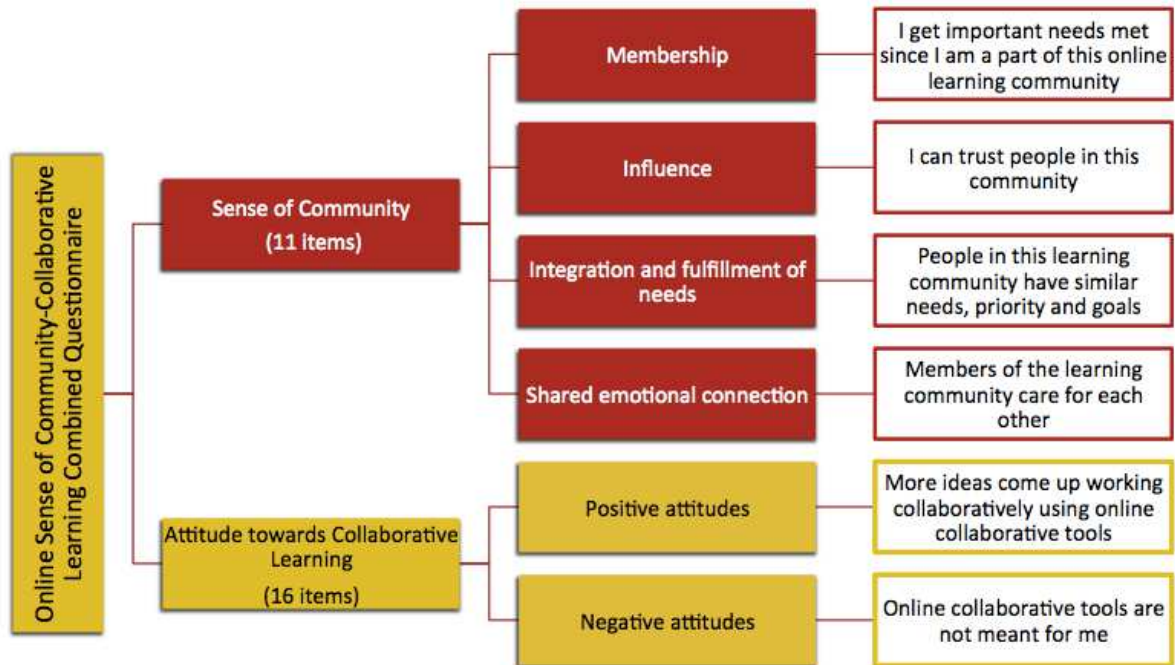


Figure 1.1: The Online Sense of Community – Collaborative Learning Combined Categories

Online cooperative learning application scale (OCLAS) (Korkmaz, 2012)

Internet-based technologies, such as Wikis, blogs, Google Docs, and discussion boards, are means of implementing cooperative learning in an online environment. To study cooperative learning, it is important to study the attitude of learners' towards the use of such tools. Korkmaz (2012) developed a valid and reliable attitude scale for measuring the attitude of students towards such online tools. He defined learners' attitudes towards cooperative learning as "an inward feeling expressed by outward behavior on this strategy which involves students in established, sustained learning groups or teams" (Korkmaz, 2012, p. 1163).

However, the context of this study was cooperative learning and the author aimed at measuring the attitude of learners toward cooperative learning. Korkmaz (2012) subjected the instrument to rigorous statistical analysis and determine the validity and reliability of the scale. For structural validity, exploratory factor analysis, confirmatory factor analysis, item factor total, and corrected correlation were employed. For reliability, the internal consistency using Cronbach's Alpha reliability coefficient, the correlation value between two congruent halves, the Spearman-Brown formula, and Guttman split-half reliability formula was calculated. The internal consistency of the questionnaire items was determined using the test-retest method. All this culminated into a 17-item close ended Likert-scale: "(1) never", "(2) seldom", "(3) sometimes", "(4) generally" and "(5) always" (see Figure 1.2). The questions can be categorized into positive attitude towards online cooperative learning and negative attitude towards online cooperative learning as shown in Table 1.1 in Chapter 2.

Reasons for using online cooperative learning application scale (Korkmaz, 2012)

The main rationale behind using a cooperative learning attitude scale for measuring attitude towards collaborative learning were:

- (1) There was a lack of studies that dealt with students' attitudes towards use of collaborative learning tools as well as the availability of valid and reliable scales to measure such student attitudes.
- (2) Moreover, the online tools used for cooperative learning are the same that are used for collaborative purposes, which include tools such as Google Docs, Wikis, Blogs, and discussion boards. These tools essentially provide learners a social platform for

interactive learning where they understand and improve themselves by interacting with peers. These tools also provide means to assess how much, when, and how each member contributed to the collaborative activity.

- (3) Furthermore, collaborative learning can be considered to be an umbrella instructional strategy that encompasses the essence and features of cooperative learning as well.

The Sense of Virtual Community Scale (SOVC) (Abfalter *et al.*, 2012)

Abfalter *et al.* (2012) were the pioneers in establishing a valid and reliable measurement instrument for measuring the sense of community in the online environment. The underlying premise for sense of community was based on the four core dimensions enunciated by McMillan and Chavis (1986). These were membership, influence, integration and fulfillment of needs, and shared emotional connection. Abfalter *et al.*, (2012) modified the scale, Sense of Community Index-2 (Chavis, *et al.*, 2008), and adapted it to the online environment. The modified scale was, henceforth, called the Sense of Virtual Community Scale by the researchers.

Abfalter *et al.*, (2012) employed confirmatory factor analysis using structural equation modeling with AMOS 17.0 as well as a reliability analysis to determine the validity of the Sense of Community Index-2 scale in the online environment. Furthermore, local fit indices, indicator reliability, Cronbach's Alpha, and average variance extracted were used to evaluate each of the SOVC dimensions. Out of the 24 items in the original SCI-2, 9 items were removed due to poor factor loadings and indicator reliability. This finally gave shape to the 15-item close-ended Likert-scale questionnaire shown in Table 1.2 in Chapter 2. The

statistical rigor that this instrument underwent to test its validity and reliability makes it fit to be used by future research to study the sense of community in the online setting.

This concludes explicating the overall research plan for this study. In the following sections the detailed procedures for participant recruitment, data collection, and analysis is elucidated along with stating the modifications to the Online Sense of Community-Collaborative Learning Combined questionnaire, for each stage of the study.

Stage 1: Mini-Pilot Study

The mini-pilot study was conducted as a part of the final research group project for a graduate course on introduction to educational research. With due consent of the team members, it was further expanded to be a part of this research study.

Data collection instrument

To measure both the variables, collaborative learning, and sense of community, the Sense of Virtual Community instrument by Abfalter *et al.* (2012) was combined with the Online Cooperative Learning Application Scale developed by Korkmaz (2012). The resulting questionnaire consisted of 20 closed-ended items using a Likert-scale ("Not at all" = 1, "Slightly" = 2, "Somewhat" = 3, "Mostly" = 4, and "Completely" = 5). The first 12 questions on the questionnaire consisted of the items from the Sense of Virtual Community Scale (SOVC) and the next eight items came from the Online Cooperative Learning Application scale (see Table 1.5). The questions from the online cooperative learning application scale were further divided as positive attitudes (OCLA+) and negative attitudes (OCLA-). The questionnaire, as sent to participants, is presented in Appendix D.

For content validity, the questionnaire was sent to two experts for review; one in the field of online course development and another a faculty member with expertise in online teaching and learning. Feedback on the instrument was also collected from graduate students as a part of a focus group. All relevant feedback was incorporated into the questionnaire.

Table 1.5: Questionnaire items for data collection for the mini-pilot study.

Questions	Relationship
Establishing a connection with peers through collaborative activities is important for me in an online course.	OCLA +
Interaction with peers makes me feel part of a community.	SOVC
I can share my problems if I feel I am a part of the community.	SOVC
People in this community have similar needs, priorities, and goals.	SOVC
Members of the community motivate me to learn the course contents and make me more productive (in terms of my contribution to the activity).	SOVC
Being a part of the community helped me increase my creativity.	SOVC
Being a part of the community helped in achieving the learning objectives of the course or a particular module.	SOVC
I get important needs of mine met because I am part of this online learning community.	SOVC
I can trust members in this group.	SOVC
Most group members know me.	SOVC
Fitting into this group is important to me.	SOVC
I enjoy collaborating with my group members to solve group assignments	SOVC
Being interactive with the other group members increases my motivation for learning.	SOVC
I enjoy helping others in online group activities.	SOVC
More ideas come up as a result of collaborative learning activities.	OCLA +
I think that I have had / will have more successful results because of collaborative learning activities.	OCLA +
Online collaborative activities do not make any sense to me.	OCLA -
I cannot develop my own ideas in an online collaborative environment.	OCLA -
Online collaborative learning activities are not suitable for me.	OCLA -
Collaborative learning activities have helped me establish a connection with my peers.	OCLA +

Participants

The target population for the mini-pilot was students registered for at least one, college-level, fully online course in the Spring semester of 2013, that is, January through May 2013. A total of 86 students participated in the mini-pilot study.

Data collection and data analysis

The online questionnaire was sent to all university students enrolled in at least one online course. The total number of students who received the questionnaire was 4,233. These students received an email invitation with a link to the online questionnaire. Students who consented to participate could complete the questionnaire any time within a two-week period.

A total of 86 students waived consent and participated in the questionnaire while two other students declined to participate. Of the 86 participants, eleven students did not answer any of the closed-ended questions. For the purposes of this analysis, there were 74 students providing answers to both the open-ended and closed-ended questions: 37 graduate students, 37 undergraduates, and one student answered that he/she “Have a master’s degree but taking classes for a certificate.” Since the latter student has a graduate degree, the educational status was changed to “graduate.”

Two participants did not answer the following question, “I enjoy collaborating with my group members to solve group assignments.” The column for this question was copied including all participants’ data and a score of 3 was added to both their data. The score of 3 was the midpoint (neutral) score of the scale. Adding the score would introduce some

uncertainty for this question, but the overall effect on the average score would be minor. A less than 2.67% error is based on two participants' scores out of 74 qualified participants.

Additionally, two participants did not answer the following question, "More ideas come up as a result of collaborative learning activities." The column for this question was copied including all participants' data and a score of 3 was added to both their data. The score of 3 was the midpoint (neutral) score of the scale. Adding the score would introduce some uncertainty for this question, but the overall effect on the average score would be minor. A less than 2.67% error is based on two participants' scores out of 74 qualified participants.

One participant did not answer the following question, "Online collaborative learning activities are not suitable for me." The column for this question was copied including all participants' data and a score of 3 was added to both their data. The score of 3 was the midpoint (neutral) score of the scale. Adding the score would introduce some uncertainty for this question, but the overall effect on the average score would be minor. A less than 1.33% error is based on two participants' scores out of 74 qualified participants.

Table 1.6: Summary of Amount of OCLA usage in online course and education level of all participants who waived consent and provided answers to the questionnaire questions.

Amount of OCLA	Number of Participants		Undergraduate	Graduate
<25% of the time	21	28.0%	12	9
25-50% of the time	13	17.33%	9	4
50-75% of the time	15	20.0%	9	5
>75% of the time	26	54.67%	7	19

It was found that 67% of undergraduate students had greater than 25% of their online course using OCLA. Also, 65% of graduate students had 50% or greater OCLA use in their online course, and approximately 75% of the graduate respondents said that their online course involved 50% or greater OCLA usage.

In coding the data for analysis, the questionnaire questions were assigned SOVC if the questions were from the sense of virtual community scale (Abfalter *et al.*, 2012), OCLA+ for measuring positive feelings relating to online collaboration and OCLA- for the negative feelings (Korkmaz, 2012). There were 12 questions assigned SOVC, 5 questions assigned OCLA+, and 3 questions assigned OCLA- as shown in Table 1.5.

Stage 2: Pilot Study

The second pilot was undertaken in the fall semester of 2014 from the months of September to December. This step was included in the overall research design to test the reliability of the questionnaire. Although, previously valid and reliable instruments were used to form the final instrument of measure, a reliability study would give the measurement more credibility. Korkmaz (2012) also suggested testing the reliability of the instrument in the context it would be used. However, the following modifications from the mini-pilot study were adopted in the pilot study:

- (1) The research design for recruiting of participants was altered to increase the response rate.
- (2) The items in the questionnaire were modified to include collaborative learning instead cooperative learning.

- (3) The questionnaire was further modified to include more questions from the original scales.
- (4) The mode of analyzing the data was changed to better statistical tools.

Re-design and development of the questionnaire from the mini-pilot

The following section elucidates the growth and development of the questionnaire from the mini-pilot to the pilot study.

Online sense of community-collaborative learning combined questionnaire

In conducting this correlational study to determine a relationship between sense of community and collaborative learning in online environment, the two valid and reliable instruments were employed, the details of which were discussed in previous sections. The questionnaire used in this pilot study can be found in Appendix A.

Review by experts and representatives of the target population

The questionnaire used for the mini-pilot was reviewed by two additional area experts. One area expert was a faculty member specializing in Curriculum and Instructional technology with online teaching and learning practices being one research focus. A second area expert was an Instructional Designer with extensive experience in designing online courses. The experts evaluated the questionnaire items for clarity and relevance. They also compared the questionnaire with the two established instruments – the online cooperative learning application scale and the sense of virtual community scales.

Based on the experts' review, seven more items from the said instruments were adapted and added to the existing 20 items, as those deemed fit and relevant for the

purpose of the study. Two questions were reworded to improve clarity of the items and minor grammatical changes were made to two more questions. The questions belonging to OCLA were also re-worded to substitute 'cooperative learning' with 'collaborative learning', including in the name of the scale, to maintain consistency with the focus of this study.

To distinguish between the original OCLA scale and this adapted form, the questionnaire was re-named as Online Sense of Community-Collaborative Learning Combined Questionnaire. In each of the questions adapted from the original Sense Of Virtual Community Scale, the word 'community' was replaced with the words 'learning community.' Some of the questions were rephrased as well; such as, "I am with other community members a lot and enjoy being with them" was changed to "I enjoy being with the members of this learning community" and "I feel hopeful about the future of this community" was changed to "I feel hopeful that members of this learning community will go beyond the course."

Finally, 12 students, representative of the target student population, who were enrolled in at least one online class, reviewed the 27-item questionnaire. The students indicated that the questions were all comprehensible with no difficulty in understanding them. No further modifications were made based on the students' feedback.

The pilot-study questionnaire

For the pilot study, the questionnaire was essentially divided into three sections: demographics, online collaborative learning, and sense of community. These sections were preceded by a cover message for the participants and the waived consent form. There was one open-ended question included in the questionnaire where the participants could share

any thoughts they had regarding collaborative learning and/or sense of community in the online learning environment.

- (1) Demographics: Although, demographics is not the primary focus of this study, there were some multiple choice questions on the participants' academic standing, level of collaboration in their respective courses, learning management system used, and their course name and number.
- (2) Online Collaborative Learning: There were a total of 16 items that were adapted from the OCLA scale. The questions related to feeling of positive attitude towards using of online collaborative tools were followed by the questions of feeling of negative attitude towards using of online collaborative tools.
- (3) Sense of Community: A total of 11 questions were adapted from the SOVC scale that fell under the four dimensions of community (McMillan & Chavis, 1986); namely, membership, influence, integration and fulfillment of needs, and shared emotional connection.

The chosen rating for the final questionnaire was a 5-point Likert-scale: (1) Never (2) Seldom (3) Sometimes (4) Mostly (5) Always. All the questions were declarative statements where respondents would have to choose their level of agreement with each statement. Hence, Likert-scale seemed the most appropriate (Johns, 2010).

The final draft of the 26-item scale was transferred to the electronic medium, and published online using a web-based service, Google forms.

The main advantages of using a web- based questionnaire are (Van Selm & Jankowski, 2006):

- Point and click responses
- Electronic medium for data collection and transfer
- Possibility of visual presentation of the questionnaire
- Possibility of structured responses

Based on Couper, Traugott, and Lamias (2001) some features of the electronic form were implemented to reduce the chances of respondent loss:

- (1) The questionnaire also had a progress at the end of each screen page
- (2) Radio buttons for the respondent to click on to select their response.
- (3) The items were divided into four screen pages.
- (4) The time taken to complete the questionnaire was optimized and kept at a minimum (Sheehan & McMillan, 1999). The cover message indicated an approximate time of 10 minutes for completion of the questionnaire.

These features were incorporated into the questionnaire for both the pilot study and the main study. The questionnaire for the pilot study was open for a period of one month, in September 2014.

Participants

The target population for the pilot was students registered for at least one college level fully online course. Since human subjects were involved in this study, an approval of the Institutional Review Board (IRB) was obtained (see Appendix E). Participants were approached via the course instructors of online courses. The only criteria for selecting these

fully online courses was the presence of some level of collaborative learning activities in the course via online collaborative tools such as Google Docs, Wikis, blogs, and discussion boards. For the purpose of this pilot study, collaborative learning encompassed activities that provided an opportunity for active and graded interaction between peers throughout the course using online collaborative tools. It was assumed that students would complete the questionnaire according to their experience in their enrolled online class in the concerned semester.

Participants' recruitment

The methodology adopted to recruit participants was altered from the mini-pilot study. This was mainly done to increase the chances of a higher response rate. As observed in the mini-pilot study, out of the 4,233 students, a mass email request sent out with the survey, only 86 responded. The time elapsed between the search and recruitment of participants to administering of the survey and subsequent data collection, took three months of the semester.

The initial design of recruiting participants required contacting the instructors of five online courses, with varied level of collaboration, with a request to post the survey link to their respective online courses. However, this approach did not yield any response from the instructors over a period of 3 weeks.

In the subsequent strategy, the initial contact was made with the Instructional Development Coordinators of various online education divisions on the campus both via in-person meeting and through the electronic medium. Out of the five divisions contacted,

only three coordinators responded. They were further provided with a written request to either provide the contact information or contact the instructors themselves who were delivering fully online courses with some level of collaborative activities, with a request to support this study.

This strategy yielded information on 27 instructors who used collaborative activities in their classes. They were then contacted either personally or through electronic communication. The research was briefly explained to them along with addressing questions such as “the nature of contact with the participants”, “the duration of the study”, “storing of any confidential information.” The link to the survey was shared with each instructor to disseminate in their respective online courses. This was also accompanied by a cover message for the students.

Out of the 27 course instructors contacted, 11 of them responded and shared the survey with the online students as well. There were five instructors who denied participating in the study for various reasons. One of the instructors also offered an added incentive of extra credit to his students for taking the survey. There was no formal request for the same and the instructor acted out of his personal choice.

The total number of participants contacted this way was approximately 275 learners, taking a ballpark figure of twenty-five students in an online course (Orellana, 2006). The number of responses received was 100, which indicates a response rate of 36.4%. Out of which one response was deleted, as the participants did not answer any of the questions. However, it is difficult to calculate the exact response rate as it was not known exactly how many individual viewed the survey but did not participate (Kay & Johnson, 1999). Moreover,

keeping a counter on the survey site would not have provided an accurate measure of the number of times the survey was viewed as it does not keep track of “unduplicated visitors” (Kay & Johnson, 1999) and whether the survey was allowed to load fully in the browser (Smith, 1997).

Data collection and data analysis

The data was collected using the questionnaire version presented in Appendix A. After the data collection period was completed, data from Google forms was downloaded into an excel file. It was further cleaned and coded for analysis.

All of the statistical analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) Version 22. The cleaned data file was imported to SPSS.

Cleaning and coding of the data

The responses to questions related to sense of community and positive attitude towards collaborative learning were substituted with a numeric value as shown below in Table 1.7.

Table 1.7: Numeric values corresponding to the levels of agreement for the sense of community items and positive attitude towards collaborative learning items.

Level of agreement	Numeric value
1) Never	1
2) Seldom	2
3) Sometimes	3
4) Mostly	4
5) Always	5

However, the questions regarding the negative attitude towards collaborative learning, the responses were reverse coded for analysis purposes as shown below in Table 1.8. This was mainly done to keep the agreement level consistent throughout, which was, Level 5 implying maximum agreement and Level 1 implying minimum agreement to the item statement.

Table 1.8: Reverse coding of the levels of agreement corresponding to negative attitude towards collaborative learning items.

Level of agreement	Numeric value
1) Never	5
2) Seldom	4
3) Sometimes	3
4) Mostly	2
5) Always	1

Reliability analysis

Internal consistency reliability of the questionnaire items was examined to test the “homogeneity of the items” (DeVillis, 2003, p. 27) within the sense of community and collaborative learning scales, respectively. The correlation between the items provides for the internal consistency of the items in the questionnaire. The Cronbach’s Alpha reliability coefficient was used for reliability testing (DeVillis, 2003). The reliability results are presented in Chapter 4.

Stage 3: Main Study

Within a week of the pilot, the main study was conducted in the month of November 2014. The same questionnaire instrument used in the pilot, with some added

features regarding incentive, was administered to collect data. The items in the questionnaire remained the same.

The following modifications from the pilot study were adopted in the main study:

- (1) The research design for recruiting of participants was altered.
- (2) The questionnaire was further modified to take into account added incentives.

The detailed data collection and analysis procedures are enunciated in the following sections.

Re-design and development of the questionnaire from the pilot

The questionnaire from the pilot study was essentially the same except a few added features, which are explained below. All the items in the questionnaire were the same as that in the pilot and followed the same sequence as well. Listed below are the modified features of the instrument used in the main study:

- (1) An additional component was added related to the incentive. Participants, who agreed to take the questionnaire, would be directed to a separate Google Form, where they could fill in their contact information for the drawing of the gift cards.
- (2) The items in the questionnaire were not “required” to begin with. Participants, who agree to participate, could skip any questions they did not wish to answer. However, it was noticed that participants would go directly to the section of the drawing of the gift cards without answering the questions. This resulted in the loss of about 30 responses. This necessitated a measure that participants who agreed to take the questionnaire would require to answer the items related to collaborative learning and sense of community.

(3) Participants need to agree to the waived consent to enter the questionnaire. The alternative would directly take them out of the questionnaire.

(4) There were a total of 27 questions; 16 from collaborative learning, 11 from sense of community, 4 general demographic questions. The incentive page has sections to enter the contact information and one open ended question asking participants to share any other experience they may have had regarding the topics covered in the questionnaire.

The final version of the questionnaire, which was same as the pilot study questionnaire, can be viewed as Appendix A. The additional incentive attached to the main study questionnaire is presented in Appendix B.

Participants

A recruited sampling (Medlin, Roy, & Ham Chai, 1999) was intended for the main study wherein the sample was selected from a population of all students enrolled at the university. The target population included were students enrolled in at least one fully online course in the Fall semester of 2014, which includes the months of August through December. Moreover, in order to reduce any sampling errors, the entire population was included in the study (Sills & Song, 2002).

Participants' recruitment

A different approach to recruiting of participants was used mainly because of two constraints:

- (1) Time: The underlying constraint of the study was to complete both the pilot and the main studies in a single period of 4 months. This was mainly so that the pool of the participants was similar for both the studies. Moreover, students could take the questionnaire while participating in an online class for their responses to be more authentic.
- (2) Participants' availability: Going by the route of establishing a contact with online instructors and relying on them to post the questionnaire to their online students, was an exhaustively time consuming process as observed in the pilot study. Moreover, most of the online education divisions on campus had already been contacted, and the pool of instructors provided was exhausted for the pilot. Although, this method could have yielded a higher response rate, concluding the study in the stipulated timeframe was crucial and hence was given a higher preference.

As a result of the two above-mentioned reasons, the initial plan of contacting instructors for recruiting participants was shelved. The questionnaire was administered to the target population of students taking at least one fully online course between, September and December of 2014, electronically via a mass email.

For procuring a list of the target population, the office of the registrar was contacted. This list was then communicated to the Information Technology Services. A request for mass email was submitted electronically along with a draft of the email message for students and a QR code of the questionnaire (See Appendix C). The mass email was sent twice to the same population in a period of about one and a half months.

The first mass email was sent, within two weeks of conclusion of the pilot study. This interim time was mainly used for analyzing the pilot data and drafting of the cover message for the email. The reminder request was sent prior to beginning of the Spring semester of 2015, that is, beginning of the month of January. This timeframe was strategically chosen, considering, three factors, (1) the low workload of students with the conclusion of the previous semester, (2) low requests from various parties for taking questionnaires, (3) remembrance of the experience of participating in an online course in the concluded semester.

The following ways were incorporated to increase the response to the questionnaire:

- (1) A monetary incentive was added. This included a drawing for five \$5 gift cards for a popular coffee shop on campus.
- (2) Flyer with a brief cover message, link to the questionnaire and the QR code was put up at location with heavy student traffic across the campus.
- (3) Instructors with personal acquaintances were approached and requested to share the questionnaire with their online classes, if any.

Data collection and data analysis

Data was collected using the questionnaire presented in Appendix A. The questionnaire was sent out to 5,427 students who were taking at least one fully online course. A total of 210 responses were received for the main questionnaire and 236 responses for the drawing of the gift cards. Out of the 210 responses, 198 were usable responses.

The data from Google Forms was downloaded into an excel file. It was further cleaned and coded for analysis.

All of the statistical analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) 22. The cleaned data file was imported to SPSS.

Cleaning and coding of the data

The responses to questions related to sense of community and online collaborative were substituted with a numeric value as shown below in Table 1.9.

Table 1.9: Numeric values corresponding to the levels of agreement for sense of community items and items related to positive attitude towards collaborative learning.

Level of agreement	Numeric value
1) Never	1
2) Seldom	2
3) Sometimes	3
4) Mostly	4
5) Always	5

However, the responses to questions regarding the negative attitude towards collaborative were reverse coded for analysis purposes as shown below in Table 2.0. This was again done mainly to keep the agreement level consistent throughout, which was, Level 5 implying maximum agreement and Level 1 implying minimum agreement to the item statement.

Table 2.0: Reverse coding corresponding to the negative attitude towards collaborative learning items.

Level of agreement	Numeric value
1) Never	5
2) Seldom	4
3) Sometimes	3
4) Mostly	2
5) Always	1

Correlational statistical analysis

To establish the existence of any relationship between collaborative learning and sense of community, the Pearson product-moment correlational coefficient was calculated for the entire data set. A scatter plot was also computed between the sense of community and attitude towards collaborative learning scores of all the respondents. The value of the coefficient determined the presence of a relationship, if any.

Furthermore, the data set was also divided on the basis of the academic classification-undergraduates and graduates. The scatter plot and Pearson product-moment coefficients for each classification was also computed and compared. The results of the analysis are presented in Chapter 4.

The questionnaire consisted of items from the collaborative learning scale as well as from the sense of community scale. The collaborative learning items could further be categorized into items related to positive attitude and negative attitude towards collaborative learning. The questions from the sense of community scale belong to the four dimensions of sense of community as described by McMillan and Chavis (1986) (see

Appendix H). An inter-item correlational coefficient matrix was computed based on the average of the scores in each of these six aspects.

The list of participants from the incentive portion of the questionnaire was downloaded into an Excel file. All participants were coded from P01 to P236. This data set was then imported to www.randompicker.com, an online tool for random sampling, to randomly select five participants. These five participants were given the \$5 gift card at the contact information provided by them.

Summary

This chapter presented the research methodology for conducting this study to address the research questions. The three stages of the study were described in detail. The first stage-the mini-pilot study was conducted to test the research mechanics and design. The second stage, the pilot study, was undertaken to test the reliability of the questionnaire and the final stage, the main study, addressed the research question specifically. The in-depth procedures adopted in each of the stages were described in this chapter that included details regarding the evolution of the questionnaire, participant recruitment and data collection and data analysis.

CHAPTER 4

RESULTS OF THE STUDY

Introduction

In this chapter the results of the three stages of this study are presented which includes Phase 1: mini-pilot study; Phase 2: pilot study; and Phase 3: main study.

The main observations of the mini-pilot study are presented here along with the results of the data analysis for the pilot and the main study. For the pilot study, the Cronbach's reliability coefficient is reported and for the main study, along with the reliability coefficient, demographic data, the descriptive statistics, and the Pearson's correlation coefficients are also reported.

Results of the Mini-Pilot Study

The mini-pilot was conducted mainly to test the mechanics of the research design specifically by (1) revisiting the items the in the questionnaire instrument, (2) rethinking the methodology adopted to collect the data, and (3) determining the ways to analyze the data. The main observations/results of the mini-pilot are presented below.

Participants' recruitment and data collection methodology

It was observed in the mini-pilot study that a mass email request sent to the target population would not yield a high response rate. Out of the total 4,233 students, to whom the questionnaire was sent, only 86 responses were received. A more targeted approach

was adopted for the pilot study, wherein, the participants were approached via instructors of particular online courses that were systematically and strategically selected and approached.

Data analysis strategies

No statistical program was used to analyze the collected data in the mini-pilot study. The questionnaire administered was also not tested for its reliability assuming that the use for prior validated and reliable instruments would forgo the need for further reliability testing.

However, for the pilot study, the data was analyzed using a statistical software. The reliability of the questionnaire was further determined by calculating the Cronbach's reliability coefficient.

Area experts and a focus group representative of the target population further reviewed the questionnaire used in the mini-pilot study. All the relevant changes were incorporated in to the questionnaire for the subsequent pilot study the details of which are enunciated in Chapter 2.

Results of the Pilot Study

The main goal of the pilot study was to calculate Cronbach's reliability coefficient to support the reliability of the scores generated by the questionnaire used. The reliability test was performed on the 27 items of the pilot study questionnaire version.

The items in the questionnaire belonged to two major categories- eleven items belonged to the sense of community scale and sixteen items belonged to the collaborative learning scale. The reliability analysis was preformed separately on each of these two sub-categories. The frequency distribution regarding the respondents' classification as well as the degree of collaboration in their respective online courses is also reported as bar charts.

Participants' response rate

The participants were contacts via the course instructors of online courses. Twenty-seven online course instructors were contacted out of which eleven responded and shared the questionnaire. The questionnaire was sent out to approximately 275 students out of which, 100 responses were received. The response rate was 36.4%.

Frequency distribution

For the purpose of awareness regarding the academic classification of the respondents, the frequency distribution was calculated and plotted as bar charts shown in Figure 1.2. There were a total of 100 responses, out of which 63 were undergraduate students and 31 were graduate students and 4 belonged to "other" category.

Regarding the degree of collaboration, 29 students reported a degree of collaboration of greater than 75% or more of the time, in their course. The number of students who reported collaboration between 50% and 75% of the time in their courses were 34, and 20 students and 16 students reported a degree of collaboration between 25%

and 50% and less than 25% of the time respectively (see Figure 1.3). There was one student who did not respond to these questions and it was considered as missing data.

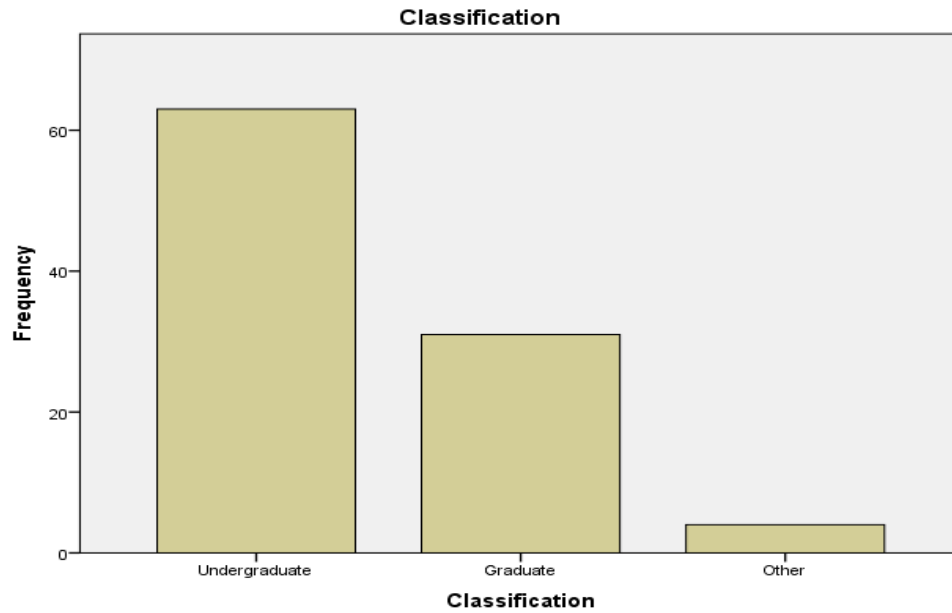


Figure 1.2: The distribution of respondents as graduates and undergraduates in the pilot study.

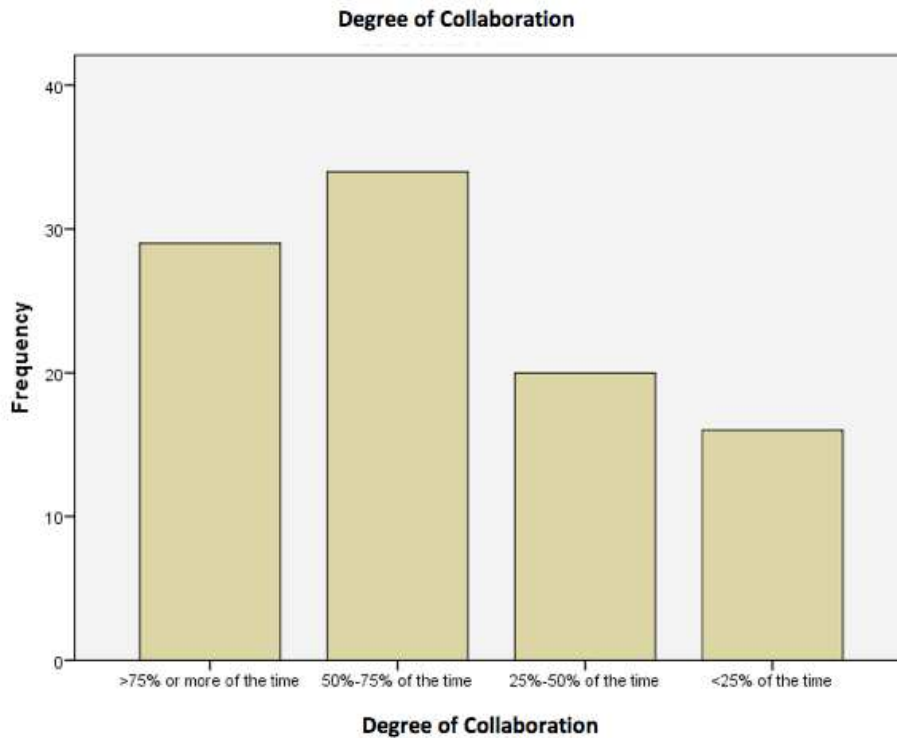


Figure 1.3: The level of collaboration in the respective online courses for the respondents in the pilot study.

Reliability analysis

The reliability analysis of the questionnaires shows that the Cronbach's Alpha reliability coefficient for internal consistency for the eleven items of the sense of community items was 0.924. The reliability coefficient, Alpha, for the sixteen items from the collaborative learning category was 0.942. The overall Cronbach's reliability coefficient, Alpha, for all the 27 items was 0.825.

These values of reliability coefficient indicate that the questionnaire has good internal consistency (Field, 2009; Peterson, 1994; Nunnally, 1978). Internal consistency means that "the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test"

(Tavakol & Dennick, 2011, p. 53). George and Mallery (2011) further restate that an Alpha value between 0.9 and 1.0 is “excellent” and that between 0.8 and 0.89 is “good” and indicated a high internal consistency.

According to DeVellis (2003), corrected-item correlation is a measure of the extent to which an item is correlated to all other items in a questionnaire except to itself.

Furthermore, the Cronbach’s Alpha, if item deleted, signifies the overall Alpha coefficient of all the items, if any item were to be deleted from the questionnaire. The comparison of the Cronbach’s Alpha if item deleted to Cronbach’s Alpha reliability coefficient for internal consistency of the questionnaire (0.815) reveals that there is no item whose deletion will result in an increase in the Cronbach’s Alpha of all items. Therefore, based on these analyses, it was decided not to delete any item from the final questionnaire, used in the pilot study, for the main study (see Table 2.1).

Table 2.1: Corrected item correlations for all the 27 items in the questionnaire for pilot study

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Being interactive with peers using online collaborative learning tools increases my motivation for learning.	77.27	120.467	0.574	0.511	0.799
I enjoy experiencing online collaborative learning using online collaborative tools with my peers.	77.22	118.579	0.639	0.770	0.796
Online collaborative activity increases our creativity.	77.12	118.423	0.670	0.820	0.795
I believe that collaborative work can be effective when using online collaborative tools.	76.89	121.740	0.553	0.719	0.801
Online collaborative activities improves social skills.	77.47	123.308	0.405	0.435	0.806
I enjoy solving issues regarding collaborative work using online collaborative tools with my peers.	77.39	118.038	0.630	0.781	0.796
I enjoy helping others using online collaborative tools.	77.10	119.237	0.584	0.696	0.798
More ideas come up working collaboratively using online collaborative tools.	77.23	120.810	0.597	0.661	0.799
Online collaborative tools are very entertaining to me.	77.80	120.656	0.635	0.597	0.798
I think I have had/will have more successful results as I work collaboratively with my peers using online collaborative tools.	77.21	120.258	0.621	0.747	0.798
Trying to teach something to my peers using online collaborative tools makes me tired.	77.72	146.607	-0.551	0.625	0.842
Online collaborative tools do not make any sense to me.	78.22	143.658	-0.413	0.687	0.839
I cannot develop my own ideas when working collaboratively using online collaborative tools.	78.34	140.790	-0.329	0.611	0.834
I do not like that people are depending on me when working collaboratively using online collaborative tools.	77.94	142.772	-0.371	0.565	0.839

Table 2.1: continued

Item-Total Statistics					
I do not think my interactions with my peers using online collaborative tools will make any contributions to me.	78.06	148.390	-0.605	0.795	0.845
Online collaborative tools are not suitable for me.	77.89	151.605	-0.670	0.854	0.851
I get important needs met since I am part of this online learning community.	77.34	123.037	0.455	0.606	0.804
When I have a problem I can talk about it to the members of this learning community.	77.24	119.872	0.549	0.570	0.799
People in this learning community have similar needs, priority and goals.	76.97	122.033	0.515	0.605	0.802
I can trust people in this community.	76.96	119.818	0.702	0.774	0.796
Most learning community members know me.	78.16	121.391	0.525	0.561	0.801
Fitting into this learning community is important to me.	77.60	114.737	0.697	0.716	0.791
If there is a problem in the community members can get it solved	77.03	122.235	0.616	0.627	0.800
It is important for me to be a part of this online learning community.	77.32	113.097	0.747	0.770	0.788
Members of this learning community care for each other	77.33	116.427	0.703	0.730	0.792
I feel hopeful that members of this learning community will go beyond the course.	77.44	116.160	0.675	0.689	0.793
I enjoy being with the members of this learning community.	77.28	116.495	0.761	0.707	0.791

Results of the Main Study

After the validation of the questionnaire in the pilot study, the next phase of this study was to address the research questions directly using the validated questionnaire. To reiterate, the research questions that guided this study were (1) to determine a correlation between students' attitude towards collaborative learning and sense of community in

asynchronous online learning environments and (2) to find the nature of the correlation, if any, between students' attitude towards collaborative learning and sense of community. The different aspects of results of the main study are presented in the following sections.

Participants' response rate

The questionnaire was sent out to students taking at least one fully online course in the period between September and December of 2014. Out of the total 5,427 such students, a total of 208 students responded to the questionnaire used in the main study. The response rate was 3.8%.

The main data was analyzed in a similar way as in the pilot study. Out of these 208 responses, 10 were discarded for two reasons (1) non-responsiveness to the questionnaire and (2) non-existence of any degree of collaboration in the respective online course of the respondents.

Frequency distribution

The frequency distribution of the academic classification of the respondents and their degree of classification in their respective online courses(s) was calculated and plotted as bar graphs. Out of the 198 usable data, 125 respondents were undergraduates and 71 were graduates (Figure 1.4). The rest belonged to the category "other." The number of respondents with more than 75% of the time in the course spent in collaborative learning was 52. Thirty seven students had a degree of collaboration between 50% and 75% of the time. Thirty-six students had a level of collaboration between 25% and 50% of the time in

their online course, whereas, 72 students had less than 25% of the time in their online course spent on collaborative learning (Figure 1.5).

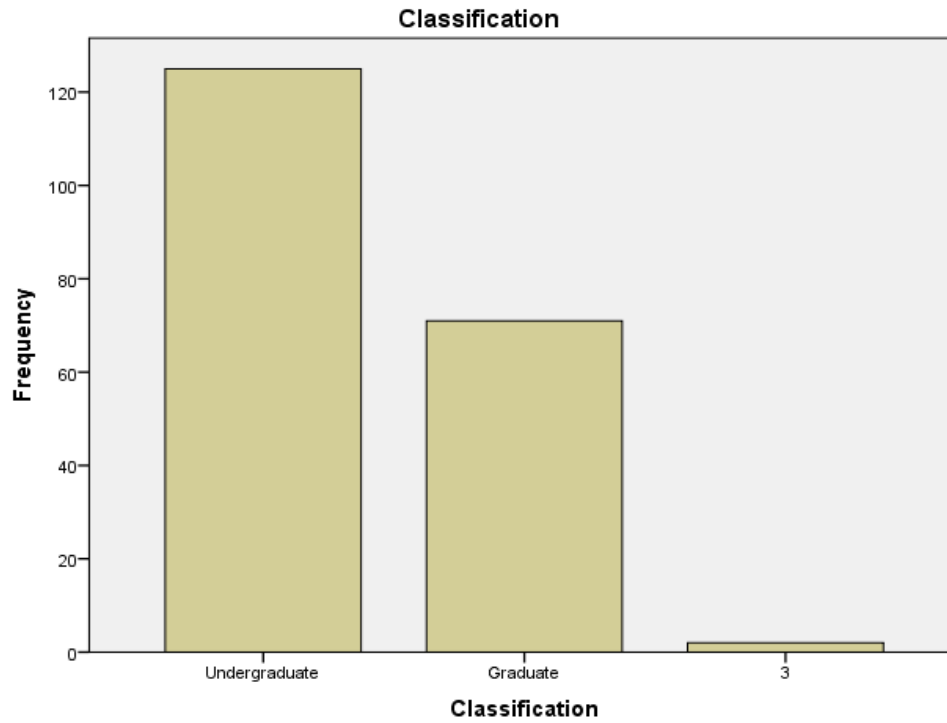


Figure 1.4: The academic classification of the respondents as Graduates, Undergraduates and Other in the main study.

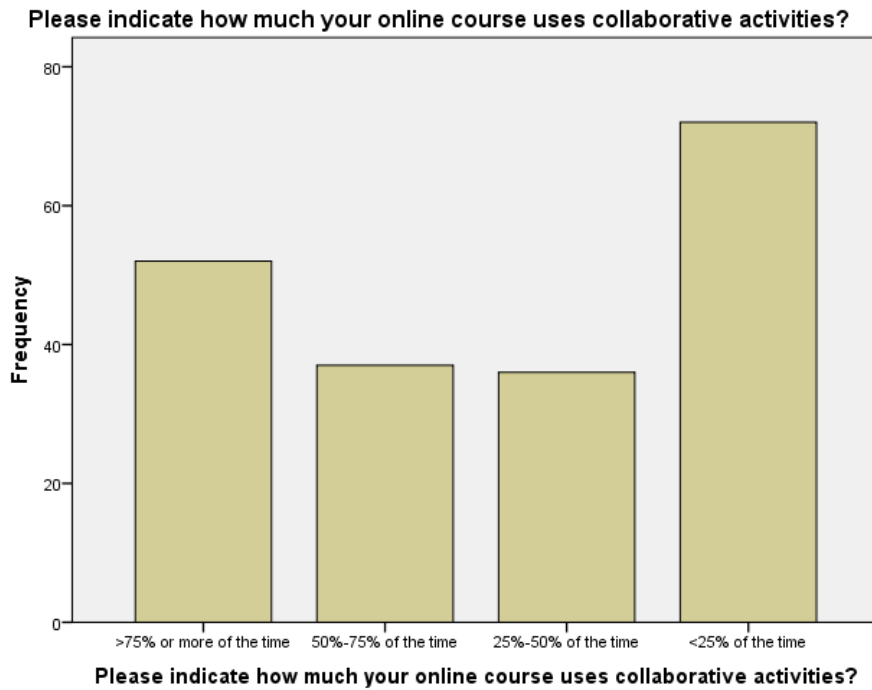


Figure 1.5: Degree of collaboration in the online courses of the respondents in the main study.

Reliability analysis

Although a high reliability coefficient was already established for the questionnaire in the pilot, the reliability analysis was repeated for the main study as well. This is because the value of Alpha is “property of the scores on a test from a specific sample of testees” (Travacol & Dennick, 2011, p. 53). Hence, instead of relying on the calculated Alpha for the questionnaire, reliability coefficient was calculated again for the main study. Wilkinson and The Task Force on Statistical Inference (1999) stated “It is important to remember that a test is not reliable or unreliable. Reliability is a property of the scores on a test for a particular population of examinees” (p. 596).

Cronbach's reliability coefficient, Alpha, was calculated for the two categories of the questions in the questionnaire to further reinforce the internal consistency of the items in the questionnaire. Reliability coefficient, Alpha, was found to be 0.922 for the sense of community items and 0.910 for the collaborative learning items.

Both of these values of Alpha indicate that questionnaire has good internal consistency (Field, 2009; Peterson, 1994; Nunnally, 1978). George and Mallery (2011) further state that an Alpha value between 0.9 and 1.0 is "excellent."

Correlational analysis

A Pearson product-moment correlational coefficient was computed to assess the existence, nature and the strength of the relationship, if any, between collaborative learning and sense of community in an online learning environment. The total score for sense of community and for collaborative learning was computed for each respondent. Using these total scores, the Pearson product-moment correlational coefficient was computed to be $r(198)=0.672$, $p<0.01$. Hinkle, Wiersman and Jurs (1998) stated the rule of thumb for determining the strength of the correlation coefficient as:

0.90 to 1.00 (–0.90 to –1.00)	Very high positive (negative) correlation
0.70 to 0.90 (–0.70 to –0.90)	High positive (negative) correlation
0.50 to 0.70 (–0.50 to –0.70)	Moderate positive (negative) correlation
0.30 to 0.50 (–0.30 to –0.50)	Low positive (negative) correlation
0.00 to 0.30 (0.00 to –0.30)	negligible correlation (p. 120).

This implied that the scores for collaborative learning and sense of community were correlated and the strength of the correlation was moderate. Furthermore, the correlational coefficient, r , was positive. This meant that the direction of the association was positive and direct, which implied, an increase in the score of collaborative learning would mean an increase in the score of sense of community as well.

It is important to point out that for the calculation of Pearson's Product-Moment Correlation Coefficient, a normal distribution of the data set is assumed. However, the correlational coefficient is robust enough to accommodate any skewness or non-normality associated with the data collected using a Likert-scale. Norman (2010) explained, "Pearson correlation is robust with respect to skewness and non-normality" (p. 629). The researcher further stated, "The Pearson correlation like all parametric tests we have examined, is extremely robust with respect to violations of assumptions" (p. 630). Hence, the normality of the data obtained in this study was not confirmed.

A scatter plot between the two factors was also plotted for the entire data set (see Figure 1.6) because "the mandatory first step in all data analysis is to make a plot of the data in the most illustrative way possible" (Asuero, Sayago, & Gonzalez, 2006, p. 9). Asuero, *et al.* (2006) further stated regarding scatter plots that they are "particularly useful tools in exploratory analysis conveying information about the association" (p. 9). The visual representation of the association between the scores of collaborative learning and that of sense of community of the participants is shown in the scatter plot in Figure 1.6. The data points follow an upward trend, which implied that the direction of the association was

positive. This meant that if the score for collaborative learning increases, the score for sense of community would also increase.

The data set was further divided based on the academic classification: undergraduates and graduate students. This division was purely speculative and on the basis of the extensive experience as an online course designer. Although, maturity of students does play a role (Lawther & Walker, 2001) in online learning, the bifurcation as graduates and undergraduates is an aspect that has not been studied extensively.

A scatter plot and Pearson correlational coefficient was generated between the sense of community score and attitude towards collaborative learning score of each of the respondents for the two-mentioned classifications. Figure 1.7 represented the scatter plot of the scores of sense of community and collaborative learning for undergraduate respondents and Figure 1.8 represented the scatter plot of the scores of sense of community and collaborative learning for the graduate students. In both the plots, an upward trend of the data points is seen, which, implied that as one variable increased, the other increased as well. Hence, both the plots visually represented a positive correlation between sense of community and collaborative learning.

The Pearson product-moment correlational coefficient between attitude towards collaborative learning and sense of community for undergraduates was $r(120) = 0.591$, $p < 0.01$ and that for the graduate students was $r(68) = 0.772$, $p < 0.01$. This shows a moderate correlation for the undergraduate students whereas a highly strong correlation for the graduate students. It is interesting to note the difference between the two, which will be further discussed in Chapter 5.

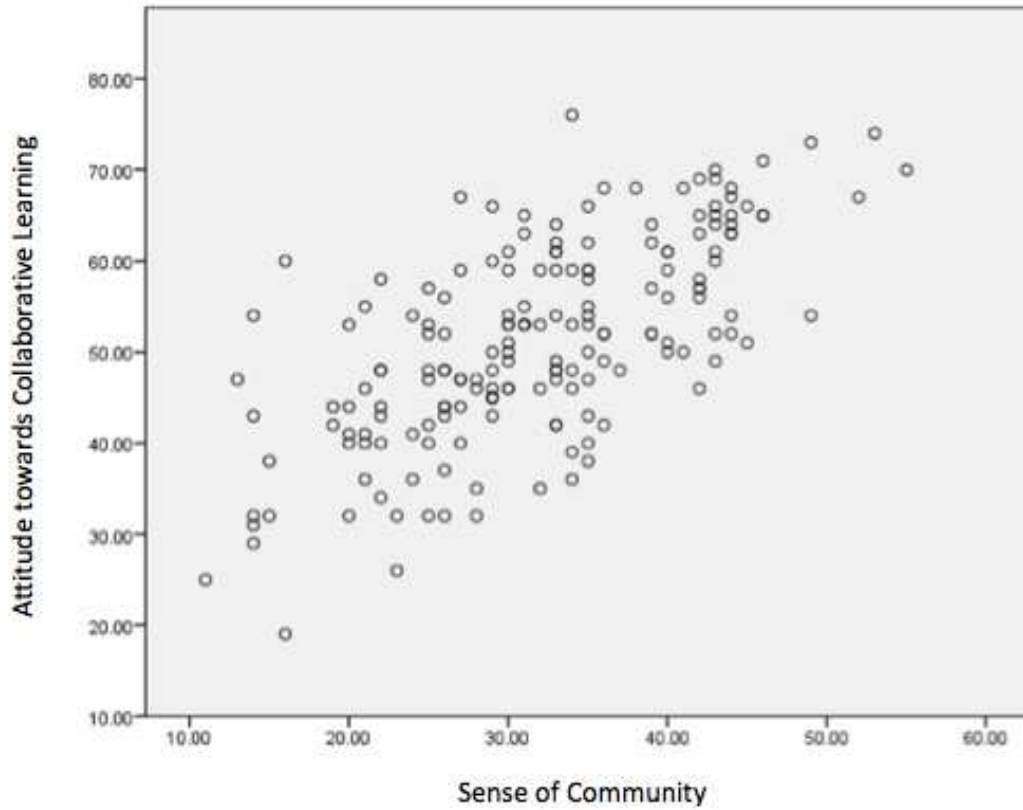


Figure 1.6: Scatter plot between total scores of each respondent of their attitude towards collaborative learning and sense of community in an online learning environment for *all* respondents of the main study.

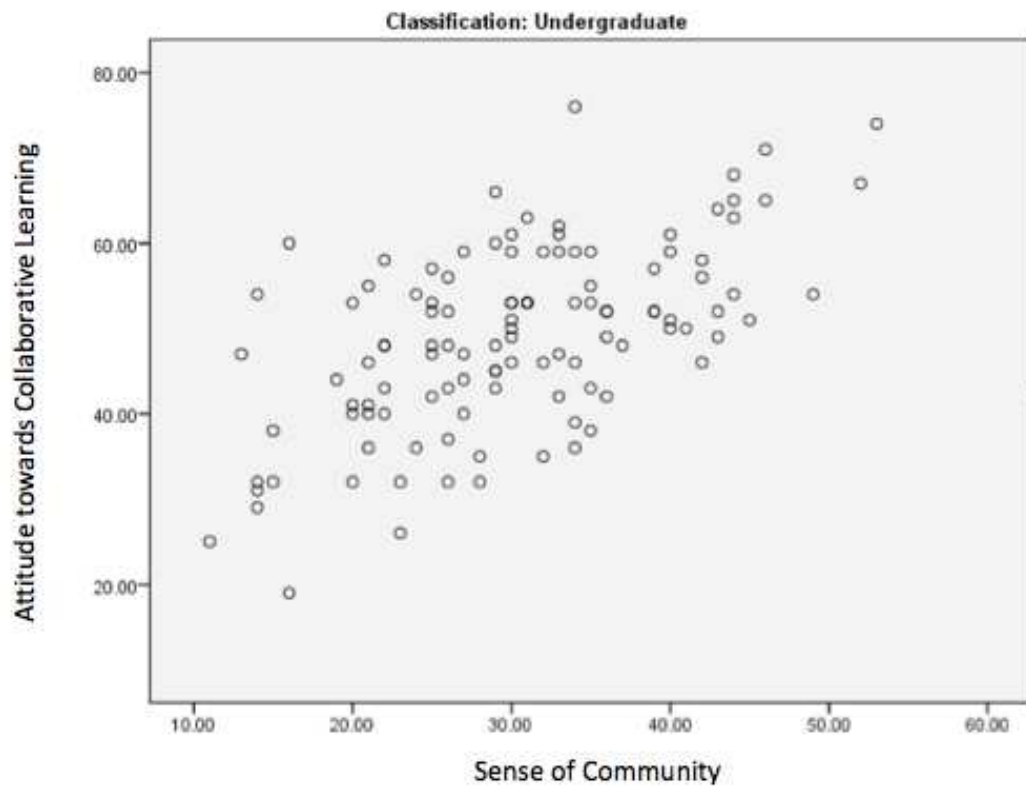


Figure 1.7: Scatter plot between total scores of each respondent of their attitude towards collaborative learning and sense of community in an online learning environment for *undergraduate* respondents of the main study.

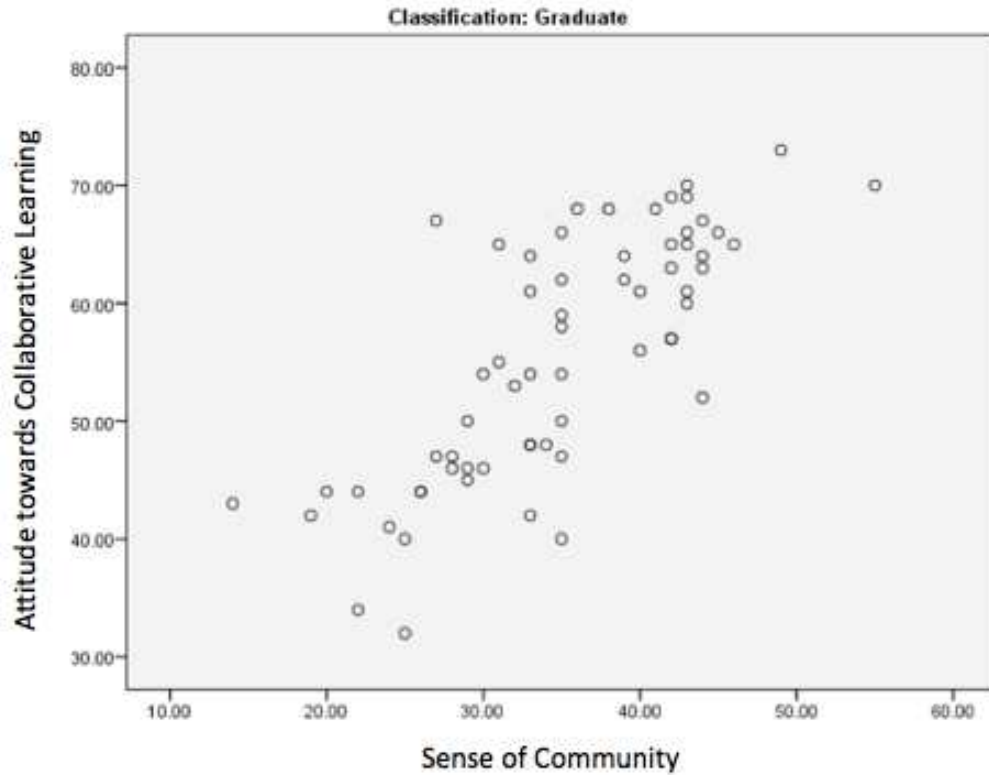


Figure 1.8: Scatter plot between total scores of each respondent of their attitude towards collaborative learning and sense of community in an online learning environment for *graduate* respondents of the main study.

As mentioned earlier, the questionnaire can essentially be categorized into six aspects, items related positive attitude and negative attitude towards collaborative learning and items that belong to the four dimensions of sense of community as described by McMillan and Chavis (1986). These are membership, influence, integration and fulfillment of needs, and shared emotional needs. An inter-item correlational coefficient matrix was computed based on the average of the scores in each of these six aspects (see Table 2.2) for the entire data set.

Comparing the Pearson's Product-Moment Correlation Coefficient between the positive attitude towards collaborative learning and the four dimensions of sense of community, a moderately strong correlation was observed, where, r , varied from 0.618 to 0.656. Whereas, comparing the Pearson product-moment correlation for negative attitude towards collaborative learning with the four dimensions of sense of community indicated that the correlation was low as, r , varied from 0.328 to 0.370 (Table 2.2). Furthermore, it is observed that the *integration* dimension of sense of community is strongly correlated to the *shared emotional connection* dimension of sense of community with the correlational coefficient being 0.723. Similar strong correlation was also observed between *integration and fulfillment of needs* and *shared emotional connection* dimensions of sense of community with the correlation coefficient being 0.787.

Hence, there is a clear distinction in the degree of correlation between a positive and a negative attitude towards collaborative learning when compared to the sense of community dimensions. This will be discussed further in Chapter 5.

Table 2.2: The inter-item correlational coefficient matrix for the six aspects of the questionnaire.

Inter-Item Correlation Matrix

	OCoL+	OCoL-	SoC_MEM	SoC_IN	SoC_IFN	SoC_SEC
OCoL+	1.000	0.474	0.618	0.554	0.565	0.656
OCoL-	0.474	1.000	0.328	0.353	0.324	0.370
SoC_MEM	0.618	0.328	1.000	0.628	0.597	0.685
SoC_IN	0.554	0.353	0.628	1.000	0.699	0.723
SoC_IFN	0.565	0.324	0.597	0.699	1.000	0.787
SoC_SEC	0.656	0.370	0.685	0.723	0.787	1.000

* OCoL+ = items related to the positive attitude towards collaborative learning
 OCoL- = items related to the negative attitude towards collaborative learning
 SoC_MEM = items related to the 'membership' dimension of Sense of Community
 SoC_IN = items related to 'Influence' dimension of Sense of Community
 SoC_IFN = items related to 'integration and fulfillment of needs' dimension of Sense of Community
 SoC_SEC = items related to 'shared emotional connection' dimension of Sense of Community

Summary

This chapter presented the results of the three stages of the study; namely, the mini-pilot study, pilot study, and the main study. The observations from the mini-pilot study regarding participant recruitment and data analysis were employed in the subsequent stages of the study. These observations included a targeted approach for recruiting of participants, use of a statistical tool for data analysis, and testing the reliability of the questionnaire. The Cronbach's Alpha reliability coefficient was found to be 0.924 for items related to the sense of community, 0.942 for the items related to collaborative learning, and 0.825 for the overall questionnaire. To address the research questions, the Pearson's product-moment correlation coefficient, $r(198) = 0.672$, $p < 0.01$, was calculated in the main study. This correlation coefficient implied a moderately strong correlation between the two

constructs; namely, sense of community and students' attitude towards collaborative learning. A difference in the Pearson's product-moment correlations coefficient was found when the data was divided based on the academic classification of participants as graduate and undergraduate students. The correlational coefficient, for sense of community and attitude towards collaborative learning, for graduate students was $r(68) = 0.772$, $p < 0.01$ and for the undergraduate students was $r(120) = 0.591$ $p < 0.01$. Furthermore, the inter-item correlational coefficients for the scores of positive attitude of students towards collaborative learning and sense of community were higher than those of the negative attitude of students towards collaborative learning and sense of community.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Introduction

With the advancement of communication technologies and the Internet, the lack of physical proximity to fellow classmates and the instructor is being mitigated rapidly in online learning environments (So & Brush, 2008). One of the many aspects that such advancements has had an impact on is interaction in online learning and teaching. As stated previously, interactions play a crucial role in online learning especially when it comes to students' satisfaction and outcomes. Wallace (2003) stated "students in online courses value and benefit from interaction with other students" (p. 250).

This correlational study aimed at investigating interactions between learners from the perspective of sense of community and collaborative learning. Both the constructs, collaborative learning (Kreijns, Kirschner, & Jochems, 2000) and sense of community (Swan, 2002), play a crucial role in establishing and supporting online interactions. Many research studies have addressed the benefits of each of these factors in an online learning environment (Song, Singleton, Hill, & Koh, 2004; Rovai, 2002; Pallof & Pratt, 1999). However, there is a lack of existing studies that elucidates specifically the correlation between collaborative learning and sense of community. This correlational study attempts to fill that gap in literature and give an educated insight into the interplay of collaborative learning and sense of community in asynchronous online learning environments.

This chapter addresses the two research questions previously stated and presents a discussion on the results and findings of the study. The chapter concludes by enunciating the summary of the results, limitations of the study and the direction for future research in this area.

Discussion of Results

This study was conducted in three-phases: (1) the mini-pilot study, (2) the pilot study, and (3) the main study. The findings and results are discussed in terms of three broad themes that emerged as a result of the data analyses. These were (1) students' attitude towards collaborative learning and sense of community are correlated, (2) positive attitude towards collaborative learning has a higher degree of correlation with sense of community, and (3) graduate students have a higher degree of correlation between their attitude towards collaborative learning and sense of community.

The research questions that guided this study and addressed in this study were:

1. Is there a correlation between students' attitude towards collaborative learning and sense of community in asynchronous online learning environments?
2. What is the nature of the correlation that exists between collaborative learning and sense of community in asynchronous online learning environments?

Students' attitude towards collaborative learning and sense of community are significantly correlated

The findings of the correlational analysis of the data of the main study indicate a statistically significant Pearson product-moment coefficient of $r(198) = 0.672, p < 0.01$. This implied that a moderate positive correlation existed between students' attitude towards collaborative learning and students' sense of community while taking online courses. The direction of the correlational coefficient was positive which also indicated that when one variable increased, the other variable increased as well. This further implied that when sense of community would increase, that is, students' feeling of connectedness with other learners in an online learning environment where they are primarily interacting via online collaborative tools, students' attitude towards collaborative learning would also increase. Since, this is a correlational study with no distinction between the dependent and independent variable, the interpretation can also be reversed. Hence, a positive correlation would also imply that when student's attitude towards collaborative learning increases, which essentially in this study is the attitude of students towards using online collaborative tools, the sense of community would also increase.

This finding is corroborated in a research study conducted by Swan (2002) who examined interactions in online courses and explored the relationship between course design factors and student perceptions in 73 online courses. The findings indicated that student satisfaction, perceived learning, perceived interaction with the instructor, and perceived interaction with peers were all highly interrelated. Specifically, concentrating on their findings on peer-peer interaction, it can be said that students with higher levels of

interaction were associated with higher levels of satisfaction as well. Swan also observed that students actively interacting with one another developed a greater sense of social presence. Social presence, in turn, is one of the indicators that help in creating a sense of community (Mayne & Wu, 2011).

Furthermore, Rovai (2002) explored the factors that help in building a sense of community in an online learning environment where collaborative learning was one of the eight discussed factors. The correlation between sense of community and collaborative learning found in this study further strengthens the argument that collaborative learning and sense of community go hand in hand. Rovai (2002) stated “one strategy to help increase retention is to provide students with increased affective support by promoting a strong sense of community. Such a strategy has the potential to reverse feelings of isolation and, by making connections with other learners, to provide students with a larger base of academic support” (p. 12).

These results of the present study are further supported by a research based on the premise that creating a sense community can be achieved through interactions (O’Hare, 2008). O’Hare (2008) explored the basic forms of interactions taking place in an online learning environment that promoted community building. He identified four categories under which his proposed four indicators of community could be categorized into. These were interaction, socialization, collaboration, and community. The correlation identified between students’ attitude towards collaborative learning and sense of community found in this study supports O’Hare’s (2008) results.

Other studies (for example, Gallagher-Lepak *et al.*, 2009; Conrad, 2005) that support the premise that collaborative work among learners is instrumental in building of communities and creating a sense of community among learners corroborate the results of the present study. Both collaborative work and sense of community are desirable in online learning and teaching as both these constructs promote interactions between learners. According to Vygotsky's (1978) social cultural theory, such interactions between learners are crucial for the understanding of the material and creation of knowledge. This is further rooted in social constructivist theory of learning which explicates that learners were not passive receivers of knowledge, rather they participate in their respective construction of knowledge. In a study by Soo and Bonk (1998), they identified learner-learner interaction to be the most important interaction in an online learning environment. Furthermore, Ally (2004) stated "Working with other learners gives learners real-life experience of working in a group and allows them to use their metacognitive skills" (p. 31). So and Brush (2008) further stated "Collaborative learning is a form of learner and learner interaction" (p. 319).

Furthermore, So and Brush (2008) also found a positive correlation between student's high levels of collaborative learning and satisfaction in online courses. This meant that students who perceived higher levels of collaborative learning were more satisfied with their distance course. The study also found that learners with high levels of collaborative learning also had higher levels of social presence. So and Brush (2008) also conducted interviews with graduate students taking a particular course and the analysis of the interview data revealed three critical factors associated with learners' perception of

collaborative learning, social presence, and satisfaction. They were course structure, emotional support, and communication.

Based on the previous research, one can say that interactions between learners is one of the key elements of collaborative learning and an increase in interactions would enhance collaborative learning as well (Kreijns, Kirschner, & Jochems, 2003). Hiltz (1994) emphasized the significance of social interaction and stated “the social process of developing shared understanding through interaction is the ‘natural’ way for people to learn” (p. 22). Since students’ attitude towards collaborative learning is positively correlated to sense of community, as determined in this present study, an increase in collaborative learning would mean an increase in students’ sense of community in the online learning environment.

Positive attitude towards collaborative learning correlated positively with sense of community

Comparing the inter-item correlational coefficients, it was seen that the correlation between the positive attitude towards collaborative learning and the four dimensions of sense of community; namely, membership, influence, integration and fulfillment of needs, and shared emotional connection, was much higher than the correlation between the negative attitude towards collaborative learning and sense of community dimensions. Recalling, in this study, the attitude towards collaborative learning was equated to the students’ attitude towards using online collaborative tools such as discussion boards, blogs, Wikis, and others.

This is an interesting outcome of the present study. In general, the ease in using technology plays a critical role in the success of an online course (Volery & Lord, 2000). Edmunds, Thorpe, and Conole (2012) argued that the “usefulness and ease of use are key aspects of students’ attitudes towards technology in all areas” (p. 83). Further, the attitude of learners towards using online collaborative tools is important for the success of collaboration. Liaw, Chen, and Huang (2008) studied web-based collaborative learning systems for knowledge management and proposed five attitude factors that affect the use of such web-based collaborative learning systems; namely, system functions, collaborative activities, learners’ characteristics, system acceptance, and system satisfaction. They further investigated the factors that affect learners’ acceptance or rejection of online collaborative tool and proposed an acceptance model for realizing learner’s attitude towards web-based collaborative systems.

In the light of this existing research and based on the results of this current study, it can be said that an increase in students’ positive feeling regarding use of online collaborative tools will relate to a greater use of such tools for collaborative learning. In this study, collaborative learning is defined as the students’ attitude towards using of online collaborative tool for peer interaction. Hence, a greater use of online collaborative tools would imply an increase in online collaborative learning by the students. As collaborative learning is positively correlated to sense of community as found in this study, an increase in collaborative learning would also increase in students’ sense of community in the online learning environment.

These findings combined with the five attitude factors of learners towards collaborative learning tools, as suggested by Liaw *et al.* (2008), can be used to further to investigate deeper into how collaborative learning tools effect the creation sense of community.

Bifurcation of results and findings between graduate and undergraduate students

The data set of the main study was further analyzed based on the academic classification of the participants; namely, as undergraduate and as graduate students. It was interesting to note that collaborative learning and sense of community, in both cases, were positively correlated. The degree of correlation was however, higher among graduate students than in the case of undergraduate students. It has been observed that student maturity plays a role in online learning (Lawther & Walker, 2001), although this is an area that needs further research and investigation. Interestingly, in another study (Richardson & Swan, 2003), students with high perception of social presence indicated a high perceived learning and satisfaction in online learning. The study considered age, gender, and number of college credits earned. They found no variability in terms of age on student's overall perception of social presence (Richardson & Swan, 2003).

The variability in the correlation according to academic classification is a novel finding of this study and can be further investigated to study the variance in sense of community and collaborative learning.

Limitations of the Study

This study adds to the literature in online learning regarding the interplay of sense of community and collaborative learning. However, there are some limitations to this study as well that should be discussed.

First, the low response rate in the main study limits the generalizability of the results to a wider population. The target population was students taking at least one online course in one large Mid-Western research university. The results and findings may not be applied to students of other universities. This low response rate should be considered while interpreting the results and findings. Moreover, a self-reported questionnaire was used to collect the data about students' level of agreement with the items in the questionnaire. There is always a room for interpretation of the constructs the data collection instrument was measuring.

The effectiveness of both constructs was not within the scope of this study. Hence, data regarding parameters such as student grades and GPA was not collected for the purpose of this study. There have been conflicting views in the literature regarding the effect of demographics on sense of community and collaborative learning (Lawther & Walker, 2001; So & Brush, 2008). Furthermore, such data was not collected from the participants except for academic classification. The reason for including academic qualification into interpreting of the data was purely speculative. However, data regarding gender, prior experience with online learning, and age could possibly have helped with a more complete interpretation of the data collected in this study.

Some may argue that one of the limitations of this study is its inability to establish cause-effect relationships. Correlational studies give an insight into the relationship between the concerned factors but cannot be used to infer causal effects. Hence, it cannot be definitively implied whether an increase in the overall collaborative learning score was caused by an increase in the overall sense of community score or vice-versa. This study was not designed to address the cause-effect concerning the two factors; namely, sense of community and collaborative learning. Hence, it cannot be determined which of the two factors was the dependent variable and which was the independent variable.

Direction for Future Research

This study can be further extended by a predictive study by employing regression analysis to determine the equation of prediction. From such an equation, it can be determined the percentage of variability in the dependent variable. This will provide a definitive insight into the causal effect of the observed correlation between collaborative learning and sense of community in this study.

The variability in the data set according to the academic classification is an area that can be further investigated. An insight into the factors that affect the motivation levels of graduate and undergraduate can throw some light into such variability.

Since, in this study, collaborative learning was equated to the attitude of students towards the use of the online collaborative tools, other variables affecting the use of such technology; namely, ease of access and navigation, interface design, and level of interaction can be also further investigated (Volery & Lord, 2000).

Moreover, a controlled comparative study with students taking a face-to-face course and students taking the same course online would provide more insight into the interplay of students' sense of community and their attitude towards collaborative learning and how each one shapes up in the respective learning environments.

Conclusions

This study is one of the few very studies that deal specifically with both collaborative learning and sense of community. The online learning environment, where the learner is distributed both temporally and physically, it is extremely crucial for educators to foster an environment that is conducive to learning, increases student satisfaction along with meeting learner outcomes. Such an environment will also motivate the learner to stay in the online course and help in mitigating the high attrition rates associated with online learning (DiRamio & Wolveton, 2006). Sense of community among learners and collaborative learning has played an important role in creating such rich and meaningful online learning experience for students (Outz, 2006; Rovai, 2002; O'Hare, 2008).

This study addressed both the research questions that were guiding this work. The questions included finding the existence of correlation between sense of community and students' attitude toward collaborative learning and the nature of the correlation. This study found a significant positive correlation between attitude towards collaborative learning and students' sense of community in an online learning environment. Further, students' positive attitude towards collaborative learning had a greater degree of correlation with the four dimensions of sense of community than the correlation between

the negative attitude towards collaborative learning and sense of community. This study lays the foundation for the argument that collaborative learning and sense of community are mutually dependent were one factor effecting the other. If there is no collaboration, there is no social interaction. If there is no social interaction, there is no sense of community. It further supports the argument that a sense of community can be built through interaction, specifically, through learner-learner interaction (Shackelford, & Maxwell, 2012), through the instructional strategy of collaborative learning.

In this age where institutions of higher education are fast adopting online learning to reach out to more and more students, it is imperative that educators take the responsibility to provide meaningful and highly satisfying online learning experiences. There must be opportunities in these online courses that provide learners with ample chances to interact with peers and build a sense of connectedness and community. This study reinforces the inclusion of collaborative learning and building a sense of community in online courses and proposes that instructional designers and educators rethink their course design to include these two significant players in successful online education.

REFERENCES

- Abfalter, D., Zaglia, M. E., & Mueller, J. (2012). Sense of virtual community: A follow up on its measurement. *Computers in Human Behavior*, 28(2), 400-404.
- Abrami, P. C., & Bures, E. M. (1996). Computer-supported collaborative learning and distance education. *American Journal of Distance Education*, 10(2), 37-42.
- Algesheimer, R., Dholakia, U. M., Herrman, A., (2005). The social influence of brand community: Evidence from European car clubs. *Journal of Marketing* 69(3). 19–34
- Allen, I. E., & Seaman, J. (2013). *Changing Course: Ten Years of Tracking Online Education in the United States*. Sloan Consortium. PO Box 1238, Newburyport, MA 01950.
- Allen, I. E., & Seaman, J. (2014). Grade change: Tracking online education in the United States, 2013. *Babson Survey Research Group and Quahog Research Group, LLC*. Retrieved on, 3(5), 2014.
- Ally, M. (2004). Foundations of educational theory for online learning. *Theory and Practice of online learning*, 2, 15-44. Retrieved from http://cde.athabasca.ca/online_book/ch1.html
- Angelino, L. M., Williams, F. K., & Natvig, D. (2007). Strategies to engage online students and reduce attrition rates. *Journal of Educators Online*, 4(2), 1-14.
- Asuero, A. G., Sayago, A., & Gonzalez, A. G. (2006). The correlation coefficient: An overview. *Critical reviews in analytical chemistry*, 36(1), 41-59.
- Augar, N., Raitman, R., & Zhou, W. (2004). Teaching and learning online with wikis. In *Beyond the comfort zone: proceedings of the 21st ASCILITE Conference, Perth, 5-8 December*, 95-104. ASCILITE.
- Belcher, M. J. (1996). A Survey of current and potential graduate students. *Research Report 96-04*. Boise, ID: Boise State University. (ERIC Document Reproduction Service No. ED 400 773).
- Bento, R., Schuster, C. (2003). *Participation: The online challenge*. A. Aggarwal (Ed.), *Web-based education: Learning from experience* (pp. 156-164), Hershey, Pennsylvania: Idea Group Publishing.

- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, A., Tamim, R., Surkes, M. A., et al. (2009). A meta-analysis of three interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289. doi:10.3102/0034654309333844v1
- Biasutti, M. (2011). The student experience of a collaborative e-learning university module. *Computers & Education*, 57, 1865–1875. <http://dx.doi.org/10.1016/j.compedu.2011.04.006>.
- Biasutti, M., & EL-Deghaidy, H. (2012). Using Wiki in teacher education: impact on knowledge management processes and student satisfaction. *Computers & Education*, 59(3), 861–872. <http://dx.doi.org/10.1016/j.compedu.2012.04.009>.
- Blanchard, A.L. (2007). Developing a sense of virtual community measure. *Cyber Psychology and Behavior*, 10(6), 827–830.
- Bolliger, D. U., & Martindale, T. (2004). Key factors influencing student satisfaction with online courses. *International Journal on E-Learning*, 3(1), 61-67.
- Bonk, C. J., & Cunningham, D. J. (1998). Searching for learner-centered, constructivist, and sociocultural components of collaborative educational learning tools. In C. J. Bonk & K. S. King (Eds.), *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse*, (pp. 25–30). Mahwah, NJ: Lawrence Erlbaum.
- Bos, N. and N. S. Shami (2006). Adapting a face-to-face role-playing simulation for online play. *Educational Technology Research and Development* 54(5), 493–521.
- Boulos, M. N., Maramba, I., & Wheeler, S. (2006). Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(1), 41.
- Branon, R. F., & Essex, C. (2001). Synchronous and asynchronous communication tools in distance education. *TechTrends*, 45(1), 36-36.
- Brindley, J., Blaschke, L., & Walti, C. (2009). Creating Effective Collaborative Learning Groups in an Online Environment. *The International Review of Research in Open and Distributed Learning*, 10(3). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/675/1271>
- Burroughs, S. M., & Eby, L. T. (1998). Psychological sense of community at work: A measurement system and explanatory framework. *Journal of Community Psychology*, 26(6), 509–532.

- Cantelon, J. E. (1995). The evolution and advantages of distance education. *New Directions for Adult and Continuing Education*, 1995(67), 3-10.
- Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education*, 46(23), A39-A41.
- Casey, D. (2008). A journey to legitimacy: The historical development of distance education through technology. March/April. *TechTrends* 52(2). 45–51.
- Chavis, D. M., & Wandersman, A. (1990). Sense of community in the urban environment: A catalyst for participation and community development. *American Journal of Community Psychology*, 18(1), 55-81.
- Chickering, A. W., & Gamson, Z. F. (1987). Seven Principles for Good Practice in Undergraduate Education. *AAHE Bulletin*, 6.
- Clark, R. E. (1983, Winter). Reconsidering research on learning from media. *Review of Educational Research*, 53(4), 445–459
- Conrad, D. (2005). Building and Maintaining Community in Cohort-Based Online Learning. *Journal of Distance Education*, 20(1), 1-20.
- Correia, A.-P., & Yusop, F. (2010). *Teaching online: A Quick reference for online instructors*. Ames, IA: Iowa State University Seed Science Center, p. 47
- Couper, M. P. Traugott, M., & Lamias, M. (2001). Web Survey design and administration. *Public Opinion Quarterly* (65), 230–253.
- Curtis, D. D., & Lawson, M. J. (2001). Exploring collaborative online learning. *Journal of Asynchronous learning networks*, 5(1), 21-34.
- Chavis, D. M., Hogge, J. H., McMillan, D. W., & Wandersman, A. (1986). Sense of community through Brunswik's lens: A first look. *Journal of community psychology*, 14(1), 24-40.
- Diaz, D. and R. Cartnal (2006). Term length as an indicator of attrition in online learning. *Innovate: Journal of Online Education*. 5(6).
- Dillenbourg, P. (1999). What do you mean by collaborative learning? *Collaborative-learning: Cognitive and Computational Approaches*, 1-19.
- Dillenbourg, P., & Schneider, D. (1995). Collaborative learning and the Internet. In *Published at <http://tecfasun1.unige.ch/tecfa/tecfa-research/CMC/colla/iccai95>*. 1. html. ICCAI 95.

DiRamio, D., & Wolverton, M. (2006). Integrating learning communities and distance education: Possibility or pipedream? *Innovative Higher Education*, 31(2), 99-113.

Duffy, T.M., & Jonassen, D. H. (1992). *Constructivism: New implications for instructional technology*. T.M. Duffy, D.H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation*. Lawrence Erlbaum, New Jersey.

Edelson, D. C., Pea, R. D., & Gomez, L. (1996). Constructivism in the collaborator. *Constructivist learning environments: Case studies in instructional design*, 151-164.

Edmunds, R., Thorpe, M., & Conole, G. (2012). Student attitudes towards and use of ICT in course study, work and social activity: A technology acceptance model approach. *British Journal of Educational Technology*, 43(1), 71-84.

Felton, B. J., & Shinn, M. (1992). Social integration and social support: Moving 'social support' beyond the individual level. *Journal of Community Psychology*, 20(1), 103-115.

Field, A. (2009). *Discovering statistics using SPSS*. Sage.

Francescato, D., Porcelli, R., Mebane, M., Cuddetta, M., Klobas, J., & Renzi, P. (2006). Evaluation of the efficacy of collaborative learning in face-to-face and computer-supported university contexts. *Computers in Human Behavior*, 22(2), 163-176.

Fredericksen, E, A. Picket, P. Shea, W. Pelz, K. Swan (2000). Student satisfaction and perceived learning with on-line courses: Principles and examples from the SUNY learning network. *Journal of Asynchronous Learning Networks*, 4(2), 7-41.

Gallagher-Lepak, S., Reilly, J., & M Killion, C. (2009). Nursing student perceptions of community in online learning. *Contemporary Nurse*, 32(1-2), 133-146.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking and computer conferencing: a model and tool to access cognitive presence. *American Journal of Distance Education*, 15(1), 7-23

Garrison, D.R. (1993). A cognitive constructivist view of distance education: An analysis of teaching-learning assumptions. *Distance Education*, 14(2), 199-211.

Gay, L. R., & Airasian, P. (2000). *Educational research: Competencies for analysis and application* (6th ed.). Englewood Cliffs, NJ: Prentice-Hall

George, D., & Mallery, P. (2011). *SPSS for Windows Step by Step: A Simple Guide and Reference*, 18.0 Update: Pearson Education.

- Graves, L.N. (1992). Cooperative learning communities: Context for a new vision of education and society. *Journal of Education*, 174 (2), p. 57-79.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education*, 11(3), 8-26.
- Gusfield, J. R. (1975). *Community: A critical response*. New York: Harper & Row.
- Harasim, L.M., S.R., Teles, L., & Turnoff, M. (1995). Learning networks: A field guide to teaching and learning online. Cambridge, MA: MIT Press.
- Hillman, D. C., Willis, D. J., & Gunawardena, C. N., (1994). Learner-interface interaction in distance education. An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education*, 8(2), 30-42.
- Hiltz, S. R., Coppola, N., Rotter, N., Toroff, M., & Benbunan-Fich, R. (2000). Measuring the Importance of Collaborative Learning for the Effectiveness of ALN: A Multi-Measure. *Online Education: Learning effectiveness and faculty satisfaction*, 1, 101-119.
- Hiltz, S. R. (1994). *The virtual classroom: learning without limits via computer networks*. Ablex Publishing Corporation, Norwood, NJ USA
- Hinkle, D.E., Wiersma, W., Jurs, S. G. (1998). *Applied Statistics for the Behavioral Sciences*, (4th ed.) Boston: Houghton Mifflin.
- Hirumi, A. (2002). The Design and Sequencing of eLearning Interactions: A Grounded Approach. *International Journal on E-Learning*, 1(1), 19-27.
- Hsu, Y. C., Ching, Y. H., & Grabowski, B. L. (2014). Web 2.0 applications and practices for learning through collaboration. In *Handbook of research on educational communications and technology* (pp. 747-758). Springer New York.
- Johns, R. (2010). Likert items and scales. *Survey Question Bank: Methods Fact Sheet*, 1.
- Johnson, D. W., & Johnson, R. T. (1996). Cooperation and the use of technology. *Handbook of research for educational communications and technology: A project of the Association for Educational Communications and Technology*, 1017-1044.
- Johnson, S. D., Aragon, S. R., & Shaik, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research*, 11(1), 29-49.

- Jonassen, D., & Land, S. (Eds.). (2012). *Theoretical foundations of learning environments*. Routledge. 7-10.
- Jonassen, D. H. (1999). *Designing constructivist learning environments*. In C. M. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm of instructional theory*. Mahwah, NJ: Lawrence Erlbaum. 217-239.
- Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in Education and Teaching International*, 39(2), 153-162.
- Kai-Wai Chu, S., & Kennedy, D. M. (2011). Using online collaborative tools for groups to co-construct knowledge. *Online Information Review*, 35(4), 581-597.
- Kanuka, H., & Jugdev, K. (2006). Distance education MBA students: An investigation into the use of an orientation course to address academic and social integration issues. *Open Learning*, 21(2), 153-166.
- Kay, B. & Johnson, T. J. (1999). Research methodology: taming the cyber frontier. Techniques for improving online Survey. *Social Science Computer Review* 17(3), 323–337.
- Keller, J., & Suzuki, K. (2004). Learner motivation and e-learning design: A multinationally validated process. *Journal of Educational Media*, 29(3), 229-239.
- Key, J. P. (1997). Survey and Interview as Data—Gathering Tools. *Oklahoma State University: Stillwater, OK, USA*.
- Kirschner, P. A. (2001). Using integrated electronic environments for collaborative teaching/learning. *Learning and Instruction*, 10, 1-9.
- Kitchenham, B. A., & Pfleeger, S. L. (2002). Principles of survey research: part 3: constructing a survey instrument. *ACM SIGSOFT Software Engineering Notes*, 27(2), 20-24.
- Korkmaz, Ö. (2012). A validity and reliability study of the Online Cooperative Learning Attitude Scale (OCLAS). *Computers & Education*, 59(4), 1162-1169.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, 19(3), 335-353.

- Kreijns, K., Kirschner, P. A., Jochems, W., & Van Buuren, H. (2007). Measuring perceived sociability of computer-supported collaborative learning environments. *Computers & Education*, 49(2), 176-192.
- Laal, M., & Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia-Social and Behavioral Sciences*, 31, 486-490.
- Laal, M., & Laal, M. (2012). Collaborative learning: what is it? *Procedia-Social and Behavioral Sciences*, 31, 491-495.
- Lane, B., & Dorfman, D. (1997). Strengthening Community Networks: The Basis for Sustainable Community Renewal. Program Report.
- Laurillard, D. (2002). *Rethinking university teaching: A conversational framework for the effective use of learning technologies* (2nd Ed). Routledge.
- Lawther, P., & Walker, D. H. T. (2001). An evaluation of a distributed learning system. *Education & Training*, 43, 105-116.
- Liaw, S. S., Chen, G. D., & Huang, H. M. (2008). Users' attitudes toward Web-based collaborative learning systems for knowledge management. *Computers & Education*, 50(3), 950-961.
- Ludwig-Hardman, S. (2003). *Case study: Instructional design strategies that contribute to the development of online learning community* (Doctoral dissertation, University of Colorado at Denver).
- Maltby, J. R., & Whittle, J. (2000). Learning programming online: Student perceptions and performance. *Proceedings of the ASCILITE 2000 Conference*. Retrieved September 30, 2004, from http://www.ascilite.org.au/conferences/coffs00/papers/john_maltby.pdf.
- Martin, C. (1996). *Institutional research and student recruitment, or how do institutions of higher education know what attracts students to their doors? Market research can help*. Paper presented at the annual forum of the Association for Institutional Research, Albuquerque, NM. (ERIC Document Reproduction Service No. ED 397 744).
- Mayne, L. A., & Wu, Q. (2011). Creating and measuring social presence in online graduate nursing courses. *Nursing Education perspectives*, 32(2), 110-114.
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of community Psychology*, 14(1), 6-23.

- Medlin, C., Roy, S., & Ham Chai, T. (1999, November). World Wide Web versus mail surveys: A comparison and report. In *Communication à la conférence de l'Australian and New Zealand Marketing Academy, Sydney*.
- Mertler, C. A., & Vannatta, R. A. (2002). *Advanced and multivariate statistical methods*. Los Angeles, CA: Pyrczak.
- Milio, N. (1996). *Engines of empowerment: Using information technology to create healthy communities and challenge public policy*. Chicago: Health Administration Press.
- Moller, L., Foshay, W., & Huett, J. (2008). The evolution of distance education: Implications for instructional design on the potential of the Web. July/August. *TechTrends*, 52(4). 66–70.
- Moore, M. G. & Kearsley, G. (1996). *Distance Education: A Systems View*. Wadsworth Publishing Company, CA, USA.
- Moore, M.G. (1993). *Theory of transactional distance*. In D. Keegan (Ed.), *Theoretical principles of distance education* (pp. 22-38). New York: Routledge.
- Norman, G. (2010). Likert scales, levels of measurement and the “laws” of statistics. *Advances in Health Sciences Education*, 15(5), 625-632.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- O’Hara, L. J. (2008). *An investigation of the formation of learning community in web-based distance education* (Unpublished Doctoral dissertation). University of Pittsburg. USA. Retrieved from <http://challenger.library.pitt.edu/ETD/available/etd-04302008-092522/>
- Orellana, A. (2006). Class size and interaction in online courses. *Quarterly Review of Distance Education*, 7(3), 229-248.
- Palloff, R., & Pratt, K. (1999). *Building learning communities in cyberspace* (Vol. 99). San Francisco, CA: Jossey-Bas
- Panitz, T. (1999). *Collaborative versus Cooperative Learning: A Comparison of the two concepts which will help us understand the underlying nature of interactive learning*. Retrieved from <http://files.eric.ed.gov/fulltext/ED448443.pdf>.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students* (Vol. 2). K. A. Feldman (Ed.). San Francisco, CA: Jossey-Bass.

- Patterson, B., & McFadden, C. (2009). Attrition in online and campus degree programs. *Online Journal of Distance Learning Administration*, 12(2).
- Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient Alpha. *Journal of Consumer Research*, 381-391.
- Piaget, J. (1953). *The origins of intelligence in children*. New York, NY: Basic Books.
- Revere, L., & Kovach, J. V. (2011). Online technologies for engaged learning. *Quarterly Review of Distance Education*, 12(2), 113-124.
- Richardson, J. C., & Swan, K. (2003). *Examining social presence in online courses in relation to students' perceived learning and satisfaction*. Retrieved from <http://hdl.handle.net/2142/18713>.
- Roschelle, J., & Teasley, S. (1995). *The construction of shared knowledge in collaborative problem solving*. In C. O'Malley (Ed.), *Computer-supported collaborative learning* (pp. 69-197). Berlin, Germany: Springer Verlag.
- Rossman, M. H., & Rossman, M. E. (1995). *Facilitating Distance Education*, San Francisco: Jossey-Bass.
- Rovai, A. (2002). Building Sense of Community at a Distance. *The International Review of Research in Open And Distance Learning*, 3(1). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/79>
- Rovai, A. P (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education* 6(1), 1-16.
- Rovai, A. P. (2000). Building and sustaining community in asynchronous learning networks. *The Internet and Higher Education*, 3(4), 285-297.
- Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, 5(4), 319-332.
- Russell, T. L. (1999). *The "no significant difference phenomenon."* Raleigh: North Carolina State University. Retrieved September 30, 2004, from http://nt.media.hku.hk/no_sig_diff/phenom1.html.
- Scheel, N. P., & Branch, R. C. (1993). The role of conversation and culture in the systematic design of instruction. *Educational Technology*, 23(8), 7-18.

- Schunk, D. H. (2008). *Learning theories: An educational perspective*. (5th ed.). New York, NY: Prentice Hall.
- Shackelford, J. L., & Maxwell, M. (2012). Sense of community in graduate online education: Contribution of learner to learner interaction. *The International Review of Research in Open and Distributed Learning*, 13(4), 228-249.
- Sheehan, K. B. & McMillan, S. J. (1999). Response variation in e-mail Survey: An exploration. *Journal of Advertising Research* 39(4). 45–54.
- Sills, S. J. & Song, C. (2002) Innovations in Survey Research: An application of Web-based Surveys. *Social Science Computer Review* 20(1). 22–30
- Smith, C. B. (1997). Casting the Net: Surveying an Internet population. *Journal of Computer-Mediated Communication*. 3(1). <http://www.ascusc.org/jcmc/vol3/issue1/smith.htm>
- So, H. J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, 51(1), 318-336.
- Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *The Internet and Higher Education*, 7(1), 59-70.
- Soo, K., & Bonk, C. J. (1998). Interaction: What does it mean in online distance education? Paper presented at the *ED/MEDIA/ED-TELECOM 98 World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Telecommunications*, Freiburg, Germany. Retrieved from <http://files.eric.ed.gov/fulltext/ED428724.pdf>.
- Stepich, D. A., & Ertmer, P. A. (2003). Building Community as a Critical Element of Online Course Design. *Educational Technology*, 43(5), 33-43.
- Streiner D (2003). Starting at the beginning: an introduction to coefficient Alpha and internal consistency. *Journal of personality assessment*, 80, 99-103.
- Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information*, 2(1), 23-49.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53–55. doi: 10.5116/ijme.4dfb.8dfd

- Thompson, B., Diamond, K. E., McWilliam, R., Snyder, P., & Snyder, S. W. (2005). Evaluating the quality of evidence from correlational research for evidence-based practice. *Exceptional Children*, 71(2), 181-194.
- Thurmond, V. A. (2003). *Examination of interaction variables as predictors of students' satisfaction and willingness to enroll in future Web-based courses while controlling for student characteristics* (Doctoral Dissertation). University of Kansas. Parkland, FL: Dissertation.com. Available online <http://www.dissertation.com/library/1121814a.htm>
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.) Chicago: University of Chicago Press.
- Top, E. (2011). Blogging as a social medium in undergraduate courses: Sense of community best predictor of perceived learning. *Internet and Higher Education*. 15(1). 24-28. <http://dx.doi.org/10.1016/j.iheduc.2011.02.001>.
- V. Tinto (1997). Classrooms as communities—exploring the educational character of student persistence. *Journal of Higher Education*, 68(6). 599–623.
- Van Selm, M., & Jankowski, N. W. (2006). Conducting online Survey. *Quality and Quantity*, 40(3), 435-456.
- Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, 14(5), 216-223.
- Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Harvard University Press.
- Wallace, R. M. (2003). Online learning in higher education: A review of research on interactions among teachers and students. *Education, Communication & Information*, 3(2), 241-280.
- Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of asynchronous learning networks*, 2(1), 34-49.
- Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.
- Westheimer, J. & Kahne, J. (1993). Building school communities: An experience based model. *Phi Delta Kappan*, 75(4), 324-28.

- Wikeley, F., & Muschamp, Y. (2004). Pedagogical implications of working with doctoral students at a distance. *Distance Education*, 25(1), 125-142.
- Wilkinson, L., & The Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54, 594-604
- Willmott, P. (1986). *Social networks: informal care and public policy*. London, Policy Studies Institute.
- Zady, M. (2000). Correlation and simple least squares regression. *Clinical laboratory science program*. Louisville, Kentucky: University of Louisville.
- Zhu, C. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, 15(1), 127-136.

APPENDIX A

PILOT AND MAIN STUDY QUESTIONNAIRE

Online learning experiences

This survey is part of my graduate thesis at Iowa State University in fulfillment of Master of Science degree requirement.

You are being invited to participate as you are currently enrolled in an Iowa State University (ISU) online graduate/ undergraduate course. You should not participate if you are under 18 years of age and/or are not currently enrolled in an online course at ISU.

You will be asked to complete a short online survey about your experience regarding online collaborative learning tools and your sense of community as part of an online course. The survey will take about 10 minutes. You can win a \$5 caribou coffee gift card in a lucky draw, if you chose to participate.

If you have any questions, please feel free to contact, Ritushree Chatterjee, at ritu@iastate.edu.

I thank you for your time and support.

Sincerely,
Ritushree Chatterjee

* Required

*** Required Waived Consent ****

Your participation is completely voluntary. You can skip any questions you wish not to answer. All responses will be kept confidential along with any identifying information of the participants.

- ☐ I Agree
☐ I choose not to participate

Experience in Online Learning

Please choose your current status. *

☐ Undergraduate

☐ Graduate

☐ Other:

Please indicate how much your online course uses collaborative activities?

Collaborative activities involving online collaborative tools such as discussion boards, wikis, social networking tools, Google Docs, etc.

☐ >75% or more of the time

☐ 50%-75% of the time

☐ 25%-50% of the time

☐ <25% of the time

☐ Other:

Please indicate your course name and number.

Please chose your Learning Management System.

☐ BlackBoard Learn

☐ Moodle

☐ Other:

Online learning experiences

* Required

Experience with collaborative learning

Instructions: Select the number that best indicates your level of agreement with the statement.

Online collaborative tools such as Google docs, wikis, discussion boards and others.

Being interactive with peers using online collaborative learning tools increases my motivation for learning.

*

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I enjoy experiencing online collaborative learning using online collaborative tools with my peers. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Online collaborative activity increases our creativity. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I believe that collaborative work can be effective when using online collaborative tools.

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Online collaborative activities improves social skills.

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I enjoy solving issues regarding collaborative work using online collaborative tools with my peers. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

More ideas come up working collaboratively using online collaborative tools.

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Online collaborative tools are very entertaining to me. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I think I have had/will have more successful results as I work collaboratively with my peers using online collaborative tools.

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Trying to teach something to my peers using online collaborative tools makes me tired. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Online collaborative tools are not suitable for me. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

« Back

Continue »



50% completed

Online learning experiences

* Required

Your sense of community in an online learning environment

Instructions: Select the number that best indicates your level of agreement with the statement.

Peers in your online course or peers part of your groups/team in the online course form your online learning community.

I get important needs met since I am part of this online learning community. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

When I have a problem I can talk about it to the members of this learning community

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

People in this learning community have similar needs, priority and goals.

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I can trust people in this community. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Most learning community members know me. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Fitting into this learning community is important to me. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

If there is a problem in the community members can get it solved. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

It is important for me to be a part of this online learning community. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

Members of this learning community care for each other. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I feel hopeful that members of this learning community will go beyond the course. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

I enjoy being with the members of this learning community. *

- ☐ 1) Never
- ☐ 2) Seldom
- ☐ 3) Sometimes
- ☐ 4) Mostly
- ☐ 5) Always

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Continue »



APPENDIX B

MAIN STUDY INCENTIVE-ADDITION TO THE QUESTIONNAIRE

Online learning experiences

Lucky Draw!!

Click the link to enter into the lucky draw!

There are 5 Caribou coffee gift cards (\$5 each) to be won!

https://docs.google.com/forms/d/1_eKojlRjNuc5yXRAhyqd0PBTpnxQlZqTEImpKZKrRgU/viewform

Thank you for your time and participation! Your input is very valuable in conducting my research.

[« Back](#)[Submit](#)

Never submit passwords through Google Forms.

100%: You made it.

APPENDIX C

MAIN STUDY MASS EMAIL REQUEST

Share your online learning experience and win a Caribou Coffee gift card!

Dear Online Learners,

Please share your online learning experience at ISU and enter to win a Caribou Coffee gift card.

Click on the link/scan QR code below.



https://docs.google.com/forms/d/1zQYLrN9J3Mat_PLNnBcEOq5b1GL87fIZ1DyvIMNd0ik/viewform

Your participation is extremely valuable in this research study.

Thank you,

Sincerely,

Ritushree Chatterjee

ritu@iastate.edu

APPENDIX D

MINI-PILOT STUDY QUESTIONNAIRE

Experiences in online courses

This Questionnaire is part of our group's research project in the RESEV550 at Iowa State University.

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time. You are being invited to participate in this study because you are currently enrolled in an Iowa State University (ISU) online graduate or undergraduate course. You should not participate if you are under age 18. Also, you should not participate if you are not currently enrolled in an online course at ISU.

If you agree to participate in our online Questionnaire, you will be asked to complete a short Questionnaire about your opinions regarding online collaborative learning tools and your experiences with them in your online course. This Questionnaire should take about 15 minutes. There are no foreseeable risks at this time from participating in this study. If you decide to participate in this study there will be no direct benefit to you. You will not have any costs from participating in this study. You will not be compensated for participating in this study. Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. You can skip any questions that you do not wish to answer. Records identifying participants will be kept confidential.

* Required

Waived Consent *

Please take your time in deciding whether you would like to participate in this research study. You are being invited as you are currently enrolled in an online course and are a student of Iowa State University. You should refrain yourself from participating if qualify under the three mentioned criteria; you are below 18 years of age or are not enrolled in an online course, or are not a student of Iowa State University. If you agree to participate you will be asked to complete an online Questionnaire regarding the role of collaborative activities in students' sense of belonging in an online course. The Questionnaire should not take more than 20 minutes. There are no foreseeable risks at this time. You will not have any costs from you for participating in this study. Your participation is completely voluntary and you may refuse to participate or leave the study at any time. You can skip any questions you wish not to answer. All your responses will be kept confidential along with any identifying information of the participants.

- ☒ Agreed
 - ☐ I choose not to participate.
-

Experiences in online courses

Experiences in online courses

Please choose your current status

- ☐ Undergraduate
- ☐ Graduate
- ☐ Other:

Please indicate how much your online course uses collaborative activities?

Collaborative activities involve using of tools such as discussion boards, Wikis, social networking tools, Google Docs, etc.

- ☐ >75% of the time
- ☐ 50-75% of the time
- ☐ 25-50% of the time
- ☐ <25% of the time
- ☐ None

Experiences in online courses

Instructions: Select the number that best indicates your level of agreement with the statement. Please refer to the scale below. "Not at all" = 1, "Slightly" = 2, "Somewhat" = 3, "Mostly" = 4, and "Completely" = 5.

Establishing a connection with peers through collaborative activities is important for me in an online course.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Interaction with peers makes me feel part of a community.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I can share my problems if I feel I am a part of the community.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

People in this community have similar needs, priorities, and goals.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Members of the community motivate me to learn the course contents and make me more productive (in terms of my contribution to the activity).

1 2 3 4 5

Not at All ☐ ☐ ☐ ☐ ☐ Completely

Being a part of the community helped me increase my creativity.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Being a part of the community helped in achieving the learning objectives of the course or a particular module.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I get important needs of mine met because I am part of this online learning community.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Experiences in online courses

Instructions: Select the number that best indicates your level of agreement with the statement. Please refer to the scale below. "Not at all" = 1, "Slightly" = 2, "Somewhat" = 3, "Mostly" = 4, and "Completely" = 5.

I can trust members in this group.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Most group members know me.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Fitting into this group is important to me.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I enjoy collaborating with my group members to solve group assignments

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Being interactive with the other group members increases my motivation for learning.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I enjoy helping others in online group activities.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

More ideas come up as a result of collaborative learning activities.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I think that I have had / will have more successful results because of collaborative learning activities.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Online collaborative activities do not make any sense to me.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

I cannot develop my own ideas in an online collaborative environment.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Online collaborative learning activities are not suitable for me.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Collaborative learning activities have helped me establish a connection with my peers.

1 2 3 4 5

Not at all ☐ ☐ ☐ ☐ ☐ Completely

Experiences in online courses

Thank you!

Thank you for your participation!

Add other comments below that you think would be useful regarding the topics covered in this Questionnaire.

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Submit

APPENDIX E

IRB APPROVAL EMAIL

**IRB Committee [ORR]**

Fri 8/29/2014 3:18 PM

Inbox

**14-397_Chatterjee_2014...**

3 MB



Dear Ritu,

Attached are your exemption materials for IRB ID 14-397. Please let me know if you have any questions.