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Students' Trust Building in a Collaborative Learning Team

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Dedication

To Jesus Christ and St. Mary

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Students' Trust Building in a Collaborative Learning Team

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The purpose of the study was to examine elements which affected students' team trust building in an online collaborative learning team and relationships among these elements. The setting of this study was a graduate-level online course on Computer Supported Collaborative Learning (CSCL) in which all course activities were conducted collaboratively through online communications. Data were collected from multiple sources including interviews which were audio taped, transcripts of students' self-reflective journals, transcripts of messages on the asynchronous web conferencing system, transcripts of messages on the synchronous web conferencing system, and the researcher's reflective journals.

Data were analyzed using the coding procedures for developing grounded theory proposed by Strauss and Corbin (1998). Results of the data analysis indicated the influences of CSCL course context including the collaborative nature of the course and the heterogeneity of teams on students' team trust building. Results also indicated the dynamics of team trust building. Four different components of team trust building, which were initial team trust, contributors, dimensions, and consequences of team trust,

influenced one another. Students' initial team trust influenced the contributors to team trust which were students' competence, reliability, online communication, and caring. In addition, these contributors influenced the dimensions of team trust such as task performance trust and interpersonal trust. Once students built trust in their teams, they could develop collaborative knowledge building and a sense of community which were the consequences of team trust. The consequences of students' team trust, in turn, influenced the contributors to team trust.

Understanding the construct of team trust may help not only instructors in their design and guidance of successful online collaborative learning teams, but also students in various online collaborative learning teams. In addition, the results of this study may help instructors and researchers to consider carefully the issues in relation to online team trust building.

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Chapter 1: Introduction

STATEMENT OF PROBLEM

According to UNESCO (2005), teachers need to respond to the changing social demands of a highly diverse, interdependent, and technologically rich workplace, one that has undergone an explosive development of knowledge in many fields that call for teamwork. Aligned with this emerging importance of teamwork, there has been exponential growth in the field of collaborative learning within education in the last 20 years. Collaborative learning is defined as groups working together for a common purpose (Resta & Laferrière, 2007). Johnson and Johnson (1996) compared collaborative learning with cooperative learning in order to define collaborative learning as “the instructional use of small groups so that students work together to maximize their own and each other’s learning” (p. 786). In collaborative learning, knowledge is conceived as a social construct, and learning is viewed as an active process of shared creation (Schrage, 1990; Kirschner, 2001). In a similar manner, Stahl (2002) stated that knowledge is a product of the collaboration process that arises through the interaction of different points of view and that it is gradually developed by negotiation. Therefore, in collaborative learning students take responsibility for learning by participating in a group and by reflecting on their own thought processes to build group knowledge (Kirschner, 2001).

Numerous studies have demonstrated that collaborative learning is effective in generating positive outcomes not only in academic performance, but also in supporting the social and psychological aspects of learning in offline settings (Johnson, Johnson, & Smith, 1991; Panitz, 1996). In terms of academic impact, collaborative learning enhances both students’ achievement and performance (Johnson, Maruyama, Johnson, & Nelson,

1981; Lou *et al.*, 1996); promotes critical thinking skills (Gokhale, 1995; O'Donnell *et al.*, 1988); fosters student metacognition (Bonwell & Eison, 1991; Baird & White, 1984); and helps create a positive attitude toward the subject matter (Kulik & Kulik, 1979; Brush, 1997; Singhanayok & Hooper, 1998). In addition to these academic benefits, collaborative learning enhances the social and psychological aspects of learning. Collaborative learning helps develop social interaction skills (Johnson, Johnson, & Holubec, 1984; Cohen & Cohen, 1991); fosters a supportive environment within which to manage conflict resolution (Johnson & Johnson, 1990; Sherman, 1991); creates a stronger social support network (Cohen & Willis, 1985); develops interpersonal relationships (Johnson & Johnson, 1987); fosters interpersonal responsibility (Stahl, 2002); builds student self esteem (Johnson & Johnson, 1989); encourages students to seek help (Hertz-Lazarowitz & Miller, 1992); enhances student satisfaction with the learning experience (Turnure & Zeigler, 1958); and reduces classroom anxiety (Kessler, Price, & Wortman, 1985; Slavin & Karweit, 1981).

In research studies on the effectiveness of collaboration, Weber, Malhotra, and Murnighan (2005) found that trust can both facilitate collaboration and help people and organizations process information more efficiently. Moreover, they indicated that mutual trust will increase incrementally through carefully considered and repeated positive interactions. Greenspan, Goldberg, Weiner, and Basso (2000) also indicated that trust helps to reduce uncertainty and its related anxieties (Luhmann, 1979; Holmes, 1991). Even in the case of virtual teams – whose members have diverse skills, a limited history of working together, and little prospect of working together in the future, coupled with the pressure of tight deadlines – Jarvenpaa and Leidner (1999) found that trust among members helps develop social communication which is predictable with substantive and timely response.

The findings of studies on the effectiveness of trust in collaboration building raise questions about the construct of trust. Numerous studies present contributors influencing trust, and these are vulnerability (Bigley & Pearce, 1998; Coleman, 1990), reliability (Hosmer, 1995; Greenspan *et al.*, 2000), competence (Baier, 1986; Greenspan *et al.*, 2000), openness (Butler & Cantrell, 1984; Mishra, 1996), and feelings of concern and attraction (Greenspan *et al.*, 2000). In addition, dimensions of trust have been proposed, and these include cognition-based trust (Lewis & Wiegert, 1985; McAllister, 1995) and affect-based trust (Clark, Mills, & Corcoran, 1989; Clark, Mills, & Powell, 1986; McAllister, 1995). Moreover, constructs of trust in collaboration such as rational choice models (Kramer, 1999), and motivated attribution models of trust development (Emerson, 1962; Weber *et al.*, 2005) have been provided.

As shown by studies in offline collaborative settings, building trust among team members is also crucial for effective online collaborative learning. A growing number of researchers have noted trust's importance in online settings, stating that "trust is a central element in the provision of both a safe environment for learners and the conditions for communication and collaboration" in online collaborative learning (Jones, Dirckinck, & Lindströöm, 2006, p. 50). Similarly, De Hoyos Guevara (2004) referred to trust as "interpersonal and communication skills that lead to getting to know and trust others, and interact and manage conflict," and presented two dimensions of trust, task performance trust and interpersonal trust. Kim (2005) also found that trust was highly related to caring and expectation, which is effective in facilitating active interaction among students. In addition, Kim (2005) presented reliability and competence as two of the main contributors to trust. Lee (2004) also emphasized the importance of trust by positing trust as one of the consequences of students' sense of community.

Even though trust has been identified as essential for successful collaborative learning, it is difficult to define trust due to its complexity (Tschannen-Moran & Hoy, 2000). Even once we have a common abstract definition of trust, the reality of trust may not be the same at all times and in all places. According to Jones and George (1998), trust is based in different things, such as values, attitudes, moods, and emotions, and it also may be present in different degrees. As Tschannen-Moran and Hoy (2000) indicated, trust is a difficult field to study, not only because it is a multi-layered concept but also because it is a dynamic one.

Given the difficulties of studying trust in collaborative learning, the majority of the existing research studies focus on individual contributors that influence students' trust building, whether positively or negatively, independent of other contributors. They do not consider such trust building in the context of its relationships with other contributors. In reality, all the contributors seem to interact with each other dynamically to influence students' trust in their teams. For example, although a contributor such as students' low self-confidence in an online collaborative learning environment may hinder the development of trust in such environments; this lack of trust can be overcome by fostering other contributors such as team confidence, which can be built through online interactions and close relationships with other team members. This example indicates that a contributor does not always influence students' trust experience in the same way since a contributor can be mitigated by others. Because of this complexity, in order to have a better understanding of students' team trust in an online collaborative learning environment, research is needed to investigate not only what contributors influence trust among students in an online collaborative learning team, but also how the contributors relate to one another.

PURPOSE OF STUDY

The main purpose of this study is to explore students' trust in an online collaborative learning team. To fulfill this purpose, this study: 1) investigates elements that influenced students' team trust in an online collaborative learning environment as well as the relationships among the elements, 2) compares students' trust experience both within a team and among teams, and 3) examines the influences of students' team trust on their online collaborative learning.

RESEARCH QUESTION

The questions that guided this study are as follows:

1. What elements comprise students' trust with their peers in their online collaborative learning teams?
2. How do these elements relate to each other?
3. How does one student's individual experience compare to that of the team as a whole?
4. How do the different teams' experiences compare to others?
5. How does students' team trust influence their online collaborative learning?

Chapter 2: Literature Review

This chapter includes a review of the theoretical and empirical literature on online collaborative learning and trust in areas that are relevant to this study. This literature review is divided into two parts. The first part addresses online collaborative learning, especially the concepts and effects of online collaborative learning and the contributors to online collaborative learning. The second part provides the concepts and effects of trust in collaboration, in collaborative learning, and in computer supported collaborative learning (CSCL). In particular, the last section of the second part describes a synthesis of the results of studies on the contributors that influence students' trust relationships in online learning environments.

ONLINE COLLABORATIVE LEARNING

To facilitate the understanding of the nature of online collaborative learning, this part first describes the nature of offline collaborative learning, the distinctions between collaborative learning and cooperative learning, and computer supported collaborative work (CSCW) and CSCL. In addition, the effects and contributors to collaborative learning are addressed.

Collaborative Learning

Collaborative learning is a complex concept that is not clearly defined. Furthermore, researchers often have different purposes, goals, and perspectives, and these differences prevent a clear definition of collaborative learning so that there is no universally adopted meaning of the term "collaborative learning."

Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Compared to cooperative learning, collaborative learning is vaguely defined. Cooperative learning is differentiated from collaborative learning, which has its roots in the work of Sir James Britton and others in England in the 1970s. Britton (1970) stated that just as an individual's mind is derived in part from his or her culture, a student's learning is derived from his or her community of learners. He recommended placing students in groups and letting them generate their own culture, community, and procedures for learning. Britton believed the source of learning is interpersonal; learning is derived from dialogues and interactions with other students along with the teacher. He considered the structure provided by teachers to be manipulation that fosters training, not learning, and therefore teachers should assign students to groups and provide no guideline. In such a teaching context, collaborative learning is historically conceived as less structured and more student-centered than cooperative learning. Likewise, both Panitz (1996) and Slavin (1997) viewed cooperative learning as a well-structured knowledge domain, while viewing collaborative learning as an ill-structured knowledge domain. However, collaborative learning and cooperative learning are usually used as interchangeable concepts. Aligned with this view which conveys the similarities between collaborative learning and cooperative learning, Johnson and Johnson (1996) defined collaborative learning as "the instructional use of small groups so that students work together to maximize their own and each other's learning" (p. 786). Similarly, Kirschner (2001) indicated the common elements of both collaborative learning and cooperative learning as follows:

- Learning is active

- The teacher is usually more a facilitator than a “sage on the stage”
- Teaching and learning are shared experiences
- Students participate in small-group activities
- Students take responsibility for their own learning
- Students reflect on their own assumptions and thought processes
- Social and team skills are developed through the give-and-take of consensus-building

Along with noting the similarities between cooperative and collaborative learning, researchers have proposed other definitions of collaborative learning. Collaborative learning is “any learning activity that is carried out using peer interaction, evaluation, and/or cooperation, with at least some structuring and monitoring by the instructor” (Harasim, Hiltz, Teles, & Turoff, 1995), and such learning is a “reculturative process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to” (Bruffee, 1995). In the collaborative learning model, knowledge is conceived to be a social construct, and learning is viewed as an active process involving shared creation (Schrage, 1990; Kirschner, 2001). According to Stahl (2002), knowledge is a product of the collaboration process that arises through the interaction of different points of view and is gradually developed by negotiation. It is not static, but lives and is situated in groups, teams, organizations, tribes, social networks, and cultural flash points. As Dennen (2000) noted, collaborative is an adjective that implies working in a group of two or more to achieve a common goal while at the same time respecting each individual's contribution to the whole, and collaborative learning is a method that uses social interaction as a means of knowledge building.

Similar to collaborative learning, online collaborative learning is also hard to define. The growth in the use of technology to support collaborative learning in higher education has attracted a rapidly growing number of research studies from numerous theoretical perspectives (Resta & Laferrière, 2007), and the emerging nature of this field means that many researchers provided their own diverse definition of online collaborative learning. Harasim *et al.* (1995) defined online collaborative learning as a learning process where two or more individuals work together to create meaning, explore a topic, or improve skills. As one aspect of online collaborative learning, the current studies focus on CSCL. According to Lipponen, Hakkarainen, and Paavola (2004), the term CSCL was used as early as 1989 by O'Malley and Scanlon and was recognized by Koschmann as an important area of research. Historically, the concept of CSCL as one aspect of online collaborative learning has largely emerged out of the extensive work done in the field of CSCW. CSCW is a computer based network system that supports group work on a common task and provides a shared interface with which groups can work (Ellis, Gibbs, & Rein, 1991). According to Hsiao (2000), the differences between CSCW and CSCL are that CSCW tends to focus on communication techniques themselves, while CSCL focuses on what is being communicated; CSCW is used mainly in business settings, while CSCL is used in educational settings; and the purpose of CSCW is to facilitate group communication and productivity, while the purpose of CSCL is to scaffold or support students in learning together effectively. According to Resta and Laferrière (2007), both CSCW and CSCL are grounded upon the assumption that computer supported systems can support and facilitate group processes and group dynamics in ways that can in turn support and enhance intellectual work in groups.

As Koschmann (1996) indicated, CSCL is an emerging paradigm in instructional technology that continues to be refined and extended through use in many ways. CSCL

also represents a convergence of three disciplines – education, psychology, and computer science – that have come together to create this particular new approach to learning. CSCL is both growing and becoming a dynamic, interdisciplinary, and international field of research (Resta & Laferrière, 2007). The CSCL research literature demonstrated a diversity of approaches and methodologies. This variety included theoretical research, peer-reviewed case studies, as well as design research and experiments. The methods also vary by the type of theoretical framework employed by the researcher. However, most of the researchers typically draw upon theoretical frameworks and constructs derived from constructivist epistemology and cognitive science's theoretical perspectives emphasizing that cognition is a social rather than a fixed entity. As Lipponen *et al.* (2004) noted the research in CSCL often shares a common focus on the interaction, discourse, and participation processes emerging among community members in particular social and physical contexts.

Effects of Collaboration on Learning

A numbers of researchers have studied collaborative learning, reporting that collaborative learning is effective in generating positive outcomes not only in terms of academic performance, but also in supporting the affective and social aspects of learning (Johnson *et al.*, 1991; Panitz, 1996).

In terms of academic impact, studies indicated collaborative learning promotes students' achievement and performance overall compared to both competitive and individual learning models. Johnson *et al.* (1981) reviewed 122 studies and compared the relative effectiveness of cooperative, competitive, and individualistic goal structures. In a cooperative goal structure, the individual's rewards are directly proportional to the quality of the group's work of which he or she is a part. In a competitive goal structure, in contrast, individuals are rewarded so that some receive a maximum reward and others a

minimum one. In an individual goal structure, individuals are rewarded according to the quality of their own work, independent of the work of other participants.

In these researchers' meta-analysis, they found that the cooperative goal structure was more effective in promoting student achievement and performance as compared to both the competitive and individualistic goal structures. These results held for all subject areas, all age groups, and all tasks, including those involving concept attainment, verbal problem solving, categorizing, spatial problem solving, retention and memory, motor performance, and guessing-judging-predicting. In another meta-analysis of sixty-six studies, in which collaborative learning groups in face-to-face settings were compared with individualistic instruction (Lou *et al.*, 1996), the researchers found that students learning in small groups achieved significantly better results than students not learning in small groups. The results of the meta-analysis suggest that members of small groups appeared to learn more when there was outcome interdependence among the group members, that is, when each member contributed to the overall group goal and subsequently received the same group reward.

Moreover, the studies demonstrated that collaborative learning enhances critical thinking. Gokhale's (1995) study revealed that collaborative learning promotes critical thinking because of the diversity of views and experiences brought to the task. He studied twenty-four students in collaborative learning treatment groups and found that students who participated in collaborative learning had performed significantly better on critical-thinking tests than students who studied individually. Another study (O'Donnell *et al.*, 1998) had ninety-eight participants who could be categorized into four experimental conditions: 1) no-strategy individuals, 2) prompting-only dyads, who did not plan prior to practice, 3) distributed-planning-with-prompting dyads, who intermittently planned how to perform prior to practice, and 4) preplanning-with-prompting dyads. O'Donnell *et al.*

(1998) found that the initial benefits that accrued from a brief cooperative training experience persisted over relatively long intervals and that students trained in the dyadic cooperative approach successfully transferred their skills to individually performed tasks.

In addition, the studies indicated that collaborative learning is effective in promoting student meta-cognition. According to Bonwell and Eison (1991), collaborative learning creates an environment "that involves students in doing things and thinking about the things they are doing" (p. 2). Baird and White (1994) also found that collaborative learning enhanced students' meta-cognition. In this six-month classroom-based action-research study, which involved sixty-four ninth and eleventh grade students, their teacher and the researchers found that collaborative learning encouraged students to be more informed, to be purposeful learners, and to exert greater control over their learning. In this sense of student responsibility, Johnson and Johnson (1990) also identified several critical reasons why cooperative learning enhances student meta-cognition. Discussions within cooperative groups require more summarizing, explaining, and elaboration of what one knows, which in turn consolidates and strengthens what is known through the rehearsal process. The heterogeneity of cooperative groups encourages students to accommodate themselves to their peers' perspectives, strategies, and approaches to completing assignments. Students often bring incomplete information to a task, and by interacting with other students they learn how to share their information and obtain insights on how other students gather and use information, thus expanding their understanding of their own thinking processes. By sharing their work within cooperative groups, students externalize their ideas and reasoning for critical examination, which in turn results in peer monitoring and regulation of group members' thinking and reasoning. Students give each other feedback regarding the quality and

relevance of their contributions and make suggestions on how to improve each other's performance.

Lastly, collaborative learning improves student attitudes toward the subject matter. According to Kulick and Kulick (1979), students' high critical thinking skills achieved through the collaborative learning process increases their retention of information and interest in the subject matter. When students succeed in their learning, they view the subject matter with a very positive attitude because their self-esteem is enhanced. This creates a positive cycle of good performance, building even higher self-esteem, which in turn leads to more interest in the subject and thus higher performance. Students share their success with their groups, thus enhancing both the individual's and the group's self-esteem. Some cooperative learning structures formalize this effect by awarding certificates of achievement or improvement to individual students or extra credit to groups for an individual's or group's improvement. In this sense of recognition and reward, Brush (1997) and Singhanayok and Hooper (1998) also found that collaborative learning has a positive impact on student attitudes toward the subject matter.

In addition to these academic benefits of collaborative learning, the studies reveal that collaborative learning also supports the social aspects of learning. Overall, collaborative learning enhances social interaction. According to Johnson *et al.* (1984), a major component of cooperative learning is the social interaction skills. By both asking group members to identify what behaviors help them work together and to share responsibility to complete tasks and by asking individuals to reflect on their contribution to the group's success or failure, students are made aware of the need for healthy, positive, and helping interactions among group members (Cohen & Cohen 1991). This process helps students learn how to interact effectively and comfortably with their group

members. Moreover, Johnson and Johnson (1996) indicated that collaborative learning creates a supportive environment within which to manage conflict resolution. Their study demonstrated that collaborative learning reduces violence, eliminates fear and blame, and increases honor, friendliness, quality, and consensus. In this sense of increased positive behavior, Sherman (1991) also makes the following observations from the perspective of psychology: most social psychology textbooks contain considerable discussions about conflict, sometimes instigated by individual or inter-group competition, and its resolution and/or reduction through the use of cooperative techniques. Additionally, Cohen and Willis (1985) indicated that collaborative learning fosters a strong social support system. Collaborative learning uses students' social experiences to encourage their involvement in the learning process, and group-building activities used throughout the course build social support. Johnson and Johnson (1987) pointed out collaborative learning develops interpersonal relationships. The confidence built among team members helps individuals keep track of each other's performance. The interdependence created by self and group assessment and improvement techniques, and the social nature of collaborative learning processes all combine to improve interpersonal relationships among students. Johnson and Johnson also indicated that collaborative learning encourages out of class work by the groups, bringing them together in a combined academic and social experience that continues over long periods of time. Finally, Stahl (2002) demonstrated that collaborative learning enhances shared responsibility. In contrast to a traditional competitive classroom, in the collaborative classroom students create interdependence amongst themselves and reliance upon others for the group's success. A nurturing atmosphere is created wherein students help each other and take shared responsibility for their entire group's progress. In this environment, students naturally learn shared responsibility.

Beyond these academic and social benefits of collaborative learning, collaborative learning also has a positive impact on the psychological aspect of student learning. Collaborative learning builds self-esteem in students (Johnson & Johnson, 1989), encourages students to seek help (Hertz-Lazarowitz & Miller, 1992), enhances student satisfaction with the learning experience (Turnure & Zeigler, 1958), and reduces classroom anxiety (Kessler, Price & Wortman, 1985; Slavin & Karweit, 1981).

Contributors to Collaborative Learning

The findings of studies on the effectiveness of collaborative learning raise questions about which contributors to collaborative learning produce these numerous beneficial results. Therefore, subsequent to the definition and effects of collaborative learning, critical contributors to collaborative learning are discussed to further understanding of the nature of collaborative learning. The following section addresses individual differences that contribute to a heterogeneous learning group, social interdependence, intellectual conflict for collaborative knowledge building, sense of community, and trust as the contributors that influence effective collaborative learning.

First, individual difference among students is one of the critical contributors to collaborative learning. Diversity of gender, ethnic background, and language are influential social contributors in collaborative learning groups. In terms of communication style, Ferris (1996) found that women express doubt more often, are more apologetic and appreciative, and focus more on community-building. In a study of American middle school students, Freedman and Liu (1996) indicated that students of different ethnic backgrounds have different learning processes and different communication patterns. They also found that Asian-American students tended to ask fewer questions, were less likely to use trial-and-error or experimental methods in their work processes, and were more hesitant about being watched when working with

computers. They preferred using e-mail as compared to other computer users, and they worked cooperatively in groups when using e-mail, often helping each other compose messages and doing other students' computer work. In a study of college students from Denmark and the U.S. who collaborated via e-mail, Bannon (1995) found that the Danish students tended to be rather reserved in terms of social communication, while Americans were more expressive of their thoughts. Similarly, in a study of undergraduate preservice teachers in an online collaborative learning environment, Kim and Bonk (2002) found that Korean students were apparently shy and anxious about contributing to online discussions because of anxiety about their limited proficiency in English.

Along with individual differences, social interdependence is identified as a critical contributor to collaborative learning. To describe social interdependence, Johnson and Johnson (1996) presented five elements: positive interdependence, individual and group accountability, promotive interaction, appropriate use of social skills, and group processing, all of which must be structured in collaborative learning. First, positive interdependence means that students need to perceive that they need each other in order to be able to complete the group tasks. Second, individual accountability denotes that students need to be responsible for their learning and to be able to perform at comparable level with their team members. Third, promotive interaction denotes that students need to promote each other's learning by helping and encouraging each other and sharing with others. Fourth, social skills mean that students need leadership, decision-making, trust building, communication, and conflict management skills. Finally, in terms of social interdependence, group processing implies that groups need specific time to discuss how to achieve their goals and maintain effective working relationships among members.

Furthermore, intellectual conflict is defined as one of the influential contributor to collaborative learning. In terms of knowledge building, which is one of the essential

purposes of CSCL, the intertwining of diverse personal perspectives (Stahl, 2002) is needed. Filling the gaps among the diverse understandings of students in a CSCL environment involves the sharing of students' understandings and the resolution of conflicts through students' reinterpretation of their own meaning structures to arrive at a new comprehension (Stahl, 2000). Intellectual conflict differs from relationship conflict or affective conflict, and it is defined as a perception of disagreements among group members about the content of their decisions and involves differences in viewpoints, ideas, and opinions (Simons & Peterson, 2000). It stimulates knowledge negotiation (Kirschner & Bruggen, 2004), and the resulting negotiated intellectual conflict leads to knowledge building. While relationship or affective conflict tends to decrease team effectiveness, intellectual conflict tends to increase team effectiveness (Amason, 1996). Intellectual conflict positively affects collaborative learning in several ways (Jehn, 1995). For example, a number of studies have demonstrated that intellectual conflict stimulates learners to make better decisions (Baron, 1991; Schulz-Hardt, Mayer, & Frey, 2002; Simons & Peterson, 2000, Putnam, 1994).

A sense of community is also one of the beneficial contributors to effective collaborative learning. Gibbs (1998) noted that students in online courses may feel isolated because they are at a distance from each other, and they do not have regular face-to-face contact with other students and the instructor. Online students also are more likely to stop participating in course activities when engaged in other responsibilities. Since classes do not meet at any specific time, but instead are only engaged with when students log on, it is easy to postpone participation (Hiltz & Wellman, 1997). Additionally, the absence of non-verbal cues within an online environment and the formality and permanence of written communication may inhibit the participation of some students (Lally & Barrett, 1999). Given these conditions, a sense of community is identified as

one contributor that may help students in online learning environments overcome these problems and fully participate in their learning process. By perceiving the environment as safe and by fostering their sense of obligation or responsibility to meet the needs of the group, they may be more likely to participate robustly (Moller, Harvey, Downs, & Godshalk, 2000).

Lastly, many researchers found that trust is a basic factor contributing to a successful online collaborative environment. In terms of the cognitive aspects of trust, trust among team members enhances intellectual conflict, facilitating the achievement of collaborative knowledge building (Kirschner & Brugger, 2004). It allows students to share divergent ideas safely in collaborative learning (Rourke, 2001; Zand, 1972) and achieve critical thinking for shared knowledge (Jameson, Ferrell, Kelly, Walker, & Ryan, 2006). In addition, in terms of the social and affective benefits of trust, trusting relationships among team members foster active interaction (Kim, 2005), reinforce team confidence based on a sense of community (Lee, 2004), and facilitate open and friendly communication that allows for the expression of ideas and the negotiation of divergent views into compromise that helps achieve the goals of the team (De Hoyos Guevara, 2004). Given the importance of trust in collaborative learning, the following part of this chapter discusses trust in collaborative environments to facilitate understanding the nature of students' trust relationships in a CSCL environment, which is the main topic of this study.

TRUST AND COLLABORATION

The bulk of research on trust in collaboration has occurred in face-to-face settings and in CSCW environments. Therefore, in this section, the research on trust in offline

collaborative environment and in CSCW environment is reviewed first and then trust in CSCL is addressed.

Trust in Collaboration

The complexity of trust has perplexed researchers for decades. Greater understanding has led to the discovery of different foundations of trust, different sources of trust-relevant information, diverse aspects of trust, and uneven degrees of trust, all of which make it an even more challenging concept to grasp. Hosmer (1995) expressed the difficulty of defining trust: "There appears to be widespread agreement on the importance of trust in human conduct, but unfortunately there also appears to be an equally widespread lack of agreement on a suitable definition of the construct" (p. 380). In spite of the difficulty of defining trust, numerous researchers in many disciplines have tried to conceptualize it. According to Tschannen-Moran and Hoy (2002), trust can be defined based on diverse perspectives. From a philosophical perspective trust has to do with ethically and morally justifiable behavior (Baier, 1986; Hosmer, 1995); from an economic perspective, trust is viewed as a rational calculation of costs and benefits (Coleman, 1990; Williamson, 1993); and from an organizational perspective, trust is often a collective judgment that another group will not act opportunistically, will be honest in negotiations, and will make a good faith effort to behave in accordance to its commitments (Bradach & Eccles, 1989; Cummings & Bromily, 1996). From a philosophical view, Baier (1986) defined trust as "accepted vulnerability to another's possible but not expected ill will toward one" (p. 236). From a similar point of view, Hosmer (1995) also defined trust as "the expectation by one person, group, or firm of ethically justifiable behavior" (p. 399). Coleman (1990) also described trust as a rational calculation based on social capital theory, coming from an economic perspective. He stated that "A rational actor will place trust if the ratio of ρ (the probability that the

trustee is trustworthy) to $1 - \rho$ is greater than the ratio of potential loss if the trustee is untrustworthy to potential gain if the trustee is trustworthy” (p. 99). From an organizational perspective, researchers conceptualized relationships among humans using the concept of trust to emphasize vulnerability. Mayer, Davis, and Schoorman (1995) defined trust as “the willingness to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (p. 712). Rousseau, Sitkin, Burt, and Camerer (1998) also offered a similar definition: “Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another” (p. 395).

In research studies on the effectiveness of collaboration, Weber *et al.* (2005) found that trust can facilitate collaboration and help people and organizations process information more efficiently. A numbers of studies have demonstrated that trust has positive effects not only on cognitive performance, but also on the social and affective aspects of collaboration. In terms of the cognitive aspects of collaboration, trust helps collaborative knowledge sharing within a group. As Na Ubon and Kimble (2002) noted, trust plays an important role in knowledge sharing. It plays an even more crucial role when it needs to be created in an online or virtual context. In this sense, Van House, Butler, and Schiff (1998) also found that the sharing of knowledge needs to be based on an understating of existing social practices, which is in turn a measure of trust and credibility. Along with this cognitive aspect of collaboration, trust supports social and affective aspects of collaboration. In terms of effective social performance in collaboration, Weber *et al.* (2005) indicated that mutual trust increases incrementally through carefully considered, repeated positive interactions.

Beyond the effects of trust in offline collaborative settings, numerous studies also identified the contributors to trust. Reliability is identified as a basic contributor to trust. According to Hosmer (1995), reliability is based on the predictability of consistency of behavior and knowledge of what to expect from others. However, predictability is unsatisfactory as a definition of trust. For example, we can trust a person to be invariably late. In addition, we might count on someone to be consistently malicious, self-serving, or dishonest. When our well-being is diminished or damaged in a predictable way, our expectations may be met, but the amount that we trust the other person or group is weak. In addition to reliability, competence has also been proposed as another basic contributor to trust. There are times when good intentions are not enough. When a person is dependent on another but some level of skill is also involved in fulfilling a shared expectation, an individual who means well may nonetheless not be trusted because of his or her incompetence (Baier, 1986; Butler & Cantrell, 1984; Mishra, 1996). For example, the student of a new teacher may feel that the teacher wishes very much to help her learn, but if the teacher is not skilled, the student may not feel a great deal of trust. Many of the trust-related situations that we speak about in an organizational context have to do with competence. Openness is also indicated as another contributor to trust. Openness allows people to make themselves vulnerable to others by sharing personal information (Butler & Cantrell, 1984; Mishra, 1996). Kramer, Brewer, and Hanna (1996) also mentioned that people who were unwilling to extend trust through openness might end up living in isolated prisons of their own making. For example, principals in closed organizational climates engender distrust by withholding information and spinning the truth in order to make their view of reality the accepted standard (Sweetland & Hoy, 2000).

In addition to the contributors to trust, there are several models of trust. Rational choice models suggest that trust grows gradually as positive interactions accumulate.

Trust building slowly increases through small but increasingly larger risks taken by each party in the trust relationship. In a motivated attributions model of trust development, Emerson (1962) suggested that the party that feels more dependence within the potential relationship will be more likely to see possibilities that would be facilitated by mutual trust and will therefore be more likely to initiate the trust development process.

Trust in Computer Supported Collaborative Work

Trust in an online environment also includes the above diverse perspectives. Similar to Mayer *et al.* (1995), Johnson-George and Swap (1982) identified risk taking as key to trust: “willingness to take risks may be one of the few characteristics common to all trust situations” (p. 1306). In addition to adapting diverse perspectives for defining trust, especially in CSCW environment, there is also the concept of initial trust among virtual team members and swift trust which is fragile and temporal (Jarvenpaa & Leidner, 1999). Meyerson, Weick, and Kramer (1996) developed the concept of swift trust for online teams, which are formed based upon a common task; consist of members with diverse skills; comprise team members with a limited history of working together; and are made up of people with little prospect of working together again in the future. The tight deadlines under which these teams work leave little time for relationship building. Additionally, researchers of CSCW often address two aspects of trust, which are cognitive based trust (Lewis & Wiegert, 1985; McAllister, 1995) and affective based trust (Clark *et al.*, 1989; Clark *et al.*, 1986; McAllister, 1995). According to McAllister (1995), the studies on cognitive and affective trust have highlighted the development of interpersonal affect upon a cognitive basis. Cognitive based trust, reliability, is seen as more superficial and less special than emotional trustworthiness. Faith is characterized by a greater investment of time and emotion than are both dependability and reliability. Some level of cognitive based trust may be necessary for affective based trust to develop;

people's baseline expectations for peer reliability and dependability must be met before they will invest further in relationships. When baseline expectations are not yet established, individuals may be inclined to skepticism, attributing extra-role conduct to efforts toward ingratiation and impression management as opposed to care and concern.

In terms of the effectiveness of trust in a CSCW environment, Jarvenpaa and Leidner (1999) found that trust among members develops through social communication which is predictable with substantive and timely response among those members. Similarly, Weber *et al.* (2005) found that trust can facilitate collaboration and help people and organizations process information more efficiently. They indicated that mutual trust increases incrementally through carefully considered, repeated positive interactions, and team trust is a critical construct in work teams and an understudied part of their functioning. Trust also facilitates affective aspects of collaboration in a CSCW environment. Trust is identified as a means to reduce uncertainty and anxieties about working with others. In the virtual world, facing information overload and increased uncertainty and risk, Luhmann (1979) stated that we, as members of society, cope with these complexities and uncertainties by relying on trust, which is the basis of all social interactions. Similarly, Holmes (1991) found that individual differences in orientations to uncertainty play a central role in shaping people's representations of their trust relationships. In a study of seventy-seven couples over a three week period, the couples completed a series of questionnaires and kept diaries about their interactions. Certainty-oriented people's need for cognitive closure resulted in either high or low levels of trust of their partners, whereas uncertainty-oriented people typically attained only a moderate level of trust. In addition, in CSCW environments, Greenspan *et al.* (2000) indicated that trust helps to reduce uncertainty and its attendant anxieties.

Similar to the contributors to trust defined in offline collaborative settings, both reliability and competence are also addressed as the main contributor to cognitive based trust, aligned with task-oriented (Greenspan *et al.*, 2000) and non-personal (Short, Williams, Christie, 1976) variables in a CSCW environment (Greenspan *et al.*, 2000). As well as openness, feelings of concern and attraction are often noted as contributors to affective based trust, which is aligned with personal variables (Short *et al.*, 1976) in a CSCW environment. In particular, virtual teams need to establish trust based on diverse technological tools, so current studies of CSCW focus on diverse online channels as crucial contributors to trust. Greenspan *et al.* (2000) found that using the telephone or Phone Channel, which provides both audio and visual channels, led to higher trust between buyers and sellers as compared to using the Internet which offers only visual channels. Similarly, in a study of trust in a social dilemma game in four different communication situations, face-to-face, video, audio, and text chat, Bos, Olson, Gergle, Olson, and Wright (2002) found all three of the richer conditions had significant improvements over text chat in terms of trust. Video and audio conferencing groups were nearly as good as face-to-face, but both did show some evidence of what the researchers' term delayed trust – which they conceived as slower progress toward full cooperation, and fragile trust – vulnerability to opportunistic behavior.

Trust in Computer Supported Collaborative Learning

In a manner similar to the concepts of cognitive trust and affective trust in a CSCW environment, in a CSCL environment, De Hoyos Guevara (2004) referred to trust as a “positive team environment that leads members to accomplish tasks, freely share talents, resources, ideas, and discuss points of view and shortcomings” (p. 116). She pointed out trust as one indicator of “interpersonal and communication skills that lead to getting to know and trust others, and interact and manage conflict” (p. 135), and she

addressed two independent but interrelated dimensions of trust: task performance trust and interpersonal trust.

As shown by studies in offline collaborative settings and CSCW, building trust among team members is also crucial in an effective online collaborative learning environment. A growing number of researchers have noted its importance, stating “trust is a central element in the provision of both a safe environment for learners and the conditions for communication and collaboration” (Jones *et al.*, 2006, p. 49) in online collaborative learning. In terms of the cognitive influence of trust, Kirschner and Bruggen (2004) and Simons and Peterson (2000) noted that there is a critical relationship between intellectual conflict and trust. Although intellectual conflict helps expose team members to multiple perspectives and leads them to critically examine their own ideas and those of their peers, such conflict may damage the effectiveness of the team unless a base of trust and respect is established first among team members. Failure to address conflicts may reduce the levels of trust, and, in turn, may negatively impact task management and the working relationships of the team. To manage intellectual conflict effectively, social preconditions such as trust, shared understanding, and accountability must be created (Kirschner & Bruggen, 2004). To share divergent ideas safely in collaborative learning, students need to trust each other (Rourke, 2001). Moreover, Zand (1972) insisted that trust positively affects intellectual conflict and results in students perceiving each other's behavior affirmatively. In addition, Jameson *et al.* (2006) found the trust allows all team members to be valued and respected in constructively critical ongoing analyses of team performance, so that shared knowledge is developed more effectively. Further enhancing the cognitive benefit of trust, trust also enhances social aspects in an online collaborative learning environment. In a study of the twenty-five prospective teachers and their leading teacher, who developed their teaching-learning relationships in CMC (computer-

mediated communication), Kim (2005) found that trust related to caring and expectation is effective for active interaction among students and indicated that reliability and competence are the main contributors to trust. Also, in a study of twenty-one graduate-level students in a CSCL course, Lee (2004) emphasized the effectiveness of trust by viewing it as one of the consequences of a sense of community. Lastly, in terms of affective impacts of trust, in a study of a CSCL course, De Hoyos Guevara (2004) found that trust facilitated open and friendly communication which in turn allowed for the expression of ideas and the negotiation of divergent views in compromises that helped achieve the team's goals. She stated both task performance trust and interpersonal trust are important bases for the positive relationships that create a community in which the environment is highly positive.

As noted above, trust has been defined from diverse perspectives: from a philosophical view, an organizational view, and an individual view. Surprisingly, very few researchers have analyzed trust at the team level. In addition, numerous studies demonstrated the effects of trust in collaboration. Yet, there are only a few studies relating students' trust and the consequences of trust in a CSCL environment. Moreover, the contributors to trust in a CSCL environment are comparatively less well defined than in a face-to-face situation and in a CSCW environment. Trust in a collaborative environment is affected by many contributors related to the different and complex aspects of trust. Especially in an online collaborative environment, trust is influenced by the technologies being used. Because of the different degrees and levels of trust, not all members in the same group will necessarily perceive trust consistently. Different levels of trust may also emerge across different aspects of trust. Some group members may feel trust relationships while others in the group do not. Hence, many contributors dynamically influence trust and the contributors' interaction with one another. Given this

complexity, one of the purposes of this study is to investigate what contributors influence students' trust relationships in an online course and how the contributors relate to one another. This study also examines how students' trust relationships influence their online collaborative learning. Furthermore, this study examines the differences among groups and within groups that occur because of uneven perceptions of trust among team members.

Chapter 3. Methodology

The three main purposes of this study were to examine the elements that influence students' trust in their learning teams, the relationships among those elements in an online collaborative learning team, and the impacts of students' team trust on their knowledge building and sense of community. To achieve these purposes, this chapter addresses the methodology of the study. In detail, the following section provides the 1) overall methodological approach, 2) purposive sample selection, 3) data collection and analysis, 4) researcher as human instrument, and 5) methods of ensuring research quality.

OVERALL METHODOLOGICAL APPROACH

To examine students' trust with their peers in an online collaborative learning team, the qualitative research methodology was chosen for several reasons. There are multiple constructions of reality, and individuals have their own unique interpretations. The qualitative research methodology is based on the idea that meaning is socially constructed by individuals in interaction with their world (Merriam, 2002). This study focused on how students build and describe team trust. Because of this focus, this study used qualitative methods to understand the perspectives of the students who are involved in this study. To include students' own voices on team trust in detail, the researcher collected two main data sets from students' interviews and reflective journals.

As Patton (1990) mentioned, qualitative research "is an effort to understand situations in their uniqueness as part of a particular context and the interactions there" (p. 1). This understanding is an end in itself, so that understand the nature of that setting – what it means for participants to be in that setting, what their lives are like, what's going on for them, what their meanings are. The analysis strives for depth of understanding. In

addition to focusing on participants' diverse and vivid perspectives, the qualitative research method allows for an understanding of the influences of the context. This reality is constructed and dynamic, influenced by an individual's interpretations at a particular point in time and in a particular context (Merriam, 2002). This study examines students' trust building in an online collaborative learning team. Identifying the elements that influence team trust building in online collaborative learning environments and the relationships among these elements is the main purpose of this study; therefore, the qualitative research methodology was used to present a holistic interpretation of what happened with this group of students and uncover the complexity of human behavior in this particular context.

One of important characteristics of qualitative research is that the process is inductive. As Merriam (2002) noted, "Researchers gather data to build concepts, hypotheses, or theories rather than deductively deriving postulates or hypotheses to be tested" (p. 5) in quantitative research. Especially, researchers undertake a qualitative study when there is a lack of theory or an existing theory fails to explain a phenomenon adequately. As presented in the previous chapter, research studies on trust at the team level and in online contexts are surprisingly rare. Therefore, this study used qualitative methods to build toward theory from observations and intuitive understandings gleaned from being in the field.

There is a wide variety of qualitative research designs. This study used the techniques and procedures of the grounded theory approach originally developed by Glaser and Strauss (Strauss & Corbin, 1998). Charmaz (2000) referred to grounded theory as "the study of experience from the standpoint of those who live it" (p. 522). The goal of this type of theory is to derive a theory inductively from data. This theory is grounded in the data, the researcher is the primary instrument of data collection and

analysis, and the end product is the building of substantive theory (Merriam, 2002). The goal of this study is to find the elements and the influences of team trust in an online collaborative learning environment; therefore, grounded theory was chosen for generating a theory emerging from the data, including students' interviews and the researcher's observations of students' online learning interactions. More detailed descriptions of the procedures used are provided in the following sections.

PURPOSIVE SAMPLE SELECTION

Site Selection

Purposive sample selection, including what sites are to be observed and who is to be interviewed, is essential in qualitative research. As Patton (1990) noted, it is crucial to select information-rich cases for in-depth study. Additionally, considering the realities of field research, the researcher's accessibility to a wide range of participants' activities is important. Given these requirements, an online collaborative learning course in higher education was chosen for the setting of the study because the researcher was able to examine students' diverse online interactions in terms of team trust and the researcher was able to access to students' learning as a moderator.

This online collaborative learning course, called CSCL, was offered in 2007 at the graduate level in the fall semester in a public university in the Southwest United States. The purpose of the course was to provide comprehensive and intensive experiences in online collaborative learning. To fulfill this purpose, participants conducted all course activities collaboratively through online communications, making it well-suited to a study of this nature.

Students in this course used various technology tools including the course website, a web conferencing system on TeachNet, Wiki tools, a Blog, and synchronous chat tools on TeachNet and Skype, along with a three-dimensional virtual world on Second Life. Most of these tools were incorporated with diverse team tasks, for example, an academic controversy activity was combined with a chat tool on TeachNet and a three-dimensional virtual world on Second Life. Among these tools, students used two primary communication systems: the course website and a web conferencing system. The course website (Figure 3.1), an instructional delivery system, provided participants with the course content and the instructions for the assignments.

The screenshot shows the course website for CACL 2007. At the top is a blue header with the text "CACL 2007". Below this is a navigation menu with tabs for SYLLABUS, MODULE 1, MODULE 2, MODULE 3, MODULE 4, MODULE 5, and HANDBOOK. The SYLLABUS tab is selected, showing a list of five modules: 1. Introduction, 2. What Is a Learning Community?, 3. Getting to Know Each Other, 4. Providing Information for Team Directory, and 5. Working Together Online. The content area displays the details for Module 1, titled "1. Building a Learning Community".

1. Building a Learning Community

In this module, you will begin the process of online collaborative learning. You will begin to build a learning community. We know from research that for online learning teams to be successful, team members must get to know each other and build levels of understanding, support, and trust. In this module, you will participate in the team-building process by sharing information about your interests, background, expertise that will help other members to get to know you better both as a team member and as a person.

We are not used to disclosing much about ourselves to others that we have just met, but since online collaboration is "high tech," we must also try as best we can to strive for "high touch."

Objectives

The objectives for this module are for you to:

- understand the concept and importance of learning community
- understand strategies and processes for building a virtual team

On the right side of the module content, there is a video thumbnail showing a man speaking, with the caption "Introduction of Module 1 (2:37 min.)".

Figure 3.1 Course Website

The conferencing system used TeachNet which is based on The FirstClass groupware (Figure 3.2). This web conferencing system on TeachNet provided a virtual

workspace and communication tools that allowed the participants to send e-mail, to communicate in synchronous discussions, to collaborate asynchronously in a discussion board, and to publish a product with a collaborative writing tool.

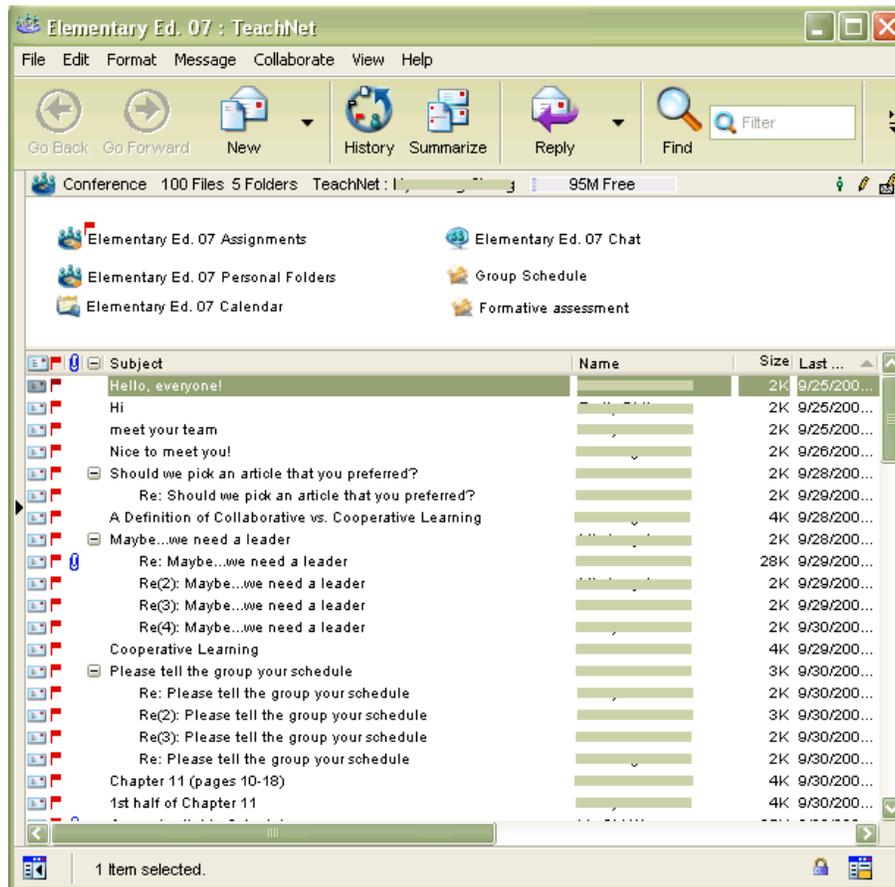


Figure 3.2 Web Conferencing System

Additionally, the course consisted of five learning modules that included both individual and group tasks (See Appendix A for instructions on assignments of the course). The very first learning module was conducted by individuals, and the rest of the modules were conducted through team based learning. Participants produced a reflective

journal about their learning experiences, conducted self and peer assessments, and created an individual portfolio at the end of every module.

Participants

The participants in the study were comprised of students in the 2007 CSCL course. There were twelve students enrolled in that course. The participants were diverse in terms of gender, ethnicity, previous online learning experience, and computer technology skills. Table 3.1. provides demographic information, academic background, and learning experiences for each participant based on the following factors: 1) students' online team directory which students provided in the beginning of the course, 2) students' answers in the personal interview which was conducted at the end of the course, and 3) the researcher's observations of students' team learning over time.

There were three different teams, each of which had four students. In terms of gender, only two participants were men, and the rest of them were women. The participants' ethnic background varied: five students were Asian and one student was middle-eastern, whose main languages were not English, and the rest of participants were Caucasian or Hispanic. The course was offered simultaneously through a distance education institution as well as at a university. Therefore, the participants in the course were enrolled through two different institutions. Ten participants enrolled through the instructor's home campus and were called "on-campus" students. Two participants were "off-campus" students enrolled through the distance education institution. However, in reality, two more on-campus participants, one in team A (Emma) and the other in team B (June), also lived far away from the campus; therefore, both of them participated in the webcast sessions though online. Consequently, all of the teams had at least one participant who could not join offline meetings with the other members. In terms of students' experience in online courses and computer technology skills, one participant in

one of the teams was an advanced learner. The majority of the participants, though, were novices in computer communication and skills.

Table 3.1. Participants' Background Information

Group	Name	Gender	Ethnicity	On /Off Student	Online Courses Taken Before	Computer Technology Skills
Team A	Austin	Male	Middle-Eastern	On	0	Intermediate
	Emma	Female	Caucasian	On	0	Intermediate
	Hyunjung	Female	Asian	On	0	Beginner
	Shih Ting	Female	Asian	On	3+	Advanced
Team B	Shan Shan	Female	Asian	On	0	Intermediate
	June	Female	Hispanic	On	0	Intermediate
	Melanie	Female	Caucasian	Off	3+	Advanced
	Chen	Female	Asian	On	0	Intermediate
Team C	Ellis	Female	Caucasian	Off	3+	Advanced
	Heather	Female	Caucasian	On	0	Intermediate
	Han Chun	Female	Asian	On	1	Beginner
	Tony	Male	Caucasian	On	0	Intermediate

DATA COLLECTION AND ANALYSIS

Data Sources

Five data sources were used in this study: 1) interviews which were audio taped, 2) transcripts of students' self-reflective journals, 3) transcripts of messages on the asynchronous web conferencing system, 4) transcripts of messages on the synchronous web conferencing system, and 5) the researcher's reflective journals. The primary data of

this study were collected from interviews and written messages on participants' Blogs, where participants reported their reflective journals on their collaborative learning.

The first source of data involved interviews with each participant. An interview with each participant was conducted after the course ended (See Appendix D for the interview questions). The researcher conducted face-to-face interviews with these participants. Eleven out of these twelve students participated in such interviews. All the interviews with participants were tape recorded with the participants' consent and then transcribed. The time allotted for each interview was approximately forty minutes. After each interview, additional follow up questions were asked in e-mail interviews.

The second source of data was the participants' reflective journals on their Blogs. Throughout the course, participants were asked to reflect upon their learning on their Blogs at the end of each module. Specific questions such as "What do I see as the most important factors to enable us to work together as a high performance online learning team? What have I learned? What problems have I encountered? How could they be overcome?" were given to participants to garner their reflections on the module. Participants were required to comment on at least one other member's reflections at the end of each module. All of the students' reflective journals were collected as data for this study.

The third source of data was the written asynchronous and synchronous messages produced by participants in the course conferencing system. As mentioned above, the course used TeachNet, which was powered by FirstClass groupware for the virtual workspace and communications among the participants. Almost all course activities and communications took place in this computer conferencing system. This conferencing system allowed the instructor to create a virtual space for each group, in which the team members could work together and communicate with each other by posting their

messages. The virtual space for each team was open to all of the course participants. The content of the messages included the following: 1) discussions focused on theoretical and research issues in online collaborative learning, 2) discussions among class members related to completing specific tasks in assigned learning projects, and 3) reflections that were publicly shared and commented on by other members of the class.

Additionally, the students used online chats that included online text chat (TeachNet chat), video conferencing chat (Skype), and online text chat in the body of a multi-user virtual environment (Second Life chat). Many teams used online chats regularly, which means once a week or at the beginning and the end of each module. The participants were encouraged to save the transcripts of their online chats and post them in the virtual space for those who could not attend the chat or for future reference. The transcripts of online chats posted by the participants were also included in the data of the study as the fourth data source.

The last source of data was the researcher's reflective journal. The researcher made entries into the reflective journal regularly during data collection and analysis to chronicle a detailed account of the methods, procedure, and decision points.

To insure confidentiality, the researcher gave a pseudonym to each student prior to the initial data collection. Interviews were conducted in private, and all the audio tapes of interviews were also labeled under the pseudonyms. After the data analysis, all the audiotapes, consent forms, and transcripts of messages were retained in locked storage and accessed only by the researcher.

Procedure

First, the purpose of this study and overall research information was introduced in the classroom. Then, informed consent forms were provided for all the students. The consent form included the purpose of this study and agreement to the use of online

discussion data. The participants were asked to be interviewed for about thirty minutes to share their learning experiences in the CSCL courses after the course was finished. These forms also pointed out that interviews would be recorded. All of the students agreed to participate in this study, so the data collection procedure started after all of the written consent forms were gathered.

As Merriam (2002) noted, data collection is simultaneous with data analysis in qualitative research. Therefore, the researcher began to analyze data while collecting data. For analyzing the data, the researcher used the coding procedures for developing grounded theory proposed by Strauss and Corbin (1998): open coding, axial coding, and selective coding. Open coding means, “the analytic process through which concepts are identified and their properties and dimensions are discovered in data” (Strauss & Corbin, 1998, p. 101). In this stage, conceptualizing and discovering categories were undertaken. A large amount of data was made more manageable by conceptualizing, a process during which similar items according to some defined properties were grouped together and the items were named. A total of eleven categories were identified through open coding in the study (See Appendix E for the list of categories that resulted from the open coding).

Axial coding was conducted after open coding. Axial coding put the data together in new ways by making connections between a category and its subcategories to develop several main categories (Strauss & Corbin, 1998). A category describes a phenomenon such as a problem, issue, or event that is defined as being significant to participants. And subcategories provide the details of the phenomenon such as when, where, and why it occurs, who it effects, how it happens, and what consequences it has. As a result of axial coding, a paradigm with conditions such as learning context, contributors, and consequences of team trust emerged (See Appendix F for the list of categories as the result of open coding).

The last procedure in data analysis using the grounded theory approach is selective coding. In this coding process, the categories are integrated to form a substantive theory (Strauss & Corbin, 1998). This theory describes an interrelated set of categories which emerged from the data through a constant comparative coding and analysis procedure. To identify a core category, which is a main conceptual element through which all the others are connected, the researcher repeatedly reviewed the results from axial coding and the original data. The detailed descriptions of the theoretical model for the study and its components are provided in Chapter 5. In addition, the methods which ensure the credibility of this study are provided in the following section.

RESEARCHER AS HUMAN INSTRUMENT

The researcher was an Asian female with a master's degree in educational technology who was a doctoral candidate in a public university in the Southwestern United States. She took several online collaborative learning courses during her master program. In addition, she took this particular course in 2004, CSCL, which was the setting of this current study, so she also experienced all the collaborative team tasks and the structure of the course as a graduate student. After the course, she was involved in the research team studying students' interactions and collaborative learning in that particular CSCL course for four years. In particular, she undertook a moderator role for the 2007 CSCL course to help students with their third team tasks, an academic controversy activity. Not only the researcher but also colleagues for the member checks procedure were all in this research team.

There are several possible biases that may result from the researcher's previous experiences in this CSCL course or other online collaborative courses. Her experiences of online collaborative learning and especially her team experience during this CSCL course

were so good that she could build deep team trust and successful collaborative learning. Therefore, the researcher may have been more likely to notice the best moments of team trust building rather than any potential team trust crises. Additional concerns are related to the research process because the researcher is also the interviewer, and resulting biases can influence the subsequent findings. There is the possibility that the researcher would find what she was looking for through selective attention to details and selective interpretation of the data. To minimize these possible biases based on the researcher's position, previous experience, and attitudes, this study used the following methods to ensure trustworthiness.

METHODS OF ENSURING RESEARCH QUALITY: TRUSTWORTHINESS

Trustworthiness of data is a major concern for researchers. Lincoln and Guba (1985) proposed four trustworthiness criteria for naturalistic studies: credibility, transferability, dependability, and confirmability, and they suggested strategies to establish trustworthiness. In this study, the researcher used the following strategies: 1) triangulation, 2) reflexivity, 3) member checks, 4) peer debriefing, and 5) an audit trail. These strategies are discussed further below.

Triangulation

The first strategy for trustworthiness undertaken in this study is triangulation. There are four different modes of triangulation, including the use of multiple and different sources, methods, researchers, and theories. Triangulation helps to eliminate biases that may result from relying exclusively on only one of these (Lincoln & Guba, 1985). To triangulate the data, this study used multiple sources and methods of data collection including the following: 1) interviews which were audio taped, 2) transcripts of

students' self reflective journals, 3) transcripts of messages on the asynchronous web conferencing system, 4) transcripts of messages on the synchronous web conferencing system, and 5) the researcher's reflective journals.

Reflexivity

The second strategy for trustworthiness used in this study is reflexivity. The relationship between the researcher and what and who are being studied has been an issue in qualitative research studies over the last two decade (Merriam, 2002). This focus consists of a clarification of the critical self-reflection by the researcher regarding his or her assumptions, worldview, biases, and relationship to the study that may affect the investigation. Such self-reflection is intended to allow the reader to better understand how the individual researcher might have arrived at the particular interpretation of the data (Merriam, 2002). The reflexivity of this study has already been discussed above where the researcher listed the possible biases in the previous section, "researcher as human instrument."

Member Checks

The third strategy for trustworthiness is member checks. Member checks is a process of taking data and tentative interpretations back to the people from whom they were derived and asking them if these results are plausible (Lincoln & Guba, 1985). During collecting and analyzing interview data, the researcher took the interview data and the results of open and axial coding back to the interviewees for member checks.

Peer Debriefing

The fourth strategy for trustworthiness is peer debriefing. Peer debriefing is a process of exposing the researcher to a disinterested peer(s) in order to mimic an analytic session, thereby exploring aspects of the inquiry that might otherwise remain

unarticulated and unknown to the researcher (Lincoln & Guba, 1985). The researcher met periodically with three fellow doctoral students for peer debriefing during the data analysis process. These knowledgeable colleagues reviewed the open coding on data that was coded by the researcher in order to verify that the coding accurately reflected the original data. They also helped the researcher develop further categories, identify the relationships among them, and check to ensure that categories were labeled accurately, reflecting the meaning of the incidents that are grouped in the category.

Audit Trail

The final strategy for trustworthiness is the audit trail. An audit trail is a detailed account of the methods, procedures, and decision points in carrying out the study (Lincoln & Guba, 1985). In this study, the researcher reported weekly in the reflective journal to offer a detailed account of the methods, procedure, and decision points for the triangulation of the study.

In short, this chapter provided the methodology of the study. To study the phenomenon of students' team trust in depth and in a descriptive manner, this study used qualitative methods. In particular, this study followed the techniques and procedures of the grounded theory approach. For the purposive sampling, this study selected an online collaborative learning course at the graduate level in a public university in the Southwest United States and the twelve participants who enrolled in this course. This study collected data mainly from the interviews with the participants and the documents in the participants' personal Blogs in which they provided their reflections on their team learning and their personal lives. Based on the procedure of the grounded theory, the data were analyzed using open, axial, and selective coding. This section also addressed the methods of ensuring research quality such as triangulation, reflexivity, member checks, peer debriefing, and leaving an audit trail.

Chapter 4: Results

The main purpose of this study was to explore students' experiences of trust building in an online collaborative learning team. As the results of the data analysis, a theoretical model entitled "Team trust building through task performance trust and interpersonal trust in an online collaborative learning team" emerged. Before discussing this theoretical model in detail, this chapter describes each of the elements that are the components of the theoretical model. The researcher examined the data from interviews and written messages on students' Blogs for each separate element. The data for a particular element was organized into sub-elements. There were general relationships among elements; however, some of the sub-elements were related to each other differently depending on the diverse team dynamics.

In terms of team trust in an online collaborative learning team, 1) CSCL context, 2) contributors of team trust, 3) two dimensions of team trust: task performance trust and interpersonal trust, and 4) consequences of team trust: collaborative knowledge building and sense of community emerged from the data. In the following section, the researcher describes each of the elements, how they influence team trust building, and the diverse team trust dynamics that emerged from the data.

CSCL COURSE CONTEXT

This study found several sub-elements of the CSLC course context that influenced students' team trust building. Both the collaborative nature of the course and the heterogeneous composition of the online team emerged as the main sub-elements that impacted students' team trust building. These sub-elements in relation to the course context influenced students' team trust building by either facilitating or interfering with

team interactions. In this part of the study, the researcher describes in detail those sub-elements of the CSLC course context which influence students' team trust and how they influence trust building in different teams.

Collaborative Nature of the Course

As discussed previously, this course was designed to foster online collaborative learning. These three teams, each of which was composed of four students, completed four different team tasks collaboratively in the semester under consideration. In terms of the collaborative nature of the course, the following elements emerged as crucial sub-elements which in turn influenced trust building: 1) the time constraints, 2) the collaborative characteristic of the tasks, and 3) the self and peer assessments.

Time Constraints

Students in the course had to complete four different team projects in one semester. They had to complete one team task approximately every three weeks (See Appendix A for a detailed course schedule). Given these restraints, completing team tasks on time was one of the students' major challenges:

Shan Shan: There was no difficult area for me in the course except the time issues. Time for each assignment was too short and the schedule was very tight.

In the early stages of the team process, due to these time limitations, students tended to combine several individual tasks together to produce the final project. The students picked one idea among several that they generated rather than negotiating among ideas to build knowledge. In addition, in the asynchronous discussion board, there were more suggestions than responses to the initiatives and more decision-making was made without negotiation as compared to later in the course.

Additionally, the time limitations tended to interfere with students' interpersonal trust building in the beginning of the course. Most students mentioned that knowing each other and sharing personal interests with team members was valuable for team trust building in their interviews; however, they could not spend sufficient time to form personal relationships.

However, the students began to perceive this tight timeline as natural over time, while they learned the values of effective online team membership such as accountability and the strategies of working together online, including planning complex projects within a tight timeline:

Austin: One thing I see as a problem might be the time and deadline constraint. After the last set of assignments, we had only one week to do this one. Assuming that we accomplish each step in two days, which is reasonable, we could barely meet the deadline. I think this is what happens in real life, too. There will be certain deadlines; everybody's business will vary; and everybody will have different schedules. This problem of time constraints can be overcome by starting as early as possible and putting mid-deadlines to accomplish every task or each step.

Gradually, the students tried to find a way to have better collaboration and learning while working under a tight timeline, rather than complaining about the time limitation. Given the tight timeline, they also perceived their team members' reliability as a critical element in online collaborative learning teams. Due to a limited timeline, the students naturally placed punctuality and predictability as their first priorities. They also appreciated the other members' responsibilities in the team learning process:

Hyunjung: It was online and each module has a timeline. So time was the most important factor. One thing that I focused on was that I finish my job on the deadline or before the deadline. Generally, I was responsible for the due date.

Additionally, the students tried to seek team strategies to complete the team tasks effectively. Students built their team systems in order to complete their projects on time, and this focus provided a foundation of task performance trust. Their own collaborative system helped the students to overcome the time limitations for the completion of team tasks:

Hyunjung: We used the “jigsaw” collaborative technique. After deciding the topic, we divided it into several subtopics which were related [to] our own interest fields. Then, we searched information and wrote each portion. Finally, one person in the group synthesized it. I think the strategy is useful when we have different interests and time constraints.

June: The way that these problems can be overcome in the future is to make more time and anticipate that things can get in the way and make it more difficult to achieve the goal. Setting up a schedule so others know when e-mails will be sent on a specific objective, such as for clarifications, questions, and suggestions, would be useful so the turn around time for replies is within that small time frame.

Collaborative Tasks

The CSCL course consisted of five learning modules. The first module (Figure 4.1) included the contents, which encouraged students to get to know each other and to establish a learning community.

CSCL 2007						
SYLLABUS	MODULE 1	MODULE 2	MODULE 3	MODULE 4	MODULE 5	HANDBOOK
1. Introduction			4. Providing Information for Team Directory			
2. What Is a Learning Community?			5. Working Together Online			
3. Getting to Know Each Other						

3. Getting to Know Each Other

For us to work together as a learning community and be helping each other in collaborative learning during the course, it is really important to get to know each other about to learn about each others expertise, interests, background and experience. To help us break the ice, you will share information about yourself with others using a special Web space called a Web-log or Blog. Your first step will be to set up your own personal blog to complete the assignment.

< Assignment 1.3.a > Setting up your personal course Web log (Blog)

You will have your own blog in which you will introduce yourself to other members of the class. Your blog will be used throughout the course for other purposes such as keeping an ongoing online learning journal, sharing your



Introducing Yourself
(1:52 min.)

Figure 4.1 Module 1

In addition, this initial module provided individual tasks that helped students to share and establish their own norms or rules for effective online collaboration. Learning the value of getting to know each other and considering how to collaborate with others by building relationships encouraged students to create a learning community that provided a safe, intimate, and cohesive space in which they could openly share their thoughts and feelings while learning from each other:

Ellis: At first, each of us did not [...] there was nothing in our group that was compassionate to others. However [...] We all had been spending a lot of time learning about each other and that comes from facilitation, from Dr. Grisham [the instructor of this course], of course, facilitating us learning more about each other and giving us situations to discuss on the interest or something, and that we could even use more of, because we went more into that course.

Heather: It does not happen in other classes. I do not think you focused on collaboration as much in other classes. I think it was a unique course because you were learning about collaboration using collaboration. And so reflecting more on the collaboration that you are doing which you would not do in other courses.

In addition to the team tasks in module one, this CSCL course provided team tasks for the rest of the four learning modules. The unique characteristics of these team tasks in the course encouraged students to share their ideas. Furthermore, these tasks helped the students to respond carefully to each other. For example, the first team task in the second learning module was to synthesize team members' ideas in terms of CSCL (See Appendix A for detailed instructions for the assignments of the course). The students had to share their best and worst collaboration experiences in an educational or vocational setting. Moreover, they had to respond to at least one of their team members identifying either a shared or contrasting experience to the one upon which their team member reported. When presented with these tasks, the students naturally shared their previous online learning experiences, as Melanie mentions in the following quotation:

Melanie: My worst collaborative experience was in the first class in this program. There were three people in my group, one from Texas, one in Romania, and I was in Japan. The project was designed to be done via an online classroom (Wimba) but with the three different time zones, there was literally no way that we could all meet online at the same time. There was little support from the instructor and so we tried to use the discussion board instead of the online classroom, but the turn around time for responses was so long that the project was losing momentum. One of the other group members had the idea of using the Wiki to do the project. We used the Wiki and then did the final project on Wikis for online collaboration. The third group member did not participate very much (which was frustrating), but since it was all documented in the Wiki, the two of us pulled the project together and submitted it on time. In the end, it all worked out, but it was stressful.

Moreover, the complicated nature of the team tasks encouraged students to open up about their ideas, and to give and receive feedback in order to produce better end products. All of the team tasks were designed to be challenging enough to require all

team members to contribute, so that the students could naturally complete team tasks collaboratively. Especially, at the last module, the students were required collaboratively to design and develop a web site for a WebQuest – which is an inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web – activity with their group members:

Emma: The WebQuest task was fun – looking at the assignments that we did – because we truly had to collaborate on that. We all had to really check over each other, go back over things and talk about the content that was in there. We really had to truly look over each other's work and make suggestions for each other. The whole process was very collaborative.

In addition, the Blog tasks helped students to open up about their personal stories to other members. Starting with the first learning module, the students created their own Blogs to introduce themselves and share their learning experiences related to the course. The tasks gave them a chance to reflect on their team performance and their relationships with their fellow team members. By making connections and relationships based on the Blog tasks, the students were able to get to know each other personally and to build trusting relationships:

Chen: I think this course is very complex. The instructor does not only let us do the projects. He also helps us to build a good relationship by letting us introduce ourselves, share experience[s], post our thoughts, and give others comments.

Self and Peer Evaluation

Students in this course conducted self and peer evaluations three times after the second, third, and the last (fourth) team tasks. Conducting self and peer evaluations encouraged students to reflect on their contributions based on their scores:

Austin: It makes me feel like I am being evaluated from my team members. So, it pushes me to contribute more to group work

Heather: At least for me, there are things that I have read, there are things that I know, I think it's more about reflection that brings it about. You can not just say "OK we are working in a group but this is our task." It was continually thinking about how you work as a group and the fact that you are focused on – you are sensitive – to the team work and how the team is working. And part of it is also how we evaluate the team. It makes you reflect and think about. During the portfolio you do your reflections and fill out the evaluations on each other. And so every time you have project you are looking at this is evaluation, this is the type of group members I'm supposed to be, this is the type of thing. I am supposed to do make sure the team is successful, so you are evaluating yourself when you reflect when you fill it out "Well, did I do this, was I a good group member?" And the next task you have in the back of your mind.

In addition, the sixteen different rubrics of self and peer evaluations made students reflect on their own work in detail and supplement and account for their own weaknesses (See Appendix C for the self and peer evaluation rubric). For example, Emma as well as Hyunjung became more accountable to team deadlines and open to sharing her ideas after conducting the peer evaluation:

Emma: The peer evaluation influenced my actions afterward. Because in each category you see how you were rated, so if it says, you know, you met team deadlines, and I had a 3 out of 5 then I did not do something right. I needed to make sure to meet those deadlines in the future. Offering more suggestions and more ideas for assignments the first time was like 3.5 out of 5. I needed to offer more ideas and suggestions. In the future I will try to make sure that I do that.

Hyunjung: The rubric of peer evaluation influenced me. I thought I could engage more and [get] involved more to get higher scores. I thought those questions or rubrics were my duties which I had to do follow.

In addition to the rubric for peer evaluation, comments from other members in peer evaluation led students to contribute to their teams' performance more than before. Furthermore, these comments helped students develop caring relationships with one another. As the result of reading others' comments, for example, Han Chun could open up and share her ideas more freely. As another example illustrates which follows Han Chun's comments, Heather also tried to be nice and kind to other members:

Han Chun: In the peer evaluation [...] they say that they appreciate my contribution and if I can stick more to my opinions, then it would be better. So I changed my strategy to interact with them. I will try to express my opinions more, even though I know they will not agree with me, but I know they want to hear my voice so I will try to make some modifications.

Heather: Peer evaluation influences on how I act, because you have it in your mind. One thing in the first peer evaluation we filled out, I think someone quoted me like, "Speaking kindly or nicely always to the group members," and I was "I was not nice when I was speaking to others. So the rest of the course I was like, 'OK, I recognized that, am I being nice because this goes across the wrong way.'" Maybe it was just one thing that I said that was a little different. I can be that way when I am focused on the job. Sometimes nice deeds and stuff go out the window, but then I am thinking about that, because that hit me, "What do I do?" I would not know exactly what I did that made them give me four instead of five, so then I was a little bit of a cheerleader more than I normally am, but that was good because you have to do that, you cannot just say, "This is what was wrong with what you did." You have to say what was good, too.

For the most part, conducting self and peer evaluations helped students to be more reliable and responsible. However, the knowledge of which team members gave the students lower scores in peer evaluation negatively influenced their trust relationships.

Generally, peer evaluations in the course were conducted online so that the anonymity of peer assessments was assured. However, Tony happened to know that Ellis gave him lower scores which lowered his total scores, and this knowledge negatively influenced his trust building with her:

Tony: There were a couple of strange things. I knew when Heather put her evaluation because she and I did it on time. And then Ellis was the next person to do it. And then Han Chun was the last person who did it. So it was easy for me to see who gave what. Knowing that she (Ellis) knocked my scores down [...] Ellis and I had different perspectives and I already felt that there was mistrust. I do not want to say mistrust, but it was not a perfect relationship [...] I guess that might influence me.

Heterogeneity of Teams

In this course, the learning teams were heterogeneous. The students were assigned to three teams by the teacher who considered both students' first and second interest areas in online learning, such as elementary, secondary, and business learning. The diversity of the students in terms of their levels of technological skill, previous online learning experience, gender, and ethnicity was also considered. In terms of the heterogeneity of the teams, 1) functional diversity, 2) different time availability, and 3) diverse technological tools emerged as the critical sub-elements that influenced students' team trust building. The heterogeneous team composition was related to the course contexts; however, the elements of team heterogeneity, such as students' different personalities, learning styles, backgrounds, and learning experiences, were in relation to students' individual differences. Therefore, in this section, the researcher describes the influences of the heterogeneity of team composition as well as the impacts of students' individual differences upon team trust building.

Functional Diversity

According to Webber (2002), functional diversity is defined as the differences among team members, including personality, culture, language or jargon, as well as organizational responsibilities. Heterogeneous teams in this study also had functional diversity based on individual differences among students.

In the beginning of the course, the heterogeneous nature of the teams' composition seemed to act as a hindrance to developing team trust. Students perceived the functional diversity of heterogeneous teams as challenges early in the semester. As Hyunjung wrote in her Blog after completing the first team task, "Team members could be international. So there could be problems while working with group members who have different background and culture." The functional diversity in relation to students' personalities and learning styles caused some conflicts among team members. For example, Shih Ting and Hyunjung in team A were task-oriented members. They were more willing to take on leadership roles in their team, and they were more punctual and productive. On the other hand, Austin and Emma seemed to be more like listeners, less punctual, and less productive. They described themselves as stand-back members in their team. In the following quotation, Hyunjung describes how she saw Shih Ting's role:

Hyunjung: Even though Shih Ting did not take a leader role officially, she did all the organizing. For a leader role, we took turns to be a leader, but she was an organizer. Shih Ting did most of the jobs when we meet, how we will do it and so on. Also, I tried to be punctual. One thing that I focused [on] was that I finish my job [by] the deadline or before the deadline. It was online and each module has a timeline. So time was most an important factor.

The quotations that follow reveal that Shih Ting and Hyunjung were concerned about their team products while Austin and Emma felt pressure from Shih Ting and Hyunjung:

Hyunjung: Sometimes, not all members are actively involved. How can we deal with the reluctant members?

Austin: But Shih Ting is [...] I do not know how to say [...] she is always looking at other people. She would say, "They are doing this, why do not we do this?" That [is] sometimes bothersome, but not too much. One time was OK; however, she said this twice, three times, four times, every time. It gets annoying. That was what I did not like about her.

Emma: Sometimes there was pressure. But when you are at this point in school you expect that pressure and you know how to handle that pressure. So I mean there was some pressure but you just had to do it.

In all three of the teams, the functional diversity in students' personalities and learning styles produced team conflicts early in the semester. However, as time went on, each team coped with the functional diversity in their team differently.

In the case of Team A, students could not fully overcome the conflicts based on its functional diversity. Even though Austin began to be more involved in the team tasks by taking a leadership role, students in Team A could not reduce the gap in participation among team members. In contrast, the students in Team B could see the benefits of the functional diversity their team. While the students in Team B were also heterogeneous, they accepted their differences naturally and tried to find factors in common among their team members. For example, Shan Shan posted her first message in their asynchronous discussion board in TeachNet in a way that was warm, welcoming, and enthusiastic:

Hello, June, Melanie, and Chen,

This is Shan Shan. My Chinese name is Pei-Yu. Weird spellings, right?

It's so cool! We are in the same team. I think most of us are interested in secondary education or have teaching experience. We've got acquainted with one another to some extent through our weblogs. Let me summarize a little bit of the information about our background.

Chen and I are studying in [the] Educational Psychology program.

June is an IT person, and so is Melanie, an Educational Technology major.

Chen comes from Shanghai, Mainland China, while I'm from Taipei, Taiwan.

At this time, Melanie is teaching in Okinawa, Japan. BTW, June, have you been to any Asian country or do you have close friends from Asia? Perhaps we could discuss something about cultural difference, shall we?

One more thing I find [is] that we are all married. It seems that the married life is wonderful for each of us. God bless!

Shan Shan tried to find and highlight the commonalities among the team members, and this positively influenced the warm team environment. As Shan Shan mentioned in her interview, “I thought somebody should break the ice. So I just read others Blogs. And when I logged on the TeachNet, there was no message. So I made a message to find our commonalities. And all of them replied to my message. I think it was a good start.” Shan Shan’s action reduced tension among team members due to the team’s functional diversity.

Additionally, this team overcame the conflicts among team members by building task performance trust and interpersonal trust. June and Chen in this group were punctual and predictable even though they were less active and did not initiate ideas in advance like Shan Shan and Melanie. Moreover, all of them kept in close contact, which Shan Shan describes as follows:

Shan Shan: I think I am lucky to work with the three members. Actually I am an active learner. And I like to complete any assignment early in the process [...] in advance. And Melanie is also active. We both wanted to get something started. And June and Chen replied promptly. So I think they were good partners, [they] made me feel comfortable.

Although June and Chen felt pressured because of individual differences at the beginning of the learning process, they could overcome it by building interpersonal trust. By communicating with each other regularly and building caring relationships, the students could understand each other and accept their differences as evidence of team competence:

June: At the beginning, I may have thought that Melanie was a little [...] I do not say bossy because I do not think this is the right word, hmm [...] maybe proactive [...] more proactive. So at the very beginning, it made me nervous because we were always giving e-mails about updating something. But after a few weeks, I understood Melanie's intention. We would let us know what was coming up and what was not. We do this now. But that was how I thought at the beginning. And you can not see somebody face to face and you can not see the body language. So, you just have to either e-mail back or on the chat you say, I do not understand and that was very helpful. Just ask what do you want us to go with it and then you realize afterwards, that member says oh. I am just putting on so that we know what we need to do. After I realized that she is just like that, then no problem. It was just people are a certain way. You must accept that and find a way to use that to make your work better.

In the case of team B, the diversity of the students in their knowledge, skills, experiences, and cultures enabled each member to bring a unique perspective and to incorporate special knowledge or skills to complete team tasks, which helped team members to trust each other.

Time Availability

Generally, the students in this study had synchronous meetings in their online chat room for both decision-making during the planning stage and knowledge building during the producing stage. In arranging time for the online synchronous discussion, the students had conflicts in scheduling due to different time availabilities. Adjusting for the differences in time availability with the tight team schedule was one of the major challenges for all students at the beginning of the course, and their Blog entries reflected such difficulties:

Emma: The difficult part was planning times [when] we could all meet. We all have very different schedules. It can be very challenging for us all to meet online at the same time.

Shih Ting: To meet each individual's available schedule is another consideration for us. Some of them work during day time; some of them take class at night. It is a challenge for everybody to adjust their own schedules for the group.

Heather: The multiple overlapping due dates caused some issues for me during this module. Working collaboratively with my team also provided some challenges. Our team members were all busy people with complicated schedules. Finding a time to meet together was difficult until we started using the calendar and communicating synchronously.

In particular, students such as Emma in Team A, Melanie in Team B, and Ellis in Team C, all of whom had full time jobs, could not participate in team discussions during the day time:

Emma: My other responsibility is being a fulltime teacher. That limits my involvement when the group schedules a meeting during the day when I am at school.

Ellis: In the beginning of the course, my difficulty was to schedule. I was not really available during the day time or in the evening. But I could not adjust work. So [...] someone wanted to meet synchronously, they tried to meet early like 5 or 7pm. Usually, I already got a training schedule at that time [...] so that it was our major difficulty.

Moreover, Melanie in Team B lived in a different time zone. Since she lived in Asia, her time availability was totally different from the other members. However, Team B's members overcame this conflict. Choosing the asynchronous discussion board in TeachNet as their main communicative tool, Team B members allowed Melanie to participate in their discussion. Even though other members had to wait for a while until Melanie came to the discussion board and continued the discussion, Team B adjusted to accommodate Melanie's needs. Because Melanie was competent and reliable, Team B's members could build team trust while they overcame the conflicts resulting from different time availabilities:

Shan Shan: Melanie, she lives in Japan, so we had a time difference. So actually when we post something, we have to wait to the next day or some period of time. However, she always posts something after. She is very active in participating in the course.

Melanie: As usual, the fact that I am in a drastically different time zone presented some problems. It was difficult for us to arrange a time when we could chat online as a group, because the times that were convenient for the other group members were impossible for me (I was at work). We eventually did find a couple of times that would work, and the sessions were productive. Again, I think very little thought is given to the difficulties that might arise from scheduling synchronous activities in groups that span the globe. I would like to see some imagination applied to this area in online courses, because most of the synchronous elements are unnecessary. They could just as easily be done asynchronously, in my opinion.

In contrast, Teams A's and C's members could not find a way to have communication at the team level due to their members' different time availabilities. After struggling to find the best time for all, Team A's members chose to have synchronous team discussion without Emma who had different time availability than the other three members. Therefore, Emma lost chances to communicate and exchange her ideas with her team members. Furthermore, Emma lost chances to contribute to her team's tasks and thus show her competence:

Shih Ting: Emma is very kind, but I think she is very busy. Because she is an elementary school teacher, every time when we have the group discussion she always said that, "I can not do it until tonight," or when she was in school she could not check the TeachNet e-mail. So, I think at least she told us her needs, so we could change the schedule. But I thought that sometimes, because she was very very busy. She said that, "I am not a student, I cannot appear on the campus." As a team, it might be a problem too, because she had to contribute her time. Comparing with other teams, they usually had a lot of discussion with their team members, but ours not very often.

Team C's members chose an asynchronous tool to accommodate Ellis's schedule, as he could not participate during the day time; however, this team chose a Wiki tool as their main tool, focusing on the product itself rather than the process of team communication.

Ellis: I was not comfortable with how we were coordinating. I was fine [with an asynchronous way to communicate] because of my experience in the previous class. I knew it was very comfortable, and we were ten times more productive in that class than any other classes. However, my team members were new, so I freaked out at the beginning thinking how we were going to use the internet. We got to be online on time and scheduling so. I think I really helped Tony on [the] Wiki project. He managed the frame work that I was encouraging him to be OK with the asynchronous, and then he went back and looked at it, he just made it

things and everybody reviewed, that he was got more comfortable with being able to effectively organize with our schedule.

Team C's members seemed to overcome the conflicts arising from their different time availabilities; however, another huge problem occurred. While the Wiki tool was good for collaborative writing, it was not very good for team communication. Therefore, Team C's members did not have enough chance to get to know each other, express themselves, and negotiate their ideas by having team communications.

Technology Tools

The course used a network based on collaborative groupware called TeachNet to facilitate the students' online communication and collaboration. In addition, this course encouraged the students to use various types of technological tools to accomplish diverse team tasks. For example, a Blog tool was combined with the task sharing reflective journals, Wiki tools were combined with the second team task that involved collaborative writing, and Second Life was incorporated with the third team task that concerned an academic controversy. Indeed, the students had to use and learn various technical tools, which in some cases influenced or interfered with building team trust.

Various technologies in use for the team collaboration generally helped the students to have diverse communicative channels. They enabled the students to have more chances to communicate with each other. These allowed them to become more familiar with each other and produce better team products, to which the following quotation attests:

Emma: Our means of communication and how we communicated helped in the relationship. It impacted, and helped in our relationship. As far as building a

deeper relationship. Anything we have used would have helped us build the trust relationship.

In particular, when a member had a technical problem with a particular technological tool, the students could easily find an alternative way to communicate with each other and engage in discussions to develop team outcomes:

Austin: For our last chat, we used Skype [instead of TeachNet chat], because one of our members could not get on her TeachNet. That was the reason why we decided to use it.

The students used various tools harmoniously; however, they had to put effort into finding their main communicative tool among the various technological tools. To find the right communicative tool for all, they had to struggle in the beginning of the course:

Heather: The multiple methods of communication also left the team unsure at first about what we were going to use to communicate. Our first meeting was an hour and a half of set up before any real discussion took place.

Students in team A could find their common preferences while using the asynchronous discussion board in TeachNet as their routine communicative channel, which they used the most. They used the synchronous chat tool in TeachNet for their team decision-making. As mentioned before, team A's members used a chat tool for important team decision-making, but they did so without Emma because she had a different time availability, so that they could not make important team decisions with all team members.

In the case of team C, students also could not reach a satisfactory decision about which technological tool they should use as their main form of communication. Tony and Heather wanted to use Skype to have synchronous discussions since both of them used Skype personally and were familiar with it. In addition, these two students did not need to log in twice to the other system since they were always there already:

Heather: We used Skype for most tasks. Pretty much all the time. For the first task we talked in Skype but we used the chat, text chat in Skype. I think that we liked how we could see each other online easily and we did not have open up TeachNet to use it. It was always there, and also our team had so much fun using the Skype. There are great features like smile faces. It was great! So it helps to express your feelings and thinking. It helped to set the mood, too. One of the problems of text based chat is that person's missing the tone of voice and visual cues [that one gets in an aural and visual setting], and this helps you to feel like you are connected to the person more.

However, not all of team members were satisfied with Skype. Even though Han Chun and Ellis were familiar with Skype, they were not logged in to this system all the time as their teammates were. Furthermore, Ellis used MSN messenger more than Skype. Further complicating matters, Han Chun and Ellis preferred using asynchronous tools. Ellis, especially, wanted to use an asynchronous tool, since she had different time availability for her team's discussions:

Han Chun: We used Skype [...] because I think most of them use Skype. Sometimes they can [...] they are just on Skype. Maybe they are used to using Skype, I think. Umm [...] usually Tony and Heather, they are always on Skype. Also, I was familiar with this tool. Before this class, I already got my Skype because I usually use Skype to call my family in [my] home country.

Ellis: My friends are all in MSN, so I used MSN rather than Skype. [The] functions are similar; however, it was easy for me to contact others by Skype.

Ellis: We were all communicating every single day [...] because we were new to this. If someone was not talking every day then we could think that somebody was not doing anything. Even though we did not see each other, we were talking everyday asynchronous, so we could find trust asynchronously.

Team C members could not find the best communicative tool for all. In the end, they chose the Wiki tool to produce team products. Fortunately, all of the members were satisfied with the Wiki tool; however, using the Wiki tool limited the opportunities for them to communicate with each other:

Heather: We used our Wiki more than just a Wiki. We used it more than just a Wiki project, we used it, I think, for every single task. We just found that was an easy place we could all go and edit and put our points. We used it for our website to start with that academic controversy. We put stuff there, it was easy for everyone to edit all together and it shows you the current [version of a text].

Ellis: We could reach consensus with the collaborative document in TeachNet [Wiki tool in TeachNet] I was putting up there and others added to it. With the collaborative document it was more focused. I think that was a valuable tool we had. Whether it was in TeachNet or the Wiki, it did not really matter. But the concept of collaborative web tool was critical in our group.

Both Team A's and Team C's members had fewer chances to communicate with each other and share ideas as compared to Team B. This lack interfered with team A's and C's interpersonal trust building. In contrast, the students in team B had more chances to communicate at the team level. They achieved consensus about using the asynchronous tool in TeachNet as their main tool from the very first task because they were all familiar with it, and it had a handful of functions to facilitate team collaboration:

June: I really like TeachNet. It is very useful and was the main communication tool we used for our group. I got used to checking TeachNet daily and when working with my group two to five times a day.

Chen: I liked TeachNet. Because TeachNet is [...] which I am most familiar with. I know how to use it.

Shan Shan: As for [our] collaborative team, TeachNet, including [the] bulletin board, chat room and revisable document etc., is such a handy tool which has facilitated the communication among my teammates a lot.

June: Melanie. She was in Japan. And she was up when we were asleep pretty much. So what we gave to her by the time we woke up, she was giving suggestions on as we moved forward. So, it was not like asynchronous it was just kind of like a system, we knew to get back to one another at a certain time during the day or the next day. So I really did like it.

Additionally, team B members valued the Blog tool more than the other teams did. As mentioned before, sharing personal stories, having casual conversations, and reflecting on their team learning in their Blogs helped them to build interpersonal trust by getting to know each other and feeling secure as a team:

Shan Shan: I posted a lot on my Blog. And so did they. I think we got to know each other more through the Blog, because we shared our family life on our Blogs. When we talked about the bad and worst collaborative experience, we shared the experiences about schools, because we were all secondary teachers. And it helped.

Shan Shan: For myself, I use my Blog most frequently. Since this is my first time to set up a published Weblog in an English version, I collected my favorite things which I learned from the culture of the United States. Also, I would like to share much more about my heritage culture through this Blog as well.

June: From reading other's reflections, you can relate. When I said that it was extremely nerve breaking in Second Life, somebody wrote back to me that was exactly how they were feeling, too. And it just made me feel a little more comfortable knowing that there were others on Second Life that felt the same way. So that made for a more trustful opinion.

TEAM TRUST BUILDING

This study found four components of team trust building, which were initial team trust along with the contributors, the dimensions, and the consequences of team trust. Each component represented the process of team trust building. In terms of the contributors of team trust, students' competence, reliability, online communication, and caring emerged. For the dimensions of team trust, task performance trust and interpersonal trust stood out in this study. Additionally, this study found that the consequences of team trust such as students' collaborative knowledge building and their sense of community were important. In this section, the researcher describes these components in detail as well as how these components influenced each other in different teams.

Initial Team Trust

The students in this study were assigned to teams by the instructor of the course. Except for two students, all of the other students first met their team members in this course. Therefore, the students had uncertainty of working together with their team members whom they did not know and with whom they had no history of working together before. In addition, the students who had not had experienced with online collaborative learning teams had concerns about working online in the beginning of the course. More than 50% of the students in this study had not had any prior experience with online collaborative learning, meaning that they were not familiar with the structure of this course:

Austin: This course was kind of hard for me because this is the first course I have ever taken, I mean about the computer-support[ed] collaborative learning, so the structure of the course. I was not familiar with the structure of the course. I was used to going to class every week, reading papers, and having discussions. This

course was different, all of assignments were online and you had to check them online. You had to go to this website and if you do not find something there, you should log on to Blackboard and check it. So the deadline and the assignment were confusing to me at the beginning of the class. For our first assignment, for example, I did not know that the deadline was coming up and it was on Sunday and I was in my office [...] oh [...] One thing is that the course mainly required us to use the TeachNet, which I was not familiar with it. I used it before for one of my earlier course but honestly I did not like it. If you do not like a system, you try not to get involved as much.

Along with working online, working together was also one of the students' major concerns. As shown in the case of Heather, students who had negative previous experiences with team learning were concerned about working collaboratively more than others:

Heather: I did not know them [team members] all, so I did not know what type of group members they would be. I mean I had experiences in the past of great groups and groups where that did not work out well, so there is always the fear that you are going to be with a group where you have to do all the work or they do not really help or the work they do is not very good. You always have the fear and also hope that things are going well.

Additionally, all the international students had concerns about their language skills. They had a lack of confidence in their language skills. Six out of the twelve students were international with first languages other than English. In particular, in team C Han Chun was the only non-native speaker, so she showed anxiety about her language in the beginning of the course:

Han Chun: Well, I was just assigned to a group and I did not know any of my teammates. I have never seen Ellis [laughing], just her picture. About concern and expectation [...] um well expectation. I hope I could get along with my team members. Especially I was an international student and the other team members

in the group, they were all native speakers. So I was worried that I could not catch up with them because their pace was very fast.

However, as mentioned before, the collaborative nature of the course helped the students start building their team trust not from the bottom but from a certain level. Even though the students did not have sufficient time to deal with their concerns, they had to work collaboratively in order to complete their team projects on time:

Emma: I think we had to trust in this situation. Everyone had a certain assignment and they had to do the whole assignment, so I think we had to trust them. And I think the time process, and we build that trust. You know the quality of work that they are going to produce [...] They might make a mistake. But knowing how they produced. By time we just experienced.

As this quotation illustrates, the students had to trust others from the beginning of the course. However, this initial trust was fragile. The students' concerns still existed, and the students could not find adequate time to get to know each other to overcome their uncertainty about working together. In this context, students' initial team experiences influenced their team trust building. Negative initial team experiences in particular interfered with team trust building.

For example, team A had a negative team experience at the beginning of the course. Austin, a member of team A, was not familiar with online collaborative learning systems because he had not experienced online collaborative learning before. Moreover, he could not concentrate on the course in the beginning due to his religious commitment to the Islamic holiday of Ramadan. Austin is a Muslim, and Ramadan fell at the beginning of the course. Ramadan is an Islamic month of fasting during which participating Muslims fast from true dawn until sunset. Given Austin's observance of this

holiday, he could not catch up with the team process especially during Ramadan. Other members in this team, Shih Ting and Hyunjung, talked about him in the team chat room since he kept missing their asynchronous meetings. For example, they said that “Austin even forgot to submit his part of the assignments.” Austin accidentally saw the archive of his team members’ asynchronous meetings and found that the other members were talking about him when he was not there. He wrote e-mails to others to explain why he could not attend the meetings. Although Austin also felt sorry that he could not contribute to his team work, this chat log, which mentioned his absence, made him displeased. In addition, other members were displeased because of this experience:

Austin: It was Sunday and I just told myself to log on to TeachNet. I needed to find out how to use it. So, that day I logged on to TeachNet, went to the chat room, and all other members were there chatting. Accidentally! Yeah, this was really weird and they were talking about articles; there was a group project and I did not know that the deadline was coming up [...] I really felt bad. They were trying to do the group project and I was not aware of that [...] After one or two days, I logged on to TeachNet again; I just wanted to look at what they had talked about. So if I missed anything I could catch up from there. And what I realized was that they talked about me. They were not telling bad thing, but [...] uh [...] Not good thing. Well, that made me feel really bad. And I was feeling really bad. I already felt bad because I accidentally caught them and made the deadline. This event made me feel much, much worse. I emailed them, and I told [them] my concerns. Those days were Ramadan. So, in Ramadan, it was hard to keep up with everything. I explained in a good manner, and they were sorry. They apologized to me, but of course it was not a good start because it harmed the trust in our trustful relationships that we should have had in a group project. That was how we started. This start was not a good start.

Shih Ting: There was one experience that Austin thought that I judged him unfairly. So, he e-mailed me and said that I should not do that. I was shocked because I did not say that in my life, I did not judge any person unfairly. So when I received his letter, I felt very sad and just very shocked. It was the beginning of our first project. We needed to work as a team, and he was supposed to submit his part but he did not. So, I just talked to Hyunjung. At that time, I did not know when we chatted, there was the record in TeachNet. And Austin saw the record.

But I just said “Austin even forgot his part.” Only this sentence. And then Hyunjung answered “Really?” Maybe these two sentences made Austin to think that we were judging him unfairly. And then he said that he did not show up on the first days because of religious activity [Ramadan]. All the Turkish [people] were very tired because they were not allowed to eat or drink or take some rest. So he was very weak and that was why that he did not show up. But I thought if he could have e-mailed us and told us more about it then we could understand, but he did not, he just did not show up. So I thought “Maybe he forgot his part. But as a team, it is not a good thing.” So I told Hyunjung. When I received Austin’s letter, I just quickly replied [to] him and said, “I am very very sorry, because I did not know about the Turkish activity. It would have been better if you had told us in advance.” And he was very angry, maybe because it had to do with a religious issue, he might have thought that I was criticizing his religion. But I did not do that, I did not know why he did not show up. His letter was really strong. So I was very sad at that time.

After exchanging e-mails and explaining themselves, these students were able to understand what had happened. However, this initial uncomfortable experience negatively influenced their team trust building:

Shih Ting: It was written by Austin I think; he said, “She is very judgmental.” And in the e-mail he said that “We do not need a leader because everybody could be a leader.” He seemed that he thought Hyunjung and I decided on everything. And he was very angry. But, in the beginning, we thought we needed a leader to remind everybody what to do. I just took the initiative to work on our team project. And then this influenced me in the following project very much. Because of this, I thought I would not take the initiative anymore.

In contrast, team B’s members had a better initial team experience. As mentioned above, Shan Shan visited all of her team members’ Blogs and found commonalities among all team members. She made a list of such commonalities, and introduced herself with this list at the beginning of team learning. This list made all the members reply in kind and appreciate Shan Shan’s effort, and they could feel that they had a good start. Consequently, their initial team experience helped them establish sound team trust.

Contributors to Team Trust

Competence

The course required that the students work together for team learning, take a particular team role, and accomplish an individual assignment for successful team learning within the limited timeline. The students had to share team responsibility based on their own abilities. In addition, the students valued other members' unique experiences and skills. Based on the students' diverse competence, they built task performance trust by accomplishing complicated team tasks collaboratively:

Shih Ting: During the collaborative writing process, I saw the magic power of team work. It is amazing that we can form such a well-structured article with everyone's effort. It seems that each of us are working [toward] the same goal and contributing our own knowledge, experience, and skills. Taking my team as an example, Emma shared her experience using formative assessment in her classroom while the rest of us can only contribute theory-based information. It is the collaboration that brings us various perspectives and such worthy experience would benefit us in many ways.

High technical skills were the most important ones in providing successful team outcomes because most of the team tasks required high-tech skills, and the students had to learn and manage several types of technological tools to communicate with each other. For example, for the fourth (last) team task, the students had to develop their own WebQuest, so they needed high technological skills to design and develop those. While conducting this task, the members in team B appreciated Melanie who mainly developed their WebQuest:

Shan Shan: Actually, it was not easy to make a WebQuest in two weeks. It was complicated. It required [of] us high technical skills, right? To create a new

WebQuest, we had to be familiar with those softwares. So. Yeah. We were lucky. We had Melanie. She had high technical skills.

In addition to students' technological skills, the students valued writing skills. Especially in the first, second, and third tasks, they had to produce final papers to synthesize their ideas. Moreover, half of the students were international ones whose first languages were not English, so they appreciated other members who had good English writing skills:

Ellis: I can see that Tony was a great writer. He was one, if we had to write a paper. He was also[skilled at] writing a concise paper or something more short.

Shan Shan: Actually, Melanie was an experienced ESL teacher, and she was the editor of our team. She knew that English was our second language. So at the very beginning, she told us how to write. For example, when we did [our] Wiki project, each of us was [in] charge of one paragraph. And she told us not to copy the whole paragraph from the literature. Actually, we did not. We did not copy anything, but our language skills were not very well. So we told her, we tried to re-word that content but we were not good at writing. So she told us, "Don't worry. You just write what you think and I will edit the content." She just re-worded the sentences. But I think actually, my writing was not so good. So [...] haha [...] I did not mind it. I replied [to] her, "Thanks for your work," because I knew it took her so much time. It was the perfect work.

At the same time, the students' low competence with English blocked them from building trust with each other. For example, as mentioned before, Han Chun was the only international student in her team. In the beginning of the course, she had miscommunications with her members in their synchronous meetings. In light of this issue, some other members in her team could not develop trust with Han Chun. In addition, Han Chun herself felt pressured. Consequently, Han Chun's lack of language competence negatively influenced her team's task performance trust building:

Heather: It was Han Chun. She was behind the group [...] She had some links then I clicked on them, some of the links were not appropriate for student use, just not the kind of links we wanted. I was little bit upset because it was late. And it was not of what I was expecting [...] When she was writing, the quality of her work was horrible.

Han Chun: I felt guilty and the pressure because [...] umm [...] Probably they [the other members] did not trust my ability.

Reliability

In terms of reliability, the students' punctuality was crucial. As mentioned before, the tight timeline of the course forced students to value punctuality. When the students were asked to describe other members in their team, they usually complimented a member in terms of the extent to which that member was punctual and the promptness of his or her responses:

Emma: Shih Ting was our leader pretty much throughout. She was our time keeper, and she did an excellent job. She is very good, very punctual.

Austin: Hyun Jung, she is silent, but she is good. She always tries to email back and forth on time, you know, in [a] timely manner.

In addition to punctuality, predictability was an important sub-contributors influencing to assessments of reliability. If one member was missing without advance notice, this absence interfered with team members' initial task performance trust building. Especially, in an online situation, most of the students had negative feelings toward a member who was missing without any notice or explanation in advance. For example and as described above, when Austin in team A was missing during the first team activity, other members like Hyunjung and Shih Ting were displeased:

Hyunjung: At the first and second modules, Austin was not that good at working with us, because sometimes he forgot the meetings, sometimes he forgot his duty. Shih Ting and I did not have really, really good feeling[s] about him because he did not finish his job as quickly as possible. He was supposed to finish that.

On the other hand, as mentioned before, Melanie in team B was punctual and kept close contact with other members even though she had huge differences in time availability with the other members. Therefore, members in team B could build task performance trust based on her predictability. Even though the other members had to wait overnight, they knew that Melanie would respond in 12 hours:

Chen: Melanie [...] I did not see her because she was in Japan. But I think Melanie was very easy to contact because she was very responsive when I asked some questions, and she would reply to me very quickly.

Online communication

As mentioned before, the students in team C chose the Wiki tool for their main technology tool rather than the other available communicative tools. Therefore, they had relatively few chances to communicate with each other. In many cases, Tony and Heather made the timeline or the schedule for the team and posted it without asking or negotiating with Ellis and Han Chun. Therefore, this team kept having problems in the process of collaboration.

While conducting the second team task, Tony and Heather wanted to finish all the assignments according to their own timeline; however, Ellis wanted to have more discussion about their topics as well as the content of their final paper before assigning the individual tasks. In the end, they could not follow Tony's and Heather's schedule, and

they could not turn in their final product on time. This hindered them from team trust building with one another:

Tony: I think Ellis is very outgoing but she has poor leadership skill[s], she is inefficient in her communication. All of us have deadlines, and we promise that we are going to get it done and when we have to get it done. Ellis [...] she did not carry things on time [...] both Heather and I had to tell her this is what is supposed to be done. First, complete the task. So, please do these things. And she would do the exact opposite of what we asked for her to do [...] So, it was frustrating. She has a communication issue, I think.

In addition, while conducting the third team task, Tony and Heather were displeased since Han Chun was missing for a while. Actually, Han Chun had left a note on the team's calendar that she was out of town attending a conference. However, Tony and Heather did not notice it and tried to find her online. In addition, Han Chun was frustrated when she found Tony and Heather's messages after the conference. This also interfered with their team trust building:

Heather: We e-mailed Han Chun. We were like "Han Chun, can you do this?" We e-mailed her earlier but she did not reply [...] I guess she went out of town. She did not tell us that she went out of town. She got back and we were like, "When can you do this?" it went so dynamic. At this point, I could not [...] trust her.

Han Chun: I could not understand. Usually, we used that calendar. Also, they knew my phone number, too. Also, Ellis was on that conference, too. How come they did not call me or asked Ellis [...] I was so frustrated when I saw several e-mails from them. It was weird.

Additionally, how the students communicated with each other influenced their levels of team trust. For example, based on their negative initial team experience, the students in team A tried to be careful with their choice of words. Maintaining respectful

dialogue and thus avoiding hurting feelings helped the students build interpersonal trust. They displayed their different ideas in a polite way so that they could resolve their intellectual conflicts effectively. Respectful dialogue maintained a safe mood among team members so that the students could express their ideas freely and negotiate them:

Shih Ting: We still work very well I think, if Hyunjung said that she thinks this way and then I disagree with her then I would say "How about [...]" or "Maybe [...]" I gave her different ideas, but I would not say "No. Why don't we do such [and such?]" I think all of us gave some different ideas in a very polite way. It helped us to manage different ideas. And we could bring up the different ideas.

Team B's members in particular kept a respectful dialogue. Complementing and expressing appreciation to others' contributions helped the students to build interpersonal trust. Doing so helped them to resolve conflicts constructively and to reduce tension when they had different ideas:

Shan Shan: We always say, "Oh it is good to work with you!" "Good job!" or "Well done." Like this.

June: Not in every single e-mail, but in most e-mails we were always saying, "Thank you," "You did such a great job," or "The way you wrote this was great." Never have we, as far as I have seen, none of the e-mails have anything negative. So [...] we could not get any bad feelings.

June: For example, when Melanie felt very bad for not being able to be there for the debate and kept saying, "I am sorry," or "I wish I was there." So we were just writing back and saying "No. No. You did such a great job with what you did before," or "We just have another module, do not worry about it." Just trying to keep everybody from feeling bad, because they could be out or because they were sick. It does not mean that they were thinking they would not just do anything.

Chen: I could feel warmth and comfort in my group. Because [...] when I did something, then they said, "You did very good." And if they did something, I would also say like that. Compliments [...] encouraged me.

Caring

The students suggested caring and understanding others as critical contributors in team trust building in their interviews. For example, June mentioned the following:

June: To build the trust relationship among team members [...] Just being empathetic. Putting your shoes, or putting yourself in another people's shoes, I think. And help each other.

Team B's members often displayed care and concern about other members' interests and skills. As Shan Shan and June mentioned in their interviews, they chose a topic which could encompass all members' interests. They tried to include all members' perspectives and negotiated to get all members' agreement in spite of their time constraints:

Shan Shan: When we decided the topic for Wikipedia, Chen and June decided to use online assessment as our topic. At that time, I agreed with their thought. And when we discussed about the academic controversy, I proposed my thought and they agreed with me. And for the WebQuest, Melanie proposed to focus on learning through technology, and I added one more dimension, culture difference, so that our topic was about learning cultural differences through technology.

June: We had different ideas. What we did was we posted documents on TeachNet so we could go in and write our ideas. And we wrote notes about feasibility. For example, [if] the topic was too broad, or too specific. And then, we had come up with the final after everybody agreed. That would be what we were going to do. We never decided on something without all four of us saying okay.

In addition, they could express their personal difficulties within their caring relationships with other members. All members were also willing to help each other. Based on their relationships, they could trust each other and produce better products:

Chen: Asking for help is a good learning strategy. I think this is also an advantage of collaborative learning. I have team members working on the same project. So if I encounter some difficulties, they would know exactly what I mean and provide me with their help.

For example, when Shan Shan and Chen had difficulty writing in English, which was their second language, they felt free to express their difficulty and ask for help:

June: They [Shan Shan and Chen] said, "Our English is not good, if you do not understand, tell us. Or if we write something, just change it to make it, proper English." That was not a problem for me. I have family who do not speak English. So, I understand. So whenever they would send something on TeachNet, we looked at that as positive thing because they were giving us really good things, because [if] you cannot spell very well, it does not mean you do not know the stuff.

Moreover, Melanie and June were willing to help Shan Shan and Chen to overcome this problem. Their caring relationships allowed them to feel secure to open up recursively. These recursive caring talks established the team trust discourse and interpersonal trust among team members. Furthermore, team B students were open about their personal issues so that they could have more chances to help and understand each other.

In contrast, team C failed to establish caring relationships among its members. Han Chun in team C also expressed her difficulty with her language skills in the Blog after conducting the first team task as follows:

Han Chun: To be honest, I think my biggest problem is my language. Since English is not my mother tongue [her 3rd language], most of the time I felt like I had a harder time catching up with my group members' pace when we discussed articles and tried to synthesize ideas in Skype. It seemed it always took me longer to read and understand what they typed, and thus sometimes I failed to react to their thoughts, which made me feel a bit guilty and sorry for them since I couldn't make much contribution to my group. However, I found my group members are all very supportive and willing to give advice. They helped and taught me how to lead the discussion. I think I'll keep trying my best not to let the language become a barrier. Also, next time if I can't understand them, I should be more active to raise my questions.

And Tony kindly replied to her message as follows:

Tony: Han Chun, I think the pace of our chats is a problem for me too, and English is my first language (and practically only). I think you do well with our chats and did good on the posting. I have some ideas for what could help (see my posting), but I'd like to hear what we could all do to make our conversations more organized and productive.

Even though Tony replied to Han Chun to encourage her, she still had problems in communicating with other members and contributing to team work. In the end, they did not try to find a way to help her:

Han Chun: Tony is very nice to me. He always checked twice whether I have understood what they are talking. Because usually we did not use TeachNet to communicate with each other especially in the very beginning of the course, we used Skype, and their typing speed was very fast for me actually. And sometimes I could not understand their English completely. I do not know why. I just do not

know why I cannot understand. Maybe the way they use English was different from what I learned.

Other members noticed Han Chun's difficulty. However, they hesitated to talk about it. Han Chun could not build caring relationship with others to express her thoughts, feelings, and difficulties. In turn, the other members could not build trust with her:

Heather: Han Chun was very quiet [...] She had problems in communicating with others. Sometimes, I could not understand her. However, I could not say anything [...] She was international [...] and I did not know how to help.

Tony: Han Chun [...] I really like Han Chun, and she produces good work, but she stays on the back further like she would stay back and hang back until somebody has to draw [it] out of her to get it done.

Dimensions of Team Trust

Two dimensions of team trust emerged in this study: 1) task performance trust and 2) interpersonal trust. Task performance trust was mainly established through the students' own competence and reliability. At the same time, interpersonal trust was primarily built through the students' communication and caring relationships. In this section, the researcher describes both task performance trust and interpersonal trust and how these teams created team trust.

Task Performance Trust

In the beginning of the course, based on the knowledge and experiences about what the other members produced and how they produced it, the students could build task performance trust. Initially, the students' competence and reliability enhanced their task performance trust building. As Emma said in her interview:

Emma: Working [with] those [teammates] together, I knew what and how they produced. I could trust them when I see they are doing a good job [...] and through their assignments. And how hard they are reading over their materials and their assignment put trust [in] me.

Further, constructing a learning system based on members' competence and reliability helped the students build task performance trust. Based on their own interests and abilities, they voluntarily chose and assigned their individual tasks. As time went by, their roles in their team became apparent such as an information searcher, an editor, or a technician. With such predetermined roles in their teams, the students could be more competent and reliable as Hyunjung mentioned in her Blog, "Moreover, as we know our own role in a group, we can contribute more willingly and productively."

The students also took turns in a leadership role to manage the whole process and encourage the other team members. All of the members experienced this leadership role at one time or another, and this experience helped them to be more responsible:

Shan Shan: We, each of us, took the lead in turn. So when we started to do the project, someone volunteered to be a leader. So actually we took the lead in turn. The leader organized the project, and assigned the job. Then, the leader posted the job description on the TeachNet. The other members just got online to view the job; you chose a job and met the dead line. Everybody did well. And this helped us to contribute to the projects more.

Furthermore, setting their own timelines helped team members to trust each other more. Usually, they had two synchronous discussions, one in the very beginning to plan what to do and one just before the deadline to check their final products. In the time between these two synchronous discussions, they were responsible for their assigned jobs. And all the members followed this timeline:

Austin: We decided who wanted to do which parts. And then after that meeting, everyone went back and did their parts. And then after two or three days, depending on the timeline, we would come back together and share what we did, and usually one person would be responsible for wrapping up. This was working with us. I liked this.

Based on the students' competence and reliability, the students took team roles, established general timelines, and chose team strategies. These tactics helped the students build their own team leaning system. Furthermore, in this learning system, they could build their task performance trust. And in a recursive manner, their task performance trust helped the students to be more competent and reliable in the team process.

In addition to the students' competence and reliability, their online communication and caring relationships influenced their task performance trust building during the learning process. The students in this online collaborative learning team had different backgrounds, so it was natural to have various perspectives and different ideas while conducting team tasks. As Emma said, "There were times where two team members had two very different ideas about the direction and an assignment to go or something extra that we should have done for an assignment." To reach fuller consensus and engage in collaborative knowledge building, having sufficient communication with each other was crucial:

Han Chun: Also I found it was important to raise any questions or concerns or even disagreement when working in a group for a project. This way, group members can solve the problems, so as to reduce any unnecessary misunderstanding.

However, some of the students such as Han Chun in team C could not build task performance trust with other members, and she could not build caring relationships with her fellow team members. She could not increasingly raise her questions or express her ideas. Rather, she followed the other's decisions. She was not confident with her language ability and did not want to interrupt others with her ideas. Moreover, she did not expect the others to help her. Therefore, she could not be involved in the process of their collaborative knowledge building and became more reluctant to become involved as time went on:

Han Chun: Most of the time [...] yeah [...] if someone says something that other people do not agree, I think my team members, at least Tony and Heather, who are very straightforward, would speak out. Most of the time, I did not persuade them [...] Most of the people in my team, either they agreed with the ideas or disagreed with those, I think probably it was my problem [to] not try to persuade them.

Han Chun: For them, it was very important because they can catch the main point what they are talking [about]. I do not want to misinterpret what they are talking because it took me a lot of time to synthesize what they were talking. I felt like it was not very effective and efficient. So, after that, I tried to be a follower [and] not to be the leader. I think it would be easier for me and easier for them.

To achieve consensus and find a constructive way of generating different ideas, raising areas of intellectual conflict was vital. However, if these intellectual conflicts were so strong that they produced negative emotions within a team, then intellectual conflicts were no longer indicators of task performance trust. For example, members in team C had strong intellectual conflicts that they could not resolve conflicts constructively. In the end, they had to ask their instructor to intervene in their decision-making process. This action injured their team trust and increased negative feelings among team members:

Tony: With the copyright issue, Ellis and I really went back and forth about it. I just got to some points I said that we would have to agree or disagree and I said after the class was over, please take my name out of the WebQuest because of [a]copyright issue. I wanted my name out of it [...] There was the issue about copyright that I spoke up. I had been debating with my teammates two or three weeks as long as the module had been going on because they had put in things about Batman, a comic. And that my job is an editor for a publishing company so I know that you can not do that and Ellis and Heather resisted to that because they were both teachers. I think Ellis is more of [an] IT person and Heather is teaching directly in the classroom, and I have been a teacher so I know exactly where they are coming from. It is in their classrooms; it is a[n example of] fair use, type it in so nobody is going to really look at it, but on the internet, there are different rules. Ellis was like have you read the TeachNet program and stuff like that. There was a little bit of mistrust there, I know that I am right but I do not think Ellis and Heather thought I was right. I think they thought I am overconscious so they did not trust my opinion and I knew I did not trust their opinion, but the moment that Dr. Grisham said that [the students had to be careful with the copyright issue even though with the class assignment] in class, Ellis skyped me and said “alright, fine let’s get the work cited” and then she changed the elements like Batman to batmo and take the pictures off. So, I think it was Dr. Grisham as an authority figure. Had we had you know a really strong debate about that and had I even thought about it, I could have [said] let’s ask Dr. Grisham. I think he would have been more than happy to mediate that. The matter of fact [way] that he did it by mentioning that in the class validated what I was saying and then, um, the trust was there, then they realized, I guess, that Dr. Grisham was saying this, so Tony must be right.

Moreover, the negative experience due to strong intellectual conflicts with no constructive resolution interfered with building task performance trust, all of which blocked the students’ collaborative knowledge building:

Tony: Or half of us were thinking that we should do it cooperatively when we split the paper and you do this part and you do that part and Heather wanted to do [it] collaboratively which is much harder to do. You get a better product, but it is much harder to do, and it takes longer. And I just do not think we had a lot of time for that. It was the first project or not the first but the first major one [...], so that was the first major disagreement. We did end up [...] starting with the collaboration but we, the way I designed [it] was that Han Chun and I

collaborated, Heather and Ellis collaborated, and we rotated and we collaborated again with each other so that we tried to get all that mix. We were all four talking on the phone. There was disagreement with that, how Ellis's part on the paper and she was really late on things, and I do not think she really had an idea on how she wanted to do it and it was until the last minute when the paper was due that next day. She had not turned in her resources or her portion of the paper so we had to cut it out, and then [at] the last minute she slipped something in. It was good, but it caused disagreement and stress.

In addition to the four contributors to team trust, the students' interpersonal trust enhanced their task performance trust. The course emphasized the importance of developing a relationship with each other for successful online collaborative learning. Hence, the students considered interpersonal relationships among team members worthwhile. However, the students had limited time to build personal relationships among team members.

In terms of interpersonal trust, only team B's members could build deeper task performance trust based on their secure interpersonal trust, as June mentioned in her interview:

June: I think we did really well on the academic controversy. It was pretty good because, two of us had to take one stand and the other two had to take another. And, we switched. That was a good exercise. It helped us learn how the other members think and what kind of knowledge they bring. So it made it a little easier. After that, we really do not say anything to each other. Here is the list that we had to do. Find your name. We are always just saying I can do this, I can do that. Usually, everything is taken care of.

Interpersonal Trust

Knowing each other helped the students to concentrate on their team tasks. Most students mentioned that both knowing each other and sharing personal interests with team

members were valuable for team trust building in their interviews. For example, Austin stated, “I think the most important thing in the group project or collaborative learning is to know each other. The better you know your team members, the more you produce.”

Initially, having joint experiences helped the students to learn about others and get to know each other naturally, as Emma stated in the interview, “As time went on, we built trust. You know the quality of work that they are going to produce. They might make a mistake. But by knowing how they produced, we could trust each other. By time we just experience[d it].” As mentioned before, the students’ task performance trust helped to build their interpersonal trust.

During the semester, the students did have more chances to get to know each other. Before or after the synchronous chat, the students naturally exchanged personal information about their lives, and this activity helped them to get to know each other:

Austin: Sometimes, we would decide to meet on the TeachNet or Skype to chat about what we are going to do and one person comes first and a second person comes so in the meantime we do not talk about the class materials. We just talk like “how it’s going?” and someone says “I have a final project tomorrow,” “I have an assignment to turn in tomorrow.” Those kinds of stuff. Yeah, that helps [getting to know other team members].

Indeed, knowing each other helped to build interpersonal trust; however, for the deeper interpersonal trust, the students needed to have more time for getting to know about their team members’ personal lives and interests rather than merely knowing about their schedules for their team tasks or knowing their tendencies about learning or collaboration styles as stated in Shih Ting’s Blog:

Shih Ting: What I am trying to say is that although we may know each team member’s characteristics through every project, it takes time to adapt to

everyone's style and schedule. If possible, I would like to know more about my team members such as their job, interests, achievement and so on. It is beneficial to know your partners' preference and it makes it a lot easier to work as a team.

When the students got used to each other, opened up about their feelings, and maintained a respectful dialogue, they could contribute to a safe environment for all members:

Austin: [Question: Reviewing your earlier reflections, how have your ideas of collaborative and/or online learning changed or evolved from the beginning of the course?] Earlier, I was thinking that online collaboration was very challenging and not as beneficial and productive as face-to-face collaboration. I have been in collaborative works a lot but I have never experienced online collaboration before. I think that was the reason why I was judgmental towards online collaborative learning in the beginning. In all of our group projects, we had to use [an] online collaboration method which helped me a lot to get used to this kind of environment. As we used online collaboration via Skype, Second-Life, and TeachNet, my prejudices about online collaboration disappeared. Now, I am more comfortable with [an] online version and can see its benefits. Moreover, the more you know about whom you are working with, the more productive the collaboration would be. I experienced this in our group projects. So, another contributing factor to me being more comfortable and engaged in the collaboration through the end of semester was that I knew better about my group-mates as well as getting used to online collaboration.

Yet, the students were not able to spend sufficient time to learn about each other in areas unrelated to team tasks since they had time constraints to accomplish their team tasks within a short timeline. Therefore, most of the students said they could trust other members as team members but not necessarily friends when they were asked whether they could trust other team members:

June: For getting our assignments done, yes. But on the personal level, I do not know because we did not meet at all. Maybe having a meeting where we could all

meet, drink coffee or something [...] then I could build [a] better relationship. However, our relationships were the classroom relationship.

This case was not common; however, some students built friendships with selected members. In such cases, the students could enhance their interpersonal trust. Shih Ting and Hyunjung in team A were able to build a friendship based on their commonalities. Both of them were Asian, and their personality characteristics were similar. They could trust each other more than others, work well, and collaborate constructively:

Shih Ting: Hyunjung and I worked well [together]. We are both from Asia and she is from Foreign Language Education department [a similar major], I had a lot of time to meet her in Sanchez building, so we had some discussion except for meeting online. So sometimes we could express our feeling about our team and the project. So we had more time to discuss about them [Austin and Emma].

In addition to Shih Ting and Hyunjung, Heather and Ellis in team C built a friendship. At the beginning of the course, Heather could not build task performance trust with Ellis since Ellis did not respond promptly. However, Heather eventually found a common interest with Ellis. They happened to discover that they were both playing the same online game. They shared much information about the game, and they even played it together. While gaming together, they helped each other and talked about their team assignments. This activity helped them to understand one another more. Due to the interpersonal trust based on their friendship, Heather could overlook Ellis' inadequacies and see Ellis' strength in accomplishing the team tasks:

Heather: Ellis is great, like she is brilliant and she did, oh my God, I can not believe how many hours put into our WebQuest. She works very hard but she gets

distracted very easily. I do not think that was ever that she was not trying to get stuff done on time. I think she was just gets distracted and so sometimes things have [gotten] behind, but she would always put so much work in her products [and they] were well done. Just beginning, but she also had another course of Dr. Grisham she said, where he wasn't too concerned about due dates and I think that played a part to[o], but me and Tony cared in the past Dr. Grisham did not care about the due dates, we wanted the due dates though. So that was, she got involved.

Heather: [Question: Can you trust your members?] I think Ellis and Tony made it. And I think that will so be in contact after this group. Ellis and I talked about playing games over Christmas break, and Tony wants me to help him with something he's working on later this year with his Math models, and I think we will be working in communicating each other['s] passes.

These close relationships certainly helped to build interpersonal trust between the students who built them. These relationships helped them to be open about their ideas and feelings and to build a safe environment between these two members. At the same time, these close relationships were indicators of an absence of interpersonal trust at the team level in this study. Even though Shih Ting and Hyunjung in team A and Heather and Ellis in team C could build strong interpersonal trust between the two of them, they could not build interpersonal trust with the other group members. Even though several students shared their interests and ideas in their own Blogs and accomplished their team tasks together for one semester, some of the students could not build personal relationships at all:

Heather: Ellis would be like creative and exuberant and crazy. Tony would be efficient but detail-oriented. And then Han Chun, Han Chun is harder [...] Because I did not get to know her that well [...] see [...] that was the problem! I have this picture of who Ellis is and who Tony is. For me Han Chun is, it is harder for me to picture [her] as a person. Even when I go to the class, I am like "that is Han Chun." You know, [the] other two, even though I have met Ellis fewer times, I feel like I know who she is, like idea in my head but [...] with Han Chun, I feel bad! I mean, She is a nice person. I can tell.

Han Chun: Heather, she is very patient. I guess she is a very careful and experienced teacher. Since we do not have too many conversations, it was hard to understand Heather and very hard for her to understand me. Ellis is more talkative and willing to share and which helps with building relationships. I think conversation between each other is very important.

Since Heather and Han Chun barely had any commonality in their backgrounds, and they did not have much conversation about their own interests and lives, they could not build interpersonal trust at the basic level. Heather, who was not sensitive to Han Chun's needs, and Han Chun, who was not open to others, failed to develop a relationship. Therefore, they could not get to the level of collaborative knowledge building and a sense of community.

In addition, members in team C could not build interpersonal trust due to a lack of communication and caring. They failed to develop careful and respectful dialogue. From their first synchronous discussion, the etiquette and politeness in an online discussion emerged as their problem. Tony was displeased since Heather and Ellis were so fast in their synchronous discussion, a communication style he was not used to. Han Chun also felt insecure in their meetings. She was afraid of not keeping up with the other members:

Tony: There needs to be some etiquette and structure with chatting, which I think is more prevalent in face-to-face conversation because we have been taught to be "polite" when speaking with others. I think I can help resolve this issue by asking team members to slow down or express my need for people to "talk" one at a time.

Han Chun: I probably missed one of the messages. I feel very [...] insecure [...] I was afraid to miss anything in this course, any deadline, and message from my team members.

Of course, team C had other issues that interfered with their interpersonal trust building; however, failure to construct a considerate dialogue caused a major problem until the end of the course. Unfortunately, this failure negatively influenced their collaborative knowledge building and sense of community.

In contrast, members of team B were supportive and respectful of others' thoughts and maintained a considerate dialogue. In this context, the students could feel secure in their team to express their different ideas and personal experiences. They successfully shared their ideas and personal lives at the team level; hence, they could build deeper interpersonal trust. And these interactions had a positive influence on collaborative knowledge building and a sense of community.

In summary, task performance trust was detected throughout all three teams. All team members could build their own learning systems to provide better products based on their own timelines and team strategies. Even though each student's level of reliability was different at the beginning of the semester, all of the members realized that they had to be punctual and predictable in provide the products for the coursework, and they were all able to build task performance trust. However, the level of interpersonal trust was different in the three teams. Team B's members were more open and careful to respond to each other, so they had more chances to develop deeper relationships. With sufficient communication and caring relationships, they felt secure enough in their team to be more open toward the task and to open up about their personal lives. At the same time, though, team A's and team C's members failed to build interpersonal trust at the team level. They focused more on developing their ideas rather than listening to others. They also could not build caring relationships. They could neither reach out to build collaborative knowledge nor build a sense of community at the team level.

Consequences of Team Trust

After experiencing team trust through completing complex team tasks, the students could build strong relationships within a team. As a result, the students could experience the consequences of team trust, which were 1) collaborative knowledge building and 2) a sense of community. In this section, the researcher describes how team trust influenced the consequences of team trust and how the consequences recursively influenced team trust building.

Collaborative Knowledge Building

Collaborative knowledge building is defined as the production and continual improvement of ideas of value to a community through means that increase the likelihood that what the community accomplishes will be greater than the sum of its members' individual contributions (Bereiter, 2002). In this study, collaborative knowledge building was indicated by several sub-elements such as improved ideas, the students' sense of ownership of their work, and their satisfaction about their learning.

Both task performance trust and interpersonal trust enhanced the students' collaborative knowledge building. However, there were differences among the three teams. Team B's members could improve their own ideas by sharing and discussing them with others. Every member's idea was shaped by other members' ideas, and all came together to build one idea that belonged to all members. Each member felt ownership of their products:

Chen: I became more familiar with collaborative learning. At first, I thought it was just putting our ideas and working together. However, the online debate let me know about collaboration more. When I faced conflicts, I did find that my thoughts changed. So collaborative learning is not to collect individuals' thoughts. Through it, we could rebuild our knowledge. Seeing the question through others' views did help me learn more.

Emma: Well we ended up not going for one or for the other, but for both. It was interesting because you know your ideas that you're debating and that you're suggesting and trying to apply, and they turn around and they counteract that and you go and turn around and counteract what they said. It was fun. I liked the academic debate. They would say something and you could negate that and they would negate what you said [...] it was fun. I actually really enjoyed it.

In this context, the team B students were able to feel satisfied with their products as well as their learning process. They could feel content about their joint learning. They began to learn more based on their sense of team collaborative learning:

Melanie: I enjoyed working with my group. The members of our group come from such diverse backgrounds that when we work together on a project, we learn so much more than we would if we did the projects by ourselves.

In the case of team A, in contrast, not all team members were satisfied with their learning products and processes. For example, Hyunjung was not satisfied with their product when they were collaborating for the third team activity. Due to time constraints, Hyunjung followed others' ideas, which she did not like. In the end, she believed at some point that it might be better to have individual learning rather than having group learning:

Hyunjung: Depending on the activity, some are better to do by myself. Wiki [...] I think I could have done it better by myself. Honestly, I did not like the topic. At that time, I did not have any other special topic and we did not have enough time so we just chose that. For the Wiki activity we did not spend much time to discuss about choosing topics. Everyone was busy.

In the case of team C, Ellis and Heather seemed to experience collaborative knowledge building. Ellis and Heather mentioned how they improved individual ideas,

how their final products were better than their original ideas, and how they were satisfied with their learning:

Ellis: We narrowed it down to three. Tony was really interested in instructional design, Han Chun liked the tool aspect – she liked to take care of chat tool, and Heather was looking at an integration which was something that I worked for. So I thought those three things could be included. That was what we ended up doing, and it was like all kinds of ideas were matched together. We found the debate topic like this. Each of our topics was chosen like this. The topic would be beneficial to each of us.

Heather: It is not as simple as working individually, but the hope is that the product is better than what each person could have achieved on their own.

Heather: I was satisfied with most of the projects, and I think our team did a really good job of making products. I have always been satisfied with every piece that every member submitted. I was satisfied with the final product, but there was a vision and editing along the way, you know, it was a group collaboration, so it's not [that] I've always [been] satisfied with every person's original piece that they submitted, but I was happy with the end result.

However, Han Chun and Tony in this team did not seem to experience collaborative knowledge building. When Han Chun was asked to answer whether she was satisfied with their team product and learning process, she expressed concern and frustration rather than answering whether she could felt satisfied:

Han Chun: [Question: Were you satisfied with your product or like a learning process when working together?] Yeah. But sometimes [...] I felt the pressure, because I think they had a high expectation for our team and we tried to be perfect on our project. But to some extent, I could not devote a lot of time only to this course because I also had other classes to take and other assignment to take care of [...] I could have done like the others, and of course, I tired my best to do the project, but they set a very high expectation, and sometimes I was very stressed.

In the process, Han Chun could not express her ideas. Rather, she agreed to others' ideas so that she did not have a chance to improve her original ideas and to feel ownership over their team products. Given this lack, she was not satisfied with learning with others. In addition, she failed to experience collaborative knowledge building. Tony also could not develop collaborative knowledge building with other members, especially when conducting the last team task. Failure to build trust during the last task negatively influenced collaborative knowledge building:

Tony: The WebQuest was a very long project [...] We broke it into parts and everyone worked on certain things. Heather and Ellis ran with it. They did the majority of the work, and I stepped up to the plate and said, "Can I do this and this?" because they created a lot. When they presented, I really felt that it was a lot of their work. I worked [a] little bit on the rubric that they created. It was good, I guess. I did not feel comfortable to say that was my WebQuest, and when I showed it to people at work to show what I did at school, most of the time I said, "This is what my team did." I felt left out of that [...] I did ask, "Is there anything I can do for you?" However [...] I was really busy so I did not really push on that. Well [...] let me put it this way, Han Chun, as I said, was always in the background and not really doing anything so I could see other people's attitudes toward her. At the time of the WebQuest, I felt like I was like Han Chun. I was not pushing them, I often said please tell me what I can do to help or whatever, and they gave me the rubric. Well [...] Heather was going to give me the rubric. It was almost like they were throwing a bomb at me, and Ellis said, "Why don't you look over and tell me if there is anything that does not seem right." They wanted to control everything. So, I think during the WebQuest was when they broke down the community. I think the major reason was because Ellis was the leader and she does not communicate well. She does a lot of great things [...] technology wise, awesome things. And we organized things, such as Wiki and did all kinds of things. And I was behind in that. But she really needed to improve on discussing, collaborating, and communicating efficiently with people. I think that was the reason why it broke down. The moment she took over, I felt like we were not in contact with others for two weeks. The WebQuest was going to be done by Wednesday (but still no communication from Ellis????). I do not feel that it was a very good experience for all of us.

Overall, team C failed to have collaborative knowledge building at the team level. Poor task performance trust and interpersonal trust blocked them from experiencing collaborative knowledge building.

Sense of Community

In this study, a sense of community is indicated by a sense of camaraderie and team confidence. In particular, interpersonal trust building helped to create a sense of community. In addition, collaborative knowledge building at the team level influenced a sense of community.

In terms of a sense of community, team B was the best team. Even though the members could not build deep personal lines with all of the other members, they could feel a sense of community at the team level as well as a sense of synergy in their team learning process:

June: I know that there were some modules that I may have done more work on and in some like the WebQuest, Melanie did the WebQuest. And there were others that Zhen and Shan Shan did. Because some of us would help other people who would say, "I have never done this before or my skills are not good at this." So, the rest of us would pick [the task] up. We just get something small. We tried to do it that way. We never really established team leader, reporter. We just sign up[for] what you are interested in doing, what part you would be interested in doing, or what part you would not want to do. And so that was how pretty much we decided what parts to do. So if there were any weaknesses, another member would just take that. And there were no longer a weakness because another member would be strong and do that part. Even though it was mostly on TeachNet, I could feel a sense of community. I would work with them again.

Melanie: One of the most fascinating things that I have discovered was how quickly projects can come together when you work with a group. One of the habits, synergy, focuses on the concept of collaboration, where when people work together, collectively they can achieve more. I have been able to share many real-life situations, based on the projects our group has completed, with my class, illustrating synergy.

In contrast, team A's and C's members could not experience the team level sense of community. For example, Tony, in team C, responded negatively when he was asked whether he felt a sense of community in this team. He said, "I think during the WebQuest was when they broke down the community [...] I do not feel that it is a very good experience for all of us." In addition, Han Chun could not feel a sense of community since she could build neither task performance trust nor interpersonal trust with her team members.

However, the students who built interpersonal trust with other members, such as Shih Ting and Hyunjung in team A and Heather and Ellis in team C, did seem to experience a sense of community, at least with each other. Their interpersonal trust only helped to build a sense of community in their sub-team. They felt a sense of camaraderie to each other but not with the other two members:

Hyunjung: We [Shih Ting and I] occasionally met in [the] Sanchez building and PCL. We had a casual conversation. But with Austin and Emma, I have not met them outside of the course. Maybe they were too busy. Emma was working. Full time. I thought that if we have more time casually outside the class, working with them would be easier with more collaboration. Because I got to know her through casual conversations not related [to] this task. I think that was very important. I think she is my friend. But I do not feel they [Austin and Emma] are friendly to me. They are just team members.

Similarly, Heather and Ellis responded positively when they were asked whether they felt a sense of community. Heather stated that using Skype helped her to express her feelings more, and this technology facilitated her ability to feel connected to other members. Ellis also said that she could make personal connections with other members, and this helped her to feel a sense of community:

Ellis: [Question: Sense of community?] Yeah, I have thought about that. In my group how Han Chun and I were looking at some [future] research project opportunity is resulted [from] what we learned about each other and each other's interest and through the project. Tony asked me to help him start building online courses for his math classes and to help him [with] his curriculum online, so he could teach other educators [to] use it. And, Heather and I are planning to work in some online gaming as gamers, players. So, those are non professional work, right? Each of us had [a] network and like, I feel like I have a lot to take away from and relationships to work.

SUMMARY

In terms of team trust in an online collaborative learning course, 1) CSCL context, 2) contributors to team trust, 3) two dimensions of team trust: task performance trust and interpersonal trust, and 4) consequences of team trust: collaborative knowledge building and sense of community all emerged from the data.

First of all, this study indicated the construct of team trust in an online collaborative learning team with its contributors, dimensions, and consequences. The CSCL course context, such as the collaborative nature of the course and the functional diversity of team members based on their individual differences, at times both facilitated and blocked the students' team trust building in the process of CSCL. In addition, this study found that the students' competence, reliability, online communication, and caring were critical contributors to team trust building. Furthermore, two dimensions of team trust – task performance trust, which guaranteed team efficiency along with interpersonal trust, which indicated of team climate of safety – emerged from this study. The consequences of team trust – students' collaborative knowledge building and their sense of community – also emerged from the analysis of the data. Teams that built team trust successfully exhibited both collaborative knowledge building and a sense of community.

Additionally, the findings of this study revealed the recursive dynamic of team trust building. The contributors, dimensions, and consequences of team trust were all meaningfully and strongly related to each other. All elements of team trust construct influenced the others. In addition, this study found the importance of initial team trust. In the early stages of team learning, the students had uncertainty and concerns about working both online and collaboratively. Given this uncertainty, building careful initial team trust positively influenced the following team learning procedure.

Chapter 5: Discussion

The main purpose of this study was to explore students' experiences of trust building in an online collaborative learning team. Throughout the analysis of the data, the researcher focused on identifying the construct of trust and the process of building team trust.

After identifying the contributors and the dimensions that influenced students' trust building and the consequences of those contributors, the researcher attempted to determine the major themes that could unite the other elements together to form an explanatory whole. After repeatedly reviewing the elements representing the construct of team trust that emerged from the original data, the researcher determined that two dimensions of team trust, "task performance trust" and "interpersonal trust," were the most dominant themes and were situated in the center of the relationships among all of the elements related to students' team trust building. Once the central themes of the study were developed, other elements were organized around the central themes, and the theoretical model of the study, "Team Trust Building through Task Performance Trust and Interpersonal Trust in an Online Collaborative Team," was derived.

This chapter describes the model in detail, referring to findings from the current study as well as those from previous research studies. Furthermore, limitations of the study, implications for future research, implications for educational practice, and conclusions are presented.

DISCUSSION OF THE FINDINGS

This part explains the model of the study, "Team Trust Building through Task Performance Trust and Interpersonal Trust in an Online Collaborative Team," a model

that evolved from the data analysis and findings from the research. This model includes the contributors that influence the dimensions of students' trust, the perceived consequences of team trust, and the relationships among these elements (Figure 5.1). The central themes of the study were task performance trust and interpersonal trust. The model consists of the following two layers: the CSCL context layer and the team trust building one. The CSCL context layer consists of describing the basis of team trust according to the CSCL course context and students' individual differences. Additionally, the team trust building layer focuses on identifying the components of team trust and the process of team trust building. This layer consists of the following four components: initial team trust, contributors to team trust, dimensions of team trust, and consequences of team trust. The interactions among these four components represent the team trust building process. In the following section, the researcher discusses the findings of the study and the associated research on team trust in the online collaborative teams.

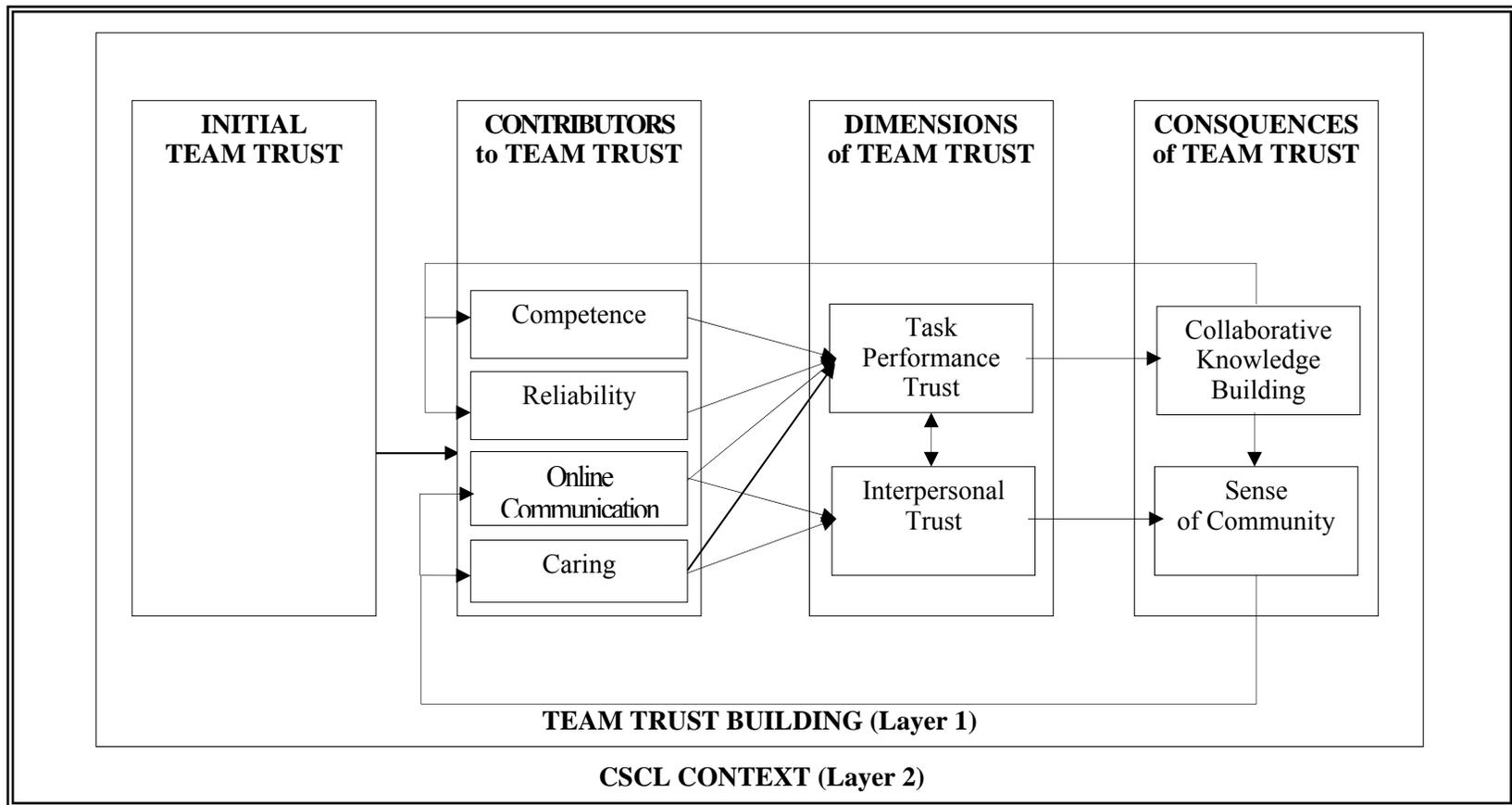


Figure 5.1 Theoretical Model “Team Trust Building through Task Performance Trust and Interpersonal Trust in an Online Collaborative Team”

CSCL Context

As noted in the results of this study, the CSCL course context influenced team trust building in online collaborative teams. The collaborative nature of the course – with its time constraints, team tasks, and self and peer evaluations – helped to generate the conditions enabling students to collaborate with and trust each other. Additionally, the heterogeneous team composition – students’ functional diversity, differences in their time availability, and differences in their preferred technological tools used to communicate with each other – all combined to influence students’ team trust building.

Collaborative Nature of the Course

One of the students’ initial concerns about team collaboration and learning was the course’s time constraints. Even though this course provided team building activities in the beginning of the course such as having students build their own Blogs to introduce their interests and personal lives, most of the students mentioned that the primary challenge of team tasks was the time limitation after completing their first team task. In spite of team building activities, the students needed more time to build social relationships while conducting team tasks. Indeed, the time limitation hindered students from negotiating with or responding to each other in order to have better ideas and improve their projects in the beginning of the course. The limited time hindered the students from sharing their personal interests and having casual conversations about their personal lives. The students ideally would need to spend sufficient time getting to know each other and building interpersonal relationships to establish a successful learning community (Holton, 2001; Bohm, Factor, & Garrett, 1991; Ellis & Phelps, 2000). However, the students in the course tended to focus on their team projects rather than

spending time getting to know each other due to the time limitations in the early team process.

As time went by, the students began to perceive this tight timeline as natural. At the same time, they learned the values that effective online team members have such as accountability as well as the strategies of working together online such as planning complex projects within a tight timeline. Gradually, the students tried to find a way to improve their collaborations and enhanced learning under the tight timeline, rather than complaining about the time limitation. They valued others' punctuality, and they made an effort to be responsible and predictable with their words and actions. They also tried to establish their own team systems to complete their team projects.

In addition to the influences of the time constraints, this study found that the characteristics of the task had a significant impact on both the nature of the interaction among team members and the members' trust building. The collaborative and challenging nature of the task – the completion of a complex project – helped foster team trust building (Lee, 2004). As Lee (2004) noted, the collaborative nature of the task helped group members to become intimately involved in the team project and to rely on each other. The course content also introduced strategies for effective online team membership and showed students the values of knowing each other and building team trust. Moreover, this course provided self and peer evaluations, both of which made students reflect on their own contributions and performance, identify their own areas requiring improvement, and think more about their future team collaboration (McLoughlin & Luca, 2002). The students were aware of the values that this course required, including reliability, developing caring relationships with one another, and maintaining a respectful dialogue, based on the rubrics for peer evaluation. Given these evaluative activities, the

students were able to build task performance trust, which helped them work interdependently in order to establish interpersonal trust.

The findings of this study are consistent with the previous studies on swift trust. Meyerson *et al.* (1996) developed the concept of swift trust for temporary teams, each of which is formed with a common task; consists of members with diverse skills; has members with a limited history of working together; and has members with little prospect of working together in the future. Generally, the tight deadlines under which these teams work leave little time for relationship building. However, the team members act as if trust is present from the start (Jarvenpaa & Leidner, 1999). Under such conditions, Jarvenpaa, Leidner, and Knoll (1998) noted that “The swift trust enables members to take action, and this action will help the team maintain trust and deal with uncertainty, ambiguity, and vulnerability while working on complex interdependent tasks with strangers in a situation of high time pressure” (P. 56). Similarly, this study found that the collaborative characteristics of the team tasks, the course context, the self and peer evaluations, and the time pressure all contributed to the collaborative nature of the course. This collaborative nature in turn helped encourage students to be more reliable, punctual, and responsible. It also fostered the students’ willingness to share information about their personal lives and to get to know each other in spite of time constraints. Consequently, the collaborative nature of the course enabled students to trust each other within their teams.

Heterogeneity of Teams

The sub-elements of the heterogeneous teams, such as the students’ functional diversity, differing time availabilities, and preferences for different technological tools, were related to students’ individual differences. All of the students had differences in personalities, learning styles, culture backgrounds, knowledge, skills, and learning experiences; the students were assigned to their teams by the instructor. In the beginning

of the course, the students perceived their individual differences as one of the major barriers to success. For example, task-oriented students, who were more productive and punctual, and other less interactive members, who were more likely to be passive listeners, had difficulty in understanding each other. Other differences also presented problems. When scheduling a synchronous meeting and choosing a main communicative tool, the students struggled in making decisions for all of the team members because their schedules were very different and their preferred technological tools varied. The differences among members seemed to generate obstacles to developing an effective team and building team trust. As Webber (2002) has mentioned, fundamental differences among individuals generated barriers for having an effective team, since diverse value systems operated against trust development. Triandis, Hall and Ewen (1965) also found that functional heterogeneity in a team was associated with low trust. As Sitkin and Roth (1993) stated, distrust occurs “when an individual or a group is perceived as not sharing key cultural values” (p. 371), especially in the early stage of the team building process.

However, as time passed, the students got to know each other better. They became more familiar with their teammates’ personalities and learning styles. They began to share their team values and goals more. Once the students better understood each other and began to build team trust, they could highlight the commonalities among team members rather than the differences, and they could thereby establish more personal relationships with one another. As Milliken and Martins (1996) noted, diverse abilities in heterogeneous groups generated more decision-making alternatives and collaboration when such a team had been together for a while. Dyer (1995) also mentioned that team trust had to be established within the membership for heterogeneous teams to have the potential to increase opportunities to be innovative, creative, and stimulating in a team. In the context of this course, the students were able to view the benefits of their differences

in knowledge, experiences, and skills. As Johnson and Johnson (1989) mentioned, not only high-achieving students but also lower-ability students benefited from individual differences in collaborative groups. Johnson and Johnson (1979), Berndt, Perry, and Miller (1988) also found that students in groups with heterogeneous abilities tended to learn more than students in homogeneous ability groups because the former tend to promote the discovery of more effective reasoning strategies. Davenport, Davies, and Grimes (1998) also found that cultural differences among students have a positive influence on the development of competence trust.

Additionally, as time progressed, the students seemed to find their main technological tool that allowed them to make crucial team decisions and to communicate effectively. In the beginning of the course, the students tried to schedule synchronous meetings for decision-making and knowledge building. The students who had not experienced online collaboration particularly wanted to have a synchronous method of communication to ensure all members' instant sanction and support of the issue at hand. Given this preference, there were conflicts in scheduling such meeting times due to the students' different time availabilities. In the case of team A, the students decided to have a synchronous meeting without one member, who had a different time availability due to her job schedule. This unavailability produced a critical team problem. The member, who was excluded from the meeting, gradually became isolated from other members. Because students made critical team decisions in the synchronous meetings, the member who was excluded from the meeting could not contribute to team decisions naturally. This lack of participation in the synchronous chats interfered with team trust building. Similarly, Webber (2001) noted that differential time allocations to the project by team members created low team trust. He found that members who contributed more time to the project

tended to impugn the commitment of those who could only contribute a small amount of time and effort to the project.

These problems, however, are not insurmountable as evidenced by team B in the study. This team chose the asynchronous discussion board in the TeachNet for their main tool. One of the team members lived in a different time zone so that other members had to wait for a while until this member was able to participate in the online discussion. It took time to get used to this asynchronous method of communication. However, once the students got used to it, they were able to communicate with each other regularly and effectively at the team level. This communication system facilitated students' team trust building and helped them to overcome differences in time availability and in their preferences for the technological tool. The students felt safe and built task performance trust since they could communicate with others predictably. Additionally, having casual interpersonal non-task-related communication, which was stimulated by the Blog activities, facilitated students' understanding of one another and helped students build interpersonal trust (Rocco, Finholt, Hofer, & Herbsleb, 2000).

Team Trust Building

As shown in the results of this study, there were four different components in team trust building: 1) initial team trust, 2) contributors to team trust, 3) dimensions of team trust, and 4) consequences of team trust. In this part of the study, the researcher mainly discusses these diverse components and how they influence each other.

Initial Team Trust

The first component was initial team trust, divided among four components of team trust building. As mentioned before, Meyerson *et al.* (1996) developed the concept of swift trust for temporary virtual teams, which is consistent with the concept of initial

team trust in this study. Meyerson *et al.* (1996) defined swift trust as “a unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk, and expectations” (p. 167). The students started team collaboration and learning with some level of team trust due to the collaborative nature of the course. Even though the students did not have any history of working together before this course and the teams’ members were heterogeneous, they collaborated to complete the projects and thus had to trust each other (Jarvenpaa & Leidner, 1999). However, initial team trust was fragile due to the students’ uncertainty about working together and the influence of their previous online collaborative learning experience. In particular, the students, who had not experienced online collaborative learning earlier or the students who had negative online collaborative learning experiences, perceived the initial team trust as fragile.

In the context of this course, the students’ initial team experience strongly influenced their team trust building. As long as there was a positive initial team experience, the students were able to sustain initial team trust. And this initial team trust positively influenced further and deeper team trust building. In contrast, if students had a negative initial team experience, the team had a hard time in developing team trust. Once the students failed to trust each other, they found it hard to restore trust among team members. Similar to this finding, previous studies have emphasized the importance of initial team interactions. Kapur, Voiklis and Kinzer (2007) reported that small initial changes could lead to vastly different outcomes over time. Coppola, Hiltz, and Rotter (2004) also noted that establishing initial trust at the beginning of online courses had a strong relationship to subsequent course success.

Contributors to Team Trust

As Hoy and Tschannen-Moran (2000) reviewed previous literature on trust, they found that the constructs of trust were defined with multiple contributors. This study also

found four different contributors comprising team trust including: 1) competence, 2) reliability, 3) online communication based on the students' openness and responsiveness, and 4) caring.

Competence

In this study, the students perceived competence as an important contributor for successful collaboration and team trust building. Similarly, previous research pointed out that competence is central to the elements of trust (Barber, 1983; Gabarro, 1987; Shapiro, 1990; Mishra, 1996). Webber (2001) also mentioned that diverse skills and knowledge of team members led to building trusting relationships. The students' unique expertise, special knowledge, and skills were crucial for completing complex team tasks (Webber, 2001). Tschannen-Moran and Hoy (2000) mentioned that good intentions are not sufficient for creating successful learning teams. As Mishra (1996) noted that an individual's good intentions may not be enough to lead to trust. In order to be dependent on another, some level of skill has to be involved in developing trust with one another.

In this study in particular, students valued other members' high technical skills and English writing skills. High technical skills among one or more team members were important in successfully accomplishing team outcomes because most of the team tasks required high-tech skills, and the students had to learn and manage several types of technological tools to communicate with each other. Furthermore, the students appreciated other members who had good English writing skills since they also had to produce final papers or products that synthesized their ideas, especially for the first, second, and third tasks. Moreover, half the students were international, and their native languages were not English, so they valued good English writing skills.

Reliability

Reliability also emerged as one of most basic contributors to task performance trust building in this study. In terms of reliability, students valued the others' punctuality and predictability. Due to the time pressure and the complexity of team tasks, the students were sensitive to due dates and to other members' consistency of behavior. Ouchi (1998) has noted that trust is ensured by satisfied expectations about consistent or reliable behavior. Gabarro (1987) also defined trust building as consistency of behavior. Consistent with prior research, in this it was found that students could not build deep trust with other members whose behavior was not consistent. For example, a team had difficulty in building trust when members were missing from their online discussions without advance notice. As McGregor (1967) mentioned, "inconsistencies between words and action decrease trust" (p. 164).

Another issue that arises in terms of reliability is related to the online environment itself. Members were in an online context, so they had to remain in close contact to have regular communication. As Rocco *et al.* (2000) found in their study, replying to emails promptly in an asynchronous discussion board was one way for students to demonstrate their reliability. The critical matter was how often and how promptly the students responded to others. This study found that students in different time zones made their own timelines and regulated the level of expectation on how promptly the others replied back to them. Even though such students experienced overnight wait times due to time differences, if other members replied back given their own time schedules, then students could build team trust.

Online communication

For successful online communication within a team, students first had to be open about their ideas. Many researchers have noted openness as a core element of trust

(Rocco *et al.*, 2000; Burlter & Cantrell, 1984). Mishra (1996), in his study of online collaborative work teams, also found that openness was one of the crucial criteria members use to recognize other members as trustworthy. Butler (1991) also found some empirical support for openness as one of several separate conditions of trust. The students tended to open up about task-related information and ideas; however, they were reluctant to open up about their weaknesses in performing team tasks or about personal issues in the beginning of the team process. As Scanzoni (1979) mentioned, trust required a willingness to show vulnerability meaning that trust was not likely to appear in the early process of a relationship. However, once students did open up about their weaknesses or personal lives to each other, they found a way to help one another constructively and build team trust. For example, if the students who are not native English speakers share their concerns about their difficulties with writing their ideas in English clearly, then the native English speakers on the team volunteered to be their team editors to help each other.

The students' responsiveness in their asynchronous conversations also helped them to have better online communication. Members in a team which had openness about making suggestions, asking questions, or sharing information, and which had effective responsiveness such as making comments, offering additional suggestions, expressing agreement/disagreement, or answering other members, felt team trust. Responsiveness is important especially since the students were in an online situation without such visual cues as facial expression or body language. When team members received responses to their postings, they could recognize that they were valued members in their teams. Furthermore, their responsiveness enhanced increased openness, interaction, and negotiation among team members and facilitated the students' knowledge building. Previous research in an online context has similarly shown that responsiveness has been

associated with increased perception of cooperative intentions, which is an indication of integrity and trust (Gefen, 2002). As Gefen and Ridings (2002) noted, if other team members do not show responsiveness, people are likely to perceive this behavior as an indication of the team member's lack of cooperative intentions, and they thus tend not to trust non responders.

The last issue to discuss in this section is the importance of non-task communication in online collaborative learning teams. Consistent with the findings of Rocco *et al.*'s (2000) study, this study found that non-work communication provided occasions to develop emotional ties that in turn led to greater openness and sharing. Greenberg, Greenberg, and Antonucci (2007) also indicated the importance of non-task-related communication in virtual teams. They demonstrated that social bonds can be developed in virtual settings; such bonding just takes longer than when team members are co-located. Indeed, interaction patterns in asynchronous discussion boards and the students' interview results of this study also indicated that the members in a team that had more non-task communication felt more warmth, security, and team trust, and such students were more satisfied with their learning. Even the members in a team who did not have sufficient non-task communication mentioned that they wished to know more about other members and such knowledge might have been helpful to their collaboration and team trust building. These students wished they had had more of such online communication.

Caring

This study found that students could build both task performance trust and interpersonal trust when they established caring relationships with one another (Mayer *et al.*, 1995; Williams, 2001). Within caring relationships, the students could confide in each other about their concerns and subsequently ask for help. Hence, the other members

could then help them in a constructive way (Scanzoni, 1979). They could establish a warm team climate and trust each other. Once they experienced each other's support, they could find a constructive way of overcoming their team problems.

In addition, including other members' interests and perspectives helped the students produce better products and build task performance trust. In this process, they could share their personal interests and views more, and this sharing helped them to get to know each other; it also helped them to build interpersonal trust. As Rempel, Holmes, and Zanna (1985), McAllister (1995) and Williams (2001) have indicated, trust based on care and concern established deeper trust relationships than that based mainly on cognitive perceptions of predictable, dependable behavior.

This study also found that maintaining a respectful dialogue within caring relationships helped to build interpersonal trust. Avoiding hurting team members' feelings and expressing appreciation about others' contributions facilitated the students' interactions, and such activities helped establish interpersonal trust. Similarly, Comstock and Fox (1995) proposed that caring talk, which established a mood of support and encouraged self-disclosure and the sharing of feelings, enhanced group trust. Holton (2001) also noted that caring talk, which was characterized by frequent affirming responses as well as humor and genuine engagement, was necessary for building online collaboration and trust.

Dimensions of Team Trust

In reviewing the previous literature on trust, the concept of trust had been developed in two different dimensions, cognitive and emotional (McAllister, 1995; Rocco *et al.*, 2001), or rational and relational (Rempel *et al.*, 1985; Couch & Jones, 1997). This study also found two different dimensions of team trust: task performance

trust and interpersonal trust, much as De Hoyos Guevara (2004) found two independent but interrelated dimensions of trust in her study of students' online interactions.

Task Performance Trust

Task performance trust was initially established through the students' competence and reliability. The quality and level of other members' contributions were the basic matters in terms of task performance trust. Questions that students deemed important included the following: Can team members complete a task? Will the outcomes be of satisfactory quality? Will the task be completed on time? As time went by, the students came to know each other's abilities and how their fellow team members worked. Naturally, they could establish their team roles, their timelines, and their collaboration methods. In their learning system, they could trust each other. Similarly, McAllister (1995) and Rocco *et al.* (2001) suggested that cognitive trust, which corresponds to task performance trust in this study, represented critical aspects of successful collaboration, including adherence to deadlines based on competence and reliability. Rocco *et al.* (2000) also noted that cognitive trust was important to the extent that it allowed people to rely on others to provide promised contributions to a project according to agreed upon plans and schedules in a work setting.

This study also found that task performance trust helped students to build interpersonal trust. The students felt secure and more open when they could trust other members' output more and when they could get to know each other more by becoming familiar with their collaboration styles. Similar to Jarvenpaa, Knoll, and Leidner's (1998) findings, the contributors to task performance trust were precursors to the development of interpersonal trust. As they noted, those teams with high trust in their task performances had better chances in turn to build high trust in their interpersonal relationships.

Interpersonal Trust

This study found that interpersonal trust was a key for developing deeper team trust. Most students could build task performance trust. Rotating the team leader role, being a successful team member by being reliable, and scheduling team timelines in the beginning of the team process, which was suggested by the course contents, all helped the students to build task performance trust. In contrast, it was more difficult to establish interpersonal trust, even though most of the students chose interpersonal trust as a crucial element of team trust building in their interviews. Because most of the students in this study were novices in online communication and collaboration, and they had to accomplish complicated team tasks within narrow time constraints, they did not have sufficient time to build personal relationships in the beginning of the course.

However, once the students got to know each other and felt comfortable working together, they could accelerate the building of interpersonal trust. The students' openness and responsiveness in their non-task communications and their caring and responding to others' caring actions all facilitated interpersonal trust building (Kramer, 1999; Ridingsa, Gefenb, & Arinze, 2002; Rocco *et al.*, 2000). Repeated interactions over time also enhanced the students' interpersonal trust building (Rousseau *et al.*, 1998). Within a secure team climate, students could better understand each other's diverse personalities and learning styles, and such students were more willing to resolve conflicts in a positive manner. Similarly, Rocco *et al.* (2000) proposed that emotional trust, corresponding to interpersonal trust in this study, elicited communal relationships and safety in a team. Edmondson (1999) also pointed out the strong relationships between team psychological safety and interpersonal trust. Regarding interpersonal trust, he mentioned that people were comfortable being themselves. As an example of this phenomenon, in this study team B's students, who continuously communicated with each other, shared their

personal interests, and maintained caring communications with each other, could feel secure and comfortable to speak up about their perspectives and ideas to other members. In contrast, team C's members, who suggested their own ideas rather than listening to or developing other members' ideas, did not share their personal interests with each other, and did not maintain caring dialogues. Similarly, they could not feel comfortable working together and building interpersonal trust in their team. This study also found that a team which built interpersonal trust allowed the students to be more responsive and to maintain a caring dialogue. De Hoyos Guevara (2004) found that interpersonal trust allowed sharing of who a person is, what he or she feels, and what he or she is experiencing. Edmondson (1999) also mentioned the relationship between security and interpersonal trust among team members and a sense of security in which the team would not embarrass, reject, or punish someone for speaking up.

Additionally, this study found the possibility that interpersonal trust could enhance task performance trust building. With interpersonal trust, the students were willing to learn and understand more about other members, even if they perceived other members' lack of competence and reliability with previous tasks. The students tried to give each other more chances to fix their mistakes or find constructive ways to rely upon each other and resolve conflicts. Similarly, many researchers reported that interpersonal trust facilitated collaboration and enabled coordinated social interactions (Coleman, 1990; Zucker, 1986). Williams (2001) mentioned that interpersonal trust facilitated informal cooperation and reduced negotiation costs so that it also reduced the need to monitor other members' actions and formalize their procedures.

Consequences of Team Trust

This study found two consequences of team trust, which were the students' collaborative knowledge building and a sense of community.

Collaborative Knowledge Building

First, this study found indicators of collaborative knowledge building that were based on team trust building, such as improved ideas, students' ownership of their products, and satisfaction in their learning. Initially, students' task performance trust influenced their collaborative knowledge building. With task performance trust, the students could critically examine their own ideas and those of their team members. This finding is similar to Rovai's (2002) suggestion that trust empowered students to negotiate common understandings and receive new perspectives naturally. He also mentioned that without trust, the climate of a classroom would be filled mostly by the instructor's presence and would become formal and stiff. Buchel and Raub (2002) also noted that building trust can be considered the foundation of knowledge generation within networks. They mentioned that accepting the contributions and suggestions of other network members requires trust in each individual's expertise. Task performance trust also helped the students open up about their ideas more and make an effort to resolve their intellectual conflicts constructively (De Hoyos Guevara, 2004). Therefore, the students could improve upon their initial ideas and thus create team knowledge.

In addition to the students' task performance trust, their interpersonal trust enhanced their collaborative knowledge building. The students needed to trust in other members' abilities and support each other reliably in order to create better team knowledge and products. In addition, they needed to get to know each other better and maintain a respectful dialogue to have improved collaborative knowledge building. When the students felt safety and security in their teams, they were not afraid to receive criticism or engage in negotiation. Rather, the students tended to create communal knowledge building based on team trust. Similarly, prior research indicated that knowledge building was facilitated by providing a safe environment in which trust was

established among members of an online learning team. For example, Buchel and Raub (2002) noted that members needed to trust each other in order to have knowledge sharing and building. They mentioned that trust in networks is built through repeated rounds of interaction. Knowing each other and establishing an understanding of each other's skills and behaviors allowed members to build trust. And creating a good first impression and establishing a maximum level of trust up front is a key success contributor for creating effective networks.

Sense of Community

In addition to collaborative knowledge building, this study found that team trust positively influenced the students' sense of community (Neyer, 1999; DeSanctis, Wright, & Jiang, 2001). As DeSanctis *et al.* (2001) noted a team that was forming trust and having higher performance levels was willing to use group discussion spaces for sharing personal information with one another. By doing so, the members built friendship ties and a sense of mutual understanding and respect. In particular, this study found two indicators of a sense of community based on team trust: a sense of camaraderie and team confidence. Beyond being team members, the students partially felt a sense of camaraderie based on their strong interpersonal trust. Building interpersonal trust and establishing a warm environment in a team facilitated the students' sense of camaraderie. Such students also felt team confidence based on their task performance trust. When the students successfully completed their team tasks and they continued to experience team success in their projects, they also continued to build team confidence. Individual concerns or worries about their language skills or technical skills that they had in the beginning of the course were overcome by establishing team confidence.

This study also found the recursive effects of the consequences of team trust. Team trust can begin as a spark that can then lead to building more trust in the future.

The collaborative learning context itself already provided a spark to build team trust with the formation of swift trust. The critical matter of team trust was how to make this spark into a flame. Not only the contributors and dimensions of team trust, but also the consequences of team trust, in turn, enhanced the students' team trust building. Their collaborative knowledge building and strong sense of community helped them to show more competence and reliability, to communicate openly, and to build caring relationships.

LIMITATIONS OF THE STUDY

In this section, the limitations of this study are discussed. First of all, the small sample size one limitation. Twelve students in three online collaborative learning teams participated in the study. Due to the small size, the results of this study may not be representative of the entire student population. Also, the participants of this study were university graduate students and majored in education-related studies; hence, they might have had a much higher level of motivation and self-expectation than other groups such as undergraduate students. Furthermore, many of the participants had limited online learning experiences and lacked skill and prior experience in the use of the tools used in the class.

The second limitation of the study is related to the nature of the course context. The course content was focused on helping students understand the theory, research, and pedagogical strategies for online collaborative learning, and therefore, the study's results may not be applicable to courses with a different content focus. This course continually emphasized the importance of building caring relationships among team members. The participants of this study were aware that building team trust was one of the important objectives of the course. Therefore, this study has limitations for the generalizability of

its findings. Whether the findings are applicable in another context depends on the degree of similarity between the two contexts (Lincoln & Guba, 1985). Therefore, readers who are interested in applying the findings of this study need to determine how similar the situation of interest to them is to the context of this study.

In addition, the students may have made socially desirable responses during their interviews since they were already well aware of the importance of team trust. They might not have shared during their interviews whatever negative incidents there may have been in terms of team trust. In order to eliminate the potential biases derived from the participants' socially desirable responses, the researcher triangulated the findings with various data sources. Nevertheless, the results of this study may be different from the results of a study of an educational setting with objectives that are not so closely related to team trust or team collaboration.

IMPLICATIONS FOR FUTURE RESEARCH

Findings from this study may provide useful information in understanding the elements involved in students' team trust building in an online collaborative learning context and the relationships among these elements. First of all, the participants of this study were very selective. As mentioned before, all of the participants were graduate students of a university and majored in education-related studies; hence, they might have had a much higher level of motivation and self-expectation than other groups such as undergraduate students. In addition, most of the participants had limited online learning experiences and low technical skills. Therefore, future research with different participant populations would guide development of a more comprehensive and richer model of students' team trust development in online collaborative learning environments.

In addition to the participants, the setting of this study was also selective. It was an online course in which all team activities were conducted collaboratively through online communications. As mentioned earlier, the online course had unique characteristics. Therefore, future research is needed to investigate whether the model developed in this study is applicable in different settings. For example, students in the course were supposed to work in the same team for all the activities and assignments. Therefore, students' team trust was developed within their own team over time. They had little personal acquaintance with members of other teams. However, if students are required to work in different teams during a course and for shorter duration or if they have different team building activities, interactions among students may be different from those of this study. Also, if students primarily work in the offline learning environment or they use different technology tools and channels to communicate with each other, their team trust building process and results might differ from those of this study.

Another implication for future research relates to the instructor's direct facilitation of students' team trust building. Prior studies found that instructors' intervention positively influenced students' successful performance and team trust building. For example, Lunetta (1990) found that effective instructors intervened to assist groups in developing student-student relationships. Johnson and Johnson (1998) also noted that appropriate instructor intervention helped foster the development of collaborative skills including communication, leadership, trust, and conflict resolution. This study also suggests that such interventions are helpful because one of the students in this study mentioned that the instructor's direct intervention helped his team members to build team trust and have collaborative knowledge building in the beginning of the course. His team members could not easily decide how to negotiate their different perspectives and ideas because their ideas varied. At this moment of indecision, the instructor intervened in their

communication and suggested several strategies about how to negotiate their ideas and combine their perspectives. After this intervention, the students could successfully complete their projects and continually build team trust. Because similar comments were not made by other students, this study did not investigate the influences of the instructor's direct intervention on team trust building. However, this student's comment implies significant positive impacts of an instructor's intervention on team trust building. Therefore, future research needs to investigate how an instructor's direct intervention in an online collaborative learning team influences team trust building.

IMPLICATIONS FOR EDUCATIONAL PRACTICE

The findings of this study suggest that it will be helpful to instructors using CSCL to understand the contributors related to establishing and maintaining team trust and the importance of intervention in teams in which team trust either fails to develop or is eroded. Specifically, the results of the study offer suggestions for educational practice in relation to the following factors: 1) forming teams and the impact of team composition, 2) focusing on early team dynamics, 3) using online communication and team trust, and 4) intervening when team trust fails to develop or is eroded to resolve crises in team trust.

Forming Teams and Impact of Team Composition

In using collaborative learning, the instructor may choose a variety of ways to form teams including heterogeneous, homogeneous, and either random or self-selection. The choice an instructor makes may depend on the type and duration of the learning task as well as other factors. In this course, the students were assigned to heterogeneous teams in order to provide diversity in terms of gender, cultural background, technological expertise, prior experience in online learning, and on-campus and off-campus residential

status. Team tasks in this CSCL course were complex and challenging and also required high technological skills. The combination of students with high technological skills and others with prior experience in online collaborative learning provided the capability of the highly skilled students to help support and mentor the students with less knowledge and skill in accomplishing team learning tasks.

This course also required online communication skills. The students had to suggest and negotiate ideas and make critical team decisions during asynchronous discussions as well as live chats. Approximately half of the students in the learning teams were international students who spoke English as their second language. In this course, online communication skills in English were crucial for completing team tasks successfully. The inclusion of native English speakers within each team also helped the quality of the team's writing, and it was observed that often the native speakers would take the role of editor of the final team products.

Drawing upon the diverse expertise of team members in successfully completing the team learning task or product helped to build team trust, and this result demonstrates the potential benefits of forming heterogeneous teams that may lead to effective team performance and team trust.

In forming heterogeneous teams, it is also important to consider the potential risks of isolating an individual member within a team who differs significantly from other team members in terms of either culture or level of knowledge and skill. For example, in this study, when an individual member of a team felt isolated, either due to a lack of fluency in English or limited technical skill, there tended to be a lower level of trust within the team. One international student could not easily open up about her difficulty in communicating in online chats, especially when the others wrote their messages relatively quickly. Furthermore, one high tech member could not persuade the other

members who had not experienced online environments to use asynchronous tools to overcome the students' different time availability. Even though members had conflicts in scheduling synchronous meetings due to different time availabilities, most of the students who had not experienced online learning wanted to have synchronous communication. However, the team relied on the technical expertise of this member in completing team tasks that would have been difficult for the team to accomplish otherwise.

Overall, these findings suggest that instructors who plan to use online collaborative learning teams in their courses should consider the following issues:

- Students' technological skills
- Students' prior online collaborative learning team experience
- Students' online communication skills
- Students' fluency in language

In addition, the study indicates that if an instructor assigns students to heterogeneous teams, she or he should be careful to avoid isolating members. Particular care must be taken to avoid having a single member of a team who is culturally different or is the only non-native English speaker.

Early Team Dynamic

The findings of this study suggested the importance of the initial team learning experience. A team in which there was lack of presence, online communication, or contribution of an individual team member in the early team learning tasks subsequently manifested a low level of team trust. Team members then had to work to rebuild their relationships and to be careful of their words and actions toward each other. For example,

the students who were absent from participating in team chats without giving advance notice to other members caused team confusion, which contributed to lowered team trust.

In contrast, a team which had started well with casual conversations and with the findings of commonalities among team members, steadily developed solid team trust. Having casual conversations that were non-task-related, even if such conversations happened only once, made the students feel comfortable on a personal level and produced a warm base of conversation. In addition, finding commonalities in a heterogeneous team made the students become more connected to each other and provided a safe environment for them to talk freely. The team climate of trust helped the students suggest their own ideas to one another and to give and receive criticism, all of which resulted in better team products.

These findings indicate the importance of including activities that help team members to learn about each other and providing opportunities for students to find commonalities among team members to produce a warm team climate. Additionally, it is helpful for the instructor to help students understand the importance of the team formation process and the potential benefits of collaborative learning, particularly in cases where students have not had prior experiences in online collaborative learning. Moreover, it is important for instructors to offer students strategies for building positive team relationships and for resolving any conflicts that may emerge.

Online Communication and Team Trust

In the process of analyzing data from this study, the researcher observed differences between what the students wrote in their Blogs about their learning experiences and what they confided to the researcher in their interviews. During the interviews, the students from dysfunctional teams mentioned their hesitance to share their concerns or negative feelings about other team member's lack of contributions,

participation, or other behaviors in their Blogs because these were open to both their fellow team members and the instructor. However, there were actually some clues indicating dysfunctional teams in the students' online messages, both in their synchronous chats or asynchronous discussion boards. The following are examples of concerns as expressed in students' Blogs, and a paragraph of commentary follows each example:

"Where is [member's name]? He is missing". Based on comments during the interview, the researcher inferred that statements such as the above were expressions of concern about a team member's prolonged absence without advance notice from both chats and online discussions. This situation contributed to confusion and lowered the level of trust within the team since the other members were unable to communicate regularly with the missing team member. Regular communication, even if it was not on a daily basis, was required for team trust building. Missing member incidents also resulted in low peer evaluation scores for the individual, and these provided additional evidence of a dysfunctional team. This finding suggests that instructors might remind students of the importance of keeping in close contact and being responsive communicating with others online.

"I am so sorry that you felt that way. [+ No solution]". In co-accomplishing team products, some students expressed concern over their lack of a specific ability, skill, or experience. It was not only the perceived lack of technical skills for novice technological learners or English skills for international students that contributed to the students' feelings of helplessness in their team learning, but also technical problems or a lack of knowledge of online communication conventions such as emoticons or abbreviations in chats. The students who expressed their concerns about their lack of knowledge or skill in a particular area were hoping to find a way to overcome this lack and receive support

from other members. When fellow team members expressed regret for a team member's feelings of helplessness but did not offer help to the member, it tended only to increase the student's feelings of helplessness in addressing the team learning tasks. As in the previous case, the instructor needs to help students understand the importance of constructive resolutions support and collaborative knowledge building in an online collaborative learning team.

“Compared to the face-to-face learning environment, it was difficult to communicate in an online environment, since we could not see others’ facial expression and body language”. The students in dysfunctional teams were most likely to express concern about the lack of full communication in an online versus a face-to-face environment. For example, two international students, whose ideas were not accepted by their other team members, expressed concern about the constraints of online communication. In contrast, the students who built team trust were able to accept and function effectively using the online communication tools and tended to attribute any difficulties more in terms of their own lack of English fluency or technical skill rather than on the constraints posed by the lack of face-to-face communication. Given these tendencies, the instructor needs to help students understand the limitations of text-based communication and the need for clarity, respect, and responsiveness when communicating with one another online.

The above findings underscore the need for an instructor using online collaborative learning to monitor carefully the team's online discussions. The instructor should identify expressions of concern and any lack of responsiveness or participation by team members. The instructor should also review student reflections in Blogs to detect any emerging difficulties within a team and to intervene in the least intrusive way to promote positive interaction and full participation of the team members. In order for the

instructor to monitor team communications, he or she will need to select the communication tool or tools to be used. If teams select other tools to use, it may be difficult or impossible for the instructor to monitor the development and progress of the teams or to identify signs of team difficulty early on and thus be able to effectively intervene in a timely fashion. To illustrate the importance of such instructor activities, the following example is instructive. One dysfunctional team chose to use a tool outside the one selected for the class for their team work, and hence the instructor had limited access to their communications and any subsequent chance to intervene. Whatever tools an instructor might select, this study underscores the importance of the instructor helping the students to become comfortable and competent in using the tools to accomplish their collaborative learning tasks.

Lack of Development of Team Trust

This study found that when team trust failed to develop or when failure to resolve a team crisis led to erosion in team trust, it was difficult to restore or improve the relationships among team members. When these issues develop, the instructor needs to intervene in members' interactions and suggest methods of resolution.

There are a number of ways an instructor might do so. First of all, the instructor might emphasize the importance of interpersonal trust. This study found that knowing each other and providing safe conversational environments were both vital in team trust building. For example, there was an incident during which two members who distrusted each other in the early process happened to be sub-team members in the academic controversy activity and had to prepare their work together. They naturally had more chances to communicate with each other resulting in more opportunities to understand each others' positions and perspectives. Consequently, this activity helped these two members to restore their relationship and carefully build team trust.

Furthermore, the instructor might suggest that students read research or other articles about the importance of building caring relationships within teams. For example, an instructor could introduce the rules of netiquette and tips to maintaining respectful dialogues online. This instructor activity could help students to be more aware of their own words and actions that might negatively influence team trust building. In distrustful relationships, students usually complained about others' inadequacies and weaknesses rather than their own shortcomings. Distrust is built in relationships in a reciprocal manner, so that both sides of distrustful relationships have to be careful about their words and make an effort to sustain respectful communication.

Finally, the instructor needs to carefully monitor teams for the quality and level of interaction and contribution, and for the development of team trust. In particular, students who are competent and reliable should support and help the other members who are not in the early learning process. This study found that collaboration and interdependence among team members were more important than creating better products through relying heavily on one member's ability or skill. The members who made the most contributions were exhausted with complicated tasks and annoyed with other members' low contributions, and conversely the other members who could not contribute enough to team products complained about the members who did all the work. For example, one student who was good at technology could design and develop all of the products by himself. The others would appreciate his contribution and competence in the beginning of the course. However, in a situation with such a disparity in levels of contribution, the teams experienced difficulty in building team trust.

CONCLUSION

The main purpose of the study was to examine elements which affected students' team trust building in an online collaborative learning team as well as the relationships among these elements. As a result of the data analysis, the following elements emerged: 1) the influence of the CSCL context on team trust building, 2) the identification of four components of team trust building, including initial team trust and the contributors, dimensions, and consequences of team trust, and 3) the process of team trust building. Additionally, a model entitled "Team Trust Building through Task Performance Trust and Interpersonal Trust in an Online Collaborative Learning Team" demonstrated the relationships among four components and the recursive process of team trust building.

The results of this study outlined the importance of team trust building in an online collaborative learning environment. Based on students' reliability, competence, online communication, and caring, students could build task performance trust in which they could interdepend and interpersonal trust which produced a safe and warm team climate and led to collaborative knowledge building and a sense of community. Additionally, based on these findings, this study offered suggestions for educational practice in terms of 1) forming teams and the impact of team composition, 2) focusing on early team dynamics, 3) fostering online communication and team trust, and 4) intervening should team trust fail to develop or become eroded because of failure to resolve crises in team trust.

Understanding the construct of team trust may help not only instructors in their design and guidance of successful online collaborative learning teams, but also students in various online collaborative learning teams. In addition, the results of this study may help instructors and researchers to consider carefully the issues in relation to online team trust building.

Appendices

APPENDIX A. INSTRUCTIONS ON ASSIGNMENTS OF THE COURSE

Module 1. Building a Learning Community

Sep. 4 (Tue) - Sep. 26 (Wed)

WEBCAST: Orientation

1. Introduction

2. What Is a Learning Community?

3. Getting to Know Each Other

< Assignment 1.3.a > Setting up your personal Web log (Blog).

< Assignment 1.3.b > Introduce Yourself.

< Assignment 1.3.c > Read and Respond to Others' Introductions.

< Assignment 1.3.d > Read One of the Following Articles.

4. Providing Information for Team Directory

< Assignment 1.4.a > Explore and Use Skype.

< Assignment 1.4.b > Provide Information for Team Directory.

5. Working Together Online

< Assignment 1.5 > Establish Norms for Effective Online Collaboration.

Module 2. Understanding CSCL

Sep. 24 (Mon) - Oct. 8 (Mon)

WEBCAST

1. Introduction

2. Exploring and Using TeachNet

< Assignment 2.2 > Install TeachNet on Your Own Computer.

3. The Key Elements of CSCL, Cooperation, & Collaboration

< Assignment 2.3 > Get to Know Your Team Mates

- Read and respond to others' postings.

4. Exploring Second Life

< Assignment 2.4.a > Set-up Second Life Account, and Submit it to Instructor

< Assignment 2.4.b > Complete Second Life Orientation Tour

5. CSCL: What & Why

6. Benefits of CSCL

< Assignment 2.6 > Make Connections & Check Understandings.

- Read an article and post your ideas emerging from the article.

WEBCAST

7. Social Aspects of Learning & CSCL

< Assignment 2.7.a > Make Connections.

- Post your ideas.
- Identify key strategies.

< Assignment 2.7.b > Reflections

- Review your reflections.
- Respond to others' reflections.

< Assignment 2.7.c > Practice Peer and Self Evaluation

Module 3. Collaborative Writing

Oct. 8 (Mon) - Oct. 22 (Mon)

WEBCAST

1. Introduction

2. Developing the Wikipedia Topic Entry

< Assignment 3.2.a > Prepare team Wiki

< Assignment 3.2.b > Develop a Wikipedia Topic Entry Related to CSCL.

< Assignment 3.2.c > Reflections

- Review your reflections.
- Read and comment on at least one other reflection.

< Assignment 3.2.d > Evaluation & Portfolio

Module 4. Multi-User Virtual Environment and Collaborative Controversy

Oct. 22 (Mon) - Nov. 5 (Mon)

WEBCAST

1. Introduction

2. Multi-User Virtual Environment

< Assignment 4.3.a > Creative Controversy

- Argue Your Position with Opposing Team.
- Come to Agreement.

< Assignment 4.3.b > Reflections

- Review your reflections.
- Read and comment on at least one other reflection.

< Assignment 4.3.c > Evaluation & Portfolio

Module 5. Strategies for Collaborative Online Inquiry

Nov. 5 (Thu) - Dec. 17 (Mon)

WEBCAST

1. Introduction

2. Learning About WebQuests

< Assignment 5.2 > Explore a WebQuest.

3. Backward Design

4. WebQuest Design Process

< Assignment 5.4.a > Create a WebQuest Related to a Topic or Question of Interest.

< Assignment 5.4.b > Evaluate your and others' WebQuests.

< Assignment 5.4.c > Report on WebQuests

< Assignment 5.4.d > Reflections

- Review your reflections.

- Read and comment on at least one other reflection.

< Assignment 5.4.e > Evaluation & Portfolio

WEBCAST

APPENDIX B. QUESTIONNAIRE FOR BACKGROUND INFORMATION

1. Name
2. Address
3. Phone
4. E-mail
5. Skype ID
6. Work Experience

7. Educational Background

8. What do you want to learn from this course?

9. Other instructional design/technology-related courses or training workshops that have been taken:

10. How comfortable do you feel using the following u_comp technology?

	Very	Some	Not
		what	at all

Word Processing

(Word, Word Perfect, ClarisWorks, Simpletext, etc.)

Spreadsheets (Excel, etc.)

Desktop Publishing

(Pagemaker, QuarkXpress, Print Shop Deluxe, etc.)

Authoring or Multimedia

(Hyperstudio, Authorware, Director, Multimedia
ToolBook, etc.)

Instructional Demonstration/Tutorial

(Powerpoint, Persuasion, etc.)

Audio/Video Editing (Premiere, Videoshop, etc.)

Art/Graphic Development

(Photoshop, Painter, Illustrator, Canvas, etc.)

Internet or Online Service Access

(Navigator, Internet Explorer, AOL, CompuServe, etc.)

Web Page Development

(FrontPage, Dreamweaver, BB Edit, etc.)

E-mail (Eudora, Outlook, Exchange, EMailer, Groupwise,
etc.)

Computer Conferencing Tool

(FirstClass, Webboard, etc.)

Database (Access, MySQL, etc.)

Scripting or Programming Language

(Javascript, ColdFusion, PHP, etc.)

Playing in a virtual world such as Second Life and There.

Playing console games such as Playstation games or
Xbox games.

Playing computer games such as World of Warcraft or
Everquest (not including virtual worlds or console games)

Learning to use (online) computer game controls.

Interacting with other players and/or characters in a game.

Creating and/or modifying your character in a game.

Solving puzzles and overcoming obstacles in a game.

11. What kind of computer are you using?

12. How do you access the Internet for this course?

- 28.8 or 56 Kbps Modem
- 4 or 128 Kbps ISDN
- DSL or Cable
- T1 or LAN
- 10 Mbps

APPENDIX C. SELF AND PEER EVALUATION RUBRIC

Evaluate yourself and your team members based on a 5-point scale on the following items.

For each item, select the score you believe best reflects that person's efforts and contributions.

If the person:

- Always demonstrates the quality, you would give a score of 5.
- Frequently demonstrates the quality, you would give a score of 4.
- Sometimes demonstrates the quality, you would give a score of 3.
- Seldom demonstrates the quality, you would give a score of 2.
- Never demonstrates the quality, you would give a score of 1.

1. Takes active role on initiating ideas or actions.
2. Is willing to take on task responsibilities.
3. Is willing to frequently share ideas and resources.
4. Accepts responsibilities for tasks determined by the group.
5. Helps promote team esprit de corps.
6. Respects differences of opinions and backgrounds, and is willing to negotiate and make compromises.
7. Provides leadership and support whenever necessary.
8. Acknowledges other members' good work and provides positive feedback.
9. Is willing to work with others for the purpose of group success.

10. Communicates online in friendly tone.
11. Keeps in close contact with the rest of the team so that everyone knows how things are going.
12. Produces high quality work.
13. Meets team's deadlines.
14. Sensitive to the needs and feelings of other members of the team.
15. Understand problems and responds with helpful comments.
16. Openly shares needs and feelings with team members.

Comments (Please provide your teammate with positive and constructive feedback.):

APPENDIX D. INTERVIEW QUESTIONS

1. In general, what do you think about your experience in the CSCL course?
2. What did you expect to get out of this course before the semester started?
3. What do you think about your experience using different tools?
 - 3.1. Did you have any problems with the technology for the course?
 - 3.2. How do you think different tools affect your relationships with your team members?
 - 3.3. How did different tools affect your team learning?
4. What was your experience and feelings at the beginning of the course?
 - 4.1. What kinds of concerns did you have about working with your team members or team learning?
 - 4.2. What kinds of expectations did you have about working with your team members or team learning?
5. During the team activity, how was your relationship with your team members?
 - 5.1. Did you know any of your team members before the course started?
 - 5.2. What was your experience working with your team members?
 - 5.3. How did you feel about your team members?
 - 5.4. What do you think about working with your team members again in the future?

- 5.5. How would you describe the relationship in your team?
- 5.6. What do you think your team members think about you?

6. How did you build relationships with your team members?
 - 6.1. What factors or events helped you to build trust relationships with your team members?
 - 6.2. Can you tell me if there were any barriers or problems that interfered with building trust relationships with your team members?

7. What was your experience in completing the task with your team members?
 - 7.1. When you had to make a decision, how did your team members provide different ideas? (Plan, Topic, Role, Content in the product)
 - 7.2. How did the team reach consensus?
 - 7.3. What was the process your team used in completing the task? (Collaboration, individually working in parallel, frequent chats of whole group, etc.)
 - 7.4. How did your relationships with your team members affect your experience in completing the task?

8. Do you feel your group became a kind of community?

If yes,

- 8.1. When did you feel that way at first? And, would you describe that moment?

If no,

- 8.2. Can you tell me any barriers or problems that prevented your team from becoming a community?
- 8.3. Did all of your team members satisfy the learning outcome and learning process?
9. What did you learn from this CSCL course? (About content, relationship, interaction, decision-making, resolving the problem or disagreement)
10. Which elements do you think are important for a successful CSCL?

APPENDIX E. LIST OF CATEGORIES AS A RESULT OF OPEN CODING

Course Context

- Instruction encouraging online collaboration (complicated tasks, peer evaluation, role, writing reflections)
- Technology being used for the course (social presence, channels)
- Time constraint

Individual Difference

- Knowledge level (experience, skill, language)
- Preference in online collaborative learning (schedule, technology, learning habits)
- Team composition

Initial Team Trust

- Sharing task responsibility
- Fragile (easy to call emotional conflicts)
- Swift trust

Reliability

- Prompt responsiveness
- Punctuality
- Shared responsibility (collective responsibility)

Competence

- Knowledge diversity (experience, skill, idea)
- Effort (devoting time)
- Producing high quality work

Openness

- Sharing ideas & resources
- Confiding personal information
- Expressing difficulties and emotions

Social Support (Caring)

- Supporting each other to complete task (compliments)
- Communicating online in friendly tone
- Sensitive to the needs & feelings of other members (preventing hurt others' feeling)

Task Performance Trust

- Positive interdependence (knowledge, devoting time)
- Resolving conflicts constructively (with negotiation)
- Building team learning system (chat time, role, channel)

Interpersonal Trust

- Knowing others to understand their diverse personalities
- Feeling comfortable working together
- Resolving conflicts in a positive manner

Knowledge Building

- Collaborative knowledge building
 - Improvable ideas
 - Symmetric knowledge advancement
 - Rise above
 - Democratizing knowledge (ownership)
 - Satisfaction

Sense of Community

- Sense of camaraderie
 - Being friends (intimacy)
 - Feeling warmth & safety
 - Confidence

APPENDIX F. LIST OF CATEGORIES AS A RESULT OF AXIAL CODING

CSCL Course Context

- Collaborative nature of the course
 - Time constraints
 - Characteristic of tasks (collaborative tasks)
 - Self/Peer evaluation
- Heterogeneous team composition
 - Functional diversity
 - Time availability
 - Technology tools

Team Trust building

- Initial team trust
 - Swift trust
 - Vulnerability
 - Initial team experience
- Contributors to team trust
 - Competence
 - Diverse skills, knowledge, and experiences
 - Reliability
 - Punctuality
 - Predictability

- Online communication
 - Sharing ideas/resources
 - Prompt responsiveness
 - Non-task-related communication

- Caring
 - Willing to support each other to complete task
 - Concerned all members' interests
 - Maintaining a respectful dialog (Avoiding hurting feelings, Expressing apprehension)

- Dimensions of team trust
 - Task performance trust
 - Positive interdependence
 - Building team learning system (chat time, role, channel)
 - Resolving conflicts constructively (with negotiation)
 - Interpersonal trust
 - Knowing others to understand their diverse personalities & learning styles
 - Feeling comfortable working together (Security)
 - Resolving conflicts in a positive manner

- Consequences of team trust
 - Collaborative knowledge building
 - Improved ideas

- Ownership/Satisfaction
- Sense of community
 - Sense of camaraderie
 - Team confidence

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