COMMUNICATION BEHAVIORS AND TRUST IN COLLABORATIVE ONLINE TEAMS

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
THE MIDDLE EAST TECHNICAL UNIVERSITY

BY

SANİYE TUĞBA BULU

IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

THE DEPARTMENT OF COMPUTER EDUCATION AND

INSTRUCTIONAL TECHNOLOGIES

JULY 2003

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ABSTRACT

COMMUNICATION BEHAVIORS AND TRUST IN
COLLABORATIVE ONLINE TEAMS

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July 2003, 137 pages

Building and maintaining trust is a necessary condition for group cohesion. In order to successful collaborative group process in online learning environment, development of trust must be understood in online teams. Difference communication behaviors in the online teams with different trust levels were investigated in this research. Participants were 61 students in an undergraduate level who enrolled in the online course. In this research, online teams' collaborative communication behaviors were analyzed using both qualitative and quantitative methods to understand the factors that facilitate and deepen trust. Data were obtained from questionnaires and online class discussion archives. One of the findings of

the study was that trust is built and maintained in online teams. Another finding was that online trust can be fragile and certain communication behaviors should be presented by members to deepen and maintain the trust level. The results of the study showed that there must be social interaction, enthusiasm, task oriented interaction, equal and predictable communication, and feedback among the member of online teams to built and maintain trust.

Keywords: computer mediated communication, online collaboration, online team, trust development, group dynamics, online learning

ÖZ

ÇEVRİM İÇİ ÖĞRENME TAKIMLARINDA İLETİŞİM DAVRANIŞLARI VE GÜVEN

Bulu, Saniye Tuğba

Yüksek Lisans, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Zahide Yıldırım

Temmuz 2003, 137 pages

Güvenin geliştirilmesi ve korunması grup birliği için gerekli şartlardan biridir. Çevrim içi öğrenme ortamında başarılı bir grup çalışması için, grubun kendi içindeki güven gelişiminin anlaşılması gereklidir. Bu araştırmada farklı güven düzeylerinde olan çevrim içi öğrenme takımlarındaki farklı iletişim davranışları incelenmiştir. Bu araştırmanın örneklemini çevrim içi derse katılan lisans düzeyindeki 61 öğrenci oluşturmuştur. Araştırmada, güveni güçlendiren unsurları anlamak için çevirim içi öğrenme takımlarının iletişim davranışları nicel ve nitel araştırma teknikleri kullanılarak incelenmiştir. Veriler anket yolu ve çevrim içi sınıf tartışma arşivelerinin incelenmesiyle elde edilmiştir. Araştırma sonuçları güvenin çevirim içi öğrenme takımlarında geliştiği ve

korunduğunu göstermiştir. Diğer bir bulgu da çevirim içi ortamda güvenin kırılgan bir yapıda olduğu ve güçlendirilip korunabilmesi için belirli iletişim davranışlarının takım üyelerince gösterilmesinin gerektiğidir. Araştırma, güvenin geliştirilmesi ve korunması için grup üyeleri arasında etkileşimin, heyecanın, görevlere ilişkin etkileşimin, eşit ve tahmin edilebilir iletişimin ve geridönütün olmasının gerekli olduğunu ortaya koymuştur.

To my family

ACKNOWLEDGEMENTS

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CEIT   : Computer Education and Instructional Technology

CMC   : Computer Mediated Communication

FBS   : Feedback Seeking

FBG   : Feedback Giving

LA   : Language Arts

LTTS   : Learning to Teach with Technology Studio

METU   : Middle East Technical University

SI   : Social Interaction

SIDE   : Social Identity Theory and De-individuation

TIP   : Time, Interaction, and Performance

TOI   : Task Oriented Interaction

TTU   : Task and Technical Uncertainties

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

With the developments in the Internet and communication technologies, integration of Computer Mediated Communication (CMC) among education, business, and organizations has been dramatically increased. Distance learning is evolving from being a special form of education using nontraditional delivery systems to providing an important conceptual framework for mainstream education (McIsaac & Gunawardena, 1996). Recently, much of the attention has been paid to use of CMC in education (Benbunan-Fich & Hiltz, 1999; Harasim, Hiltz, Teles, & Turoff, 1995; Paulsen, 1995). Turoff (1990a) see educational delivery as the key application of CMC.

Paulsen (1995a) defined CMC as "Transmission and reception of messages using computers as input, storage, output, and routing devices." CMC examples include e-mail, online chats, bulletin boards, computer conferencing, audio teleconferencing, video conferencing, and listservs. These examples can be classified into two categories: synchronous and asynchronous. Synchronous communication technologies such as audio teleconferencing and video

conferencing support two-way and real time interactions. On the other hand, asynchronous communication technologies such as discussion forums, email, and bulletin boards are text-based instructions and don't support real-time interactions.

Interaction between a social environment and an individual has always been emphasized as a critical factor to facilitate learning (Dewey, 1916; Vygotsky, 1978). This led to use of collaborative learning as placing students in small groups in traditional education. There has been much study done on collaborative learning in a face to face environment. Majority of those studies have shown the advantages of collaborative learning over individual learning (Johnson & Johnson, 1989).

As well as supporting individualized learning, CMC environments have potential to support teamwork among distance learners. Although there are empirical studies show advantages of synchronous communication technologies, they are not as suitable as asynchronous communication technologies to support collaborative learning among learners. Asynchronous communication technologies gives students both time to think about a problem and the opportunity to discuss possible solutions in a group, independent time and space (Hiltz, 1998). Because of their flexible and independent feature, they are important medium for creating collaborative and cooperative distance learning environments (McIsaac & Gunawardena, 1996). This type of communication technologies are the most common applications in current online courses (Hiltz & Wellman, 1997; Klobas & Haddow, 2000; Stacey, 1999).

In the literature, the terms virtual team and online team are used to refer to small groups that work collaboratively through CMC. In this study, virtual team, online team, and computer mediated team/group, collaborative online team/group are used interchangeably. Online teams are different from teams in the face to face environment in many ways. There is conflicting body of literature that examines the similarities and differences between computer mediated and face to face collaborative groups. Studies have examined the variety of outcomes including quality of decision making, participation rate, time to reach consensus, task oriented communication, and social communication, and interpersonal effects of CMC.

1.2 Statement of the Problem

Some theories about the effects of CMC suggested that media result in impersonal communication. They assert that the major features of CMC including asynchronous interaction, text-based communication, and lack of communication cues affects the development of relationships in online environment. Text-based asynchronous interactions lack the nonverbal messages by which 65% of the social meaning is carried in the face-to-face contact (Johnson, 1997). Gunawardena (1995) argued that CMC "create a unique social climate that impacts interactions and group dynamics online" (p. 148).

The term "cues-filtered-out perspective" is used to describe antisocial and impersonal communication in CMC (Culnan & Markus, 1987). The media richness theory (Daft & Lengel, 1984), the social presence theory (Short, Williams, & Christie, 1976), and lack of social context cues hypothesis (Sproull

& Kiesler, 1986) are the main examples that argue CMC filters out nonverbal channels and eliminate social cues.

According to Jarvenpaa and Leidner (1999), the media richness and social presence theories question the possibility of development of relationship and subsequently development of trust. In this research trust is defined as "a characteristic for collaboration where members believe in the character, ability, integrity, familiarity and morality of each other" (Ishaya & Macaulay, 1999, p.145). Building and maintaining trust is acknowledged as necessary condition for cooperation (Johnson & Johnson, 1975). Sherif (1966) also noted that trust, face-to-face communication, and interpersonal relationships are important elements of collaboration and cooperation. Although trust is important for both face-to-face and online groups, it is acknowledged as a key factor for effective functioning of collaborative computer mediated groups because lack of a social environment affects interaction and communication. Consequently this hinders trust in collaborative online groups (O'Hara-Devereaux & Johansen 1994).

There are alternative perspectives to cues-filtered-out approach. One of them is Walther's (1992, 1993) social information processing theory. This theory asserts that there is not a critical difference between computer-mediated communication and face to face communication in terms of capability of social information processing. However, the theory asserts that they are different in terms of the rate of transfer. According to the social information processing theory, CMC users adopt their linguistic and textual behaviors to presentation of socially revealing behavior to reduce uncertainty.

An important challenge in online collaborative learning environments is the extent to which the face to face collaborative behaviors can be replicated in the online environment. Curtis and Lawson (2001) showed there are similarities between behaviors in online collaboration and the face to face environment described by Johnson & Johnson (1996). Differences, however, exist like lack of challenges to the input of others and attempts to explain and elaborate participants' own contributions in the interactions. Curtis and Lawson (2001) claimed that this difference is a result of absence of face to face meetings among the group members. Because the participants had lack of historical background and they were not acquainted with each other, trust development among online group members might be affected.

Literature in interpersonal and organizational trust argues that trust cannot exist in the lack of social context, communication, and interaction (Jarvenpaa & Leidner, 1999). Handy (1995) argued that "trust needs touch" (p. 46). However, many studies showed that trust can exist in a virtual environment, and team communication and interaction are the significant factors for trust development (Ishaya & Macaulay, 1999; Jarvenpaa & Leidner, 1999). Moreover, while some teams develop high level of trust in spite of the negative effects of CMC; other teams develop low level of trust. Iacono and Weisband (1997) showed that teams which hold high level of trust engage in continuous and frequent communications and focus on the work content. Jarvenpaa and Leidner (1999) noted that different communication behaviors including social communication and communication conveying enthusiasm can change the trust levels over time.

In the literature, there are research studies that examine trust in online environment. However, few studies investigate interaction of online collaboration and trust levels exist. Therefore, there is a need to explore this issue to contribute effective implementation of collaborative learning through CMC and the related literature.

1.3 Purpose of the Study

The purpose of the study is to explore communication behaviors and trust in collaborative online teams. This study aims to examine the differences in the groups with different trust level in terms of their technology beliefs and competencies, distribution of the communication, and different communication behavior patterns.

The research questions investigated in this study are:

Question 1:

What are the online groups' technology beliefs and competencies in the beginning of the study?

Question 2:

What are the online groups' social trust levels in the beginning and at the end of the study?

Question 3:

What are the online groups' group trust levels at the end of the study?

Question 4:

What is the distribution of groups' online posts?

Question 5:

What are the collaborative communication behaviors of online groups throughout the study?

1.4 Significance of the Study

There has been much research in business and organizational sciences literature about trust in virtual teams. Nevertheless, these virtual teams are "work groups" or "business groups" in business and organizations rather than learning groups in education. In recent educational research, a few researchers have addressed change in group dynamics and interpersonal communication in online learning (Gunawardena, 1995). Although computer mediated collaboration is prominently used in distance education, none of studies in educational research specifically examine the nature and development of trust in online groups.

Majority of researches on virtual teams examined communication behaviors in virtual teams. To date, however, different collaborative communication behaviors between groups with high and low level of trust are not deeply emphasized in the literature. Methods applied in existing studies are purely qualitative methods. For example, Jarvenpaa and Leidner (1999) did not use any coding schema for defining communication behaviors. Moreover,

although there are research studies about social presence in CMC in educational research, there are not specific empirical studies on the trust and communication behaviors at this time.

Once which communication behaviors deepen or fail trust in collaborative computer mediated groups are determined, trust problems can be inhibited. Facilitators and instructors will be able to develop strategies for managing and facilitating online teams. They can help online teams deepen trust and avoid trust failures.

1.5 Definitions of the Terms

Trust: Trust is a characteristic for collaboration where members believe in the character, ability, integrity, familiarity and morality of each other (Ishaya & Macaulay, 1999).

Online team/virtual team/Computer mediated team: Teams whose members use technology as a primary means of communication.

Computer mediated communication: CMC refers to human communication between two or more individuals through the use of central computers that store and process message content, and are connected to users in a communication network.

Collaborative communication: Collaborative communication is a process of communication in which participants share in the process of creating

meaning and mutual understanding of meaning, in a shared space for a specific

purpose (Schrage, 1990).

CHAPTER 2

REVIEW OF LITERATURE

This chapter provides a review of literature related to this study under five main sections: Concept of trust, trust and group dynamics, computer mediated communication, dynamic nature of trust in online environment, and variables affecting trust development in online environment.

2.1 What is Trust?

Trust is a concept that plays an important role in human interactions and cooperation. According to Rotter (1967, 1980), absence and presence of the trust affect the efficiency, adjustment, and even survival of any social group. Moreover, Simmel (1978) argue that:

"Without the general trust that people have in each other, society itself would disintegrate, for very few relationships are based entirely upon what is known with certainty about another person, and very few relationships would endure if trust were not as strong as, or stronger than, rational proof or personal observation." (p. 178-179).

Trust has been studied in a large number of different contexts in terms of population size. Trust has been found to affect different levels of community

including dyad, small or large groups, teams, organization, community, and society.

There has been a considerable amount of research on trust from several disciplinary perspectives such as psychology, anthropology, sociology, political science, and economics. However, scholars made limited attempts to integrate different perspectives or articulate the key role that trust plays in critical social processes such as cooperation, coordination, and performance (Kramer & Tyler, 1996; Lewicki & Bunker, 1996). Therefore, no clear definition of trust exists in the literature.

Generally speaking, different theories of trust are viewed from a rational or social perspective (Ishaya & Macaulay, 1999; Jarvenpaa, Knoll, & Leidner, 1998; Kramer & Tyler, 1996). In this section two perspectives of trust will be reviewed as well as outlining the perspective and defining the concept of trust in this research.

2.1.1 Rational Perspective of Trust

The rational perspective centers on the view of calculus of self interest (Jarvenpaa et al. 1998) and it focuses on individual gains and exchange of material resources. This perspective argues that people react to other individuals, organizations, and rules from a self-interested instrumental perspective (Kramer & Tyler, 1996).

Within the rational perspective, trust has been studied as individual personality differences, as an institutional phenomenon, and in terms of interpersonal transactions (Lewicki & Bunker, 1995).

Personality psychologists view trust as an individual personality difference and trust is conceptualized as a belief, expectancy, and feeling. Rotter (1967), for example, defines trust "as an expectancy held by an individual or group that the word, promise, verbal, or written statement of another individual or group can be relied upon" (p. 651). Economists and sociologists focus on trust as an institutional phenomenon and trust is conceptualized as a phenomenon within and between institutions. (Goffman, 1971; Zucker, 1986). Social psychologists focused on the interpersonal transactions between the individuals that enhance or inhibit the development and maintenance of trust (Deutsch, 1958; Mayer, Davis, & Schoorman, 1995). Mayer et al. (1995), for example define trust as "the willingness of a party to be vulnerable to actions of another party based on expectations that the other party will perform at a particular action important to the trustor, irrespective of the ability to monitor and control the party" (p. 712).

2.1.2 Social Perspective of Trust

Trust can be conceptualized as a phenomenon that has social meaning beyond the rational perspective. People become distinct from calculations of interest and help others because they feel it is moral duty (Kramer & Tyler, 1996).

Social trust plays an important role in cooperative and collaborative behaviors. Trust is conceived as a property of dyads, groups, and collectivities rather than not isolated individuals (Lewis & Weigert, 1985). Social perspective argues that trust emerges from the acquisition of shared values and norms. Fukuyama (1995) defined trust as "the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of that community" (p. 26).

2.1.3 Perspective and Definition of Trust in this Research

Recently, two different perspectives have been integrated to conceptualize and analyze trust. Ishaya and Macaulay (1999) developed a complementary perspective of trust that links between rational and social perspectives. Their unitary view of trust is conceptually complemented by both calculative elements within a relationships and norm-based aspects of trust. According to their view, trust is not a completely free from calculation. At the same time, common values and norms have an important role in the development of trust.

This research will take this complementary view of trust based on Ishaya and Macaulay's (1999) definition of trust which is "a characteristic for collaboration where members believe in the character, ability, integrity, familiarity and morality of each other" (p. 145).

2.2 Trust and Group Dynamics

Lewicki & Mcallister (1998) contend that trust is a necessary precondition for team cohesion. Moreover, excessive trust is seen at the root of group dynamics. Different perspectives of trust result in different views about processes of building trust in small groups. There are mainly two views about trust building. Some theorists claim that trust is systematically created or developed (Lewicki & Bunker, 1995). On the other hand, other theorists claim that trust is imported from outside rather than developed (Meyerson, Weick, & Kramer, 1996). This section will outline two models of trust building: Development model of trust and Swift trust.

2.2.1 Development Model of Trust

Development model of trust supports the idea that trust is built on step by step agreements between the members of group. Development view of trust is closely related with the development of relationship in groups (Lewicki & Bunker, 1996).

Researchers have studied groups to understand how they develop and work together. Several different models of group development have been created. Mennecke, Hoffer, and Wynne (1992) reviewed group development literature and categorized group development models into three categories: 1) Progressive Models, 2) Cyclical Models, and 3) Non-sequential Models.

2.2.1.1 Progressive Models of Group Development

In the progressive models, groups show an increasing degree of maturity and performance over time (Mennecke et al., 1992). Equilibrium model and linear-progressive models are the example for progressive group development models.

Bales Equilibrium Model (Bales, 1970; Bales & Strodbeck, 1951) assumes that group divide its efforts between task-related and socioemotional needs and seek to maintain an equilibrium between them. The model predicts that groups move through three phases: orientation, evaluation, and control. In an orientation phase, members get to know each other, ask for and receive information from other group members. In the next phase, evaluation, members ask for opinion from other members. In the final phase of group development, control, members apply norms to direct the actions of the group.

Tuckman Model (Tuckman, 1965; Tuckman & Jensen, 1977) and Bennis & Shepherd Model (Bennis & Shepherd, 1956) are the two examples for linear-progressive models. They assume that groups go through definite sequential stages. Tuckman Model of group development predicts that groups move through four phases: forming, storming, norming, performing, and adjourning. In the forming phase, members learn about each other, identify group structure, and define the task facing the group. After members become more comfortable with each other, storming phase begin in which conflicts and individual differences come to surface and interpersonal issues emerges. After those conflict resolved, norming stage take place. Group members develop rules,

roles, in-group feelings, and cohesion. In the next performing phase, group members reach a conclusion and implement it. In the final phase, adjourning, group work is concluded and group relationships change.

Like Bales equilibrium model, each phase include two parts which are interpersonal relationship and task behavior. Model of Bennis and Shepherd (1956) assume that groups go through two phases which are dependence (relationship to authority) and interdependence (relationship with peers). According to this model, groups developed through growing maturity and deep communication.

2.2.1.2. Cyclical Models of Group Development

In the cyclical models, groups follow recurring or linear sequence of events (Mennecke et al., 1992). Life-cycle models and recurring cycle models are the example for cyclical group development models.

Models of Mann, Gibbard, and Hartman (1967) and Mills (1967) are the examples o life-cycle models. Difference of these models from progressive models is the existence of the terminal phase prior to group dissolution and regeneration. Recurring cycle model assume that groups continually move back and forth between various issues. Hare (1976) proposes that all groups must solve four problems including latent pattern maintenance and tension management, adoption, integration, and goal attainment. Drexler, Sibbet, and Forrester (1988) propose a model that assumes team deal with seven independent problems through group life which are orientation, trust building,

goal or role clarification, commitment, implementation, high performance, and renewal.

2.2.1.3 Non-sequential Models of Group Development

Unlike the other models, non-sequential models do not imply specific sequence of stages. The models assume that events result from factors that change the focus of the activities of group (Mennecke et al., 1992).

McGrath's (1991) Time, Interaction, and Performance (TIP) model describe groups as a complex and multifunctional. According to TIP model, groups make contributions to systems at three levels: 1) to systems in which they are embedded-its context, 2) to members of the group, and 3) to the group itself. Three functions that make contributions to these levels are group's production function, member-support function, and group-well being function. Production function is similar to task-related; member-support and group-well being function is related to socioemotional-related needs of Bales (1970) and Tuckman (1965). TIP theory argues that both task-related and socioemotional behaviors of group members should be investigated. However, it argues that if group well-being and member-support functions are neglected, success and life of the group is in danger because "task-oriented behavior is short sighted because it ignores the underlying need that a group may have to deal with non-task-related issues" (McGrath, 1991, p. 536).

According to TIP theory, group performs these three functions through four modes of activity as presented in Table 2.1. TIP theory assumes that groups

are always acting in one of four modes regarding each of three functions. However, they are not necessarily engaged in the same mode for all functions. For example, members might focus on Mode IV in terms of the production function and simultaneously cope with Mode III in terms of well being. All projects begin with Mode I and end with Mode IV. However, if groups warrant Mode II and III, they may progress directly from Mode I to Mode IV.

Table 2.1: Modes and Functions of TIP Theory (McGrath, 1991, p.154)

	Production	**Well-Being**	**Member-Support**
Mode I: Inception and acceptance of a project	Production Demand/ Opportunity	Interactions Demand/ Opportunity	Inclusion Demand/ Opportunity
Mode II: Problem solving	Technical Problem Solving	Role network Definition	Position/ Status Attainment
Mode III: Conflict resolution	Policy Conflict Resolution	Power/Payoff Distribution	Contribution/Payoff Relationships
Mode IV: Project execution	Performance	Interaction	Participation

McGrath (1991) proposes that new teams especially work on complex and unfamiliar task within technological uncertainties have to engage in all modes. Moreover, it is argued that such teams must devote time to the various modes of group well-being and member-support to be able to solve conflicts and problems. This can be example case for the online groups who works with members with no or little history and under technical difficulties.

2.2.2 Swift Trust Theory

Meyerson et al. (1996) developed swift trust theory to the explain behavior of temporary groups such as film crews, theatre, and architectural groups, cockpit crews. They defined the temporary groups as who work on high complexity of task in insufficient time to engage in the usual forms of confidence building activities that contribute the development and maintained of trust. Moreover, Goodman and Goodman (1976, p. 494, cited in Meyerson et al, 1996) defined the temporary groups as "a set of diversely skilled people working together on a complex task over a limited period of time". Temporary groups have commonalities with online groups in that both groups have no or little common history, work as temporary for common task with finite life span under strict deadlines.

According to Meyerson et al. (1996), trust that tied temporary groups is not simply conventional trust scaled down to brief encounters among small groups of strangers. They called this form of trust as "swift trust". They argue that temporary group members are "thrown together" and developed swift trust and quickly become productive regardless of the lack of interpersonal relationship. Namely, temporary groups exhibit behavior that presupposes trust and they act as if trust were present.

Swift trust theory does not take into account socioemotional need of members unlike development view of trust. The theory less emphasize on feeling, commitment rather more emphasize on action, cognition, contextual cues. In such a weak and uncertain situation and under time pressure, members

import trust from other settings according to their stereotypical impressions. In their initial trust model, McKnight, Cummings, and Chervany (1998) also support this idea in that categorization can occur through unit grouping or stereotyping when a person has no explicit knowledge of others' reputations. They defined stereotyping as to place another person into a general category of persons.

Swift trust theory assumes that clear role divisions among the team members leads to more rapid development of trust. Conversely, inconsistent role behavior and blurring of roles lead to a slower build of trust. According to swift trust theory, teams that establish trust early in the group life are more likely to be handle uncertainty and complexity. According to Meyerson et al. (1996) swift trust is a "product of highly active, proactive, enthusiastic, generative style of action" (p. 180). Moreover, establishment of swift trust lead to expression of enthusiasm and excitement which is maintain trust and increase collaboration.

2.3 Computer Mediated Communication

Computer mediated communication (CMC) has become one of the most widely used means for exchanging information and communicating among the humans. Various modes and media can be combined to facilitate the communication. According to framework proposed by Johansen (1992, cited in Benbunan-Fich & Hiltz, 1999), computer mediated learning can be classified in two dimensions to describe different modes of interaction: time and place. In terms of time dimension, interaction can be classified as synchronous-communication can occur at the same time and asynchronous-communication

can occur at different times. In terms of place dimension, interaction can be classified as proximate-members can meet in the same place and disperse-members can meet in different places. Electronic mail, bulletin board systems, discussion forums, and computer conferencing are all asynchronous, while IRC, audio teleconferencing, and video conferencing all take place synchronously.

Although there has been increasing sophistication of computer and synchronous communication technologies, text based asynchronous technologies which are electronic mail, electronic bulletin board systems, and chat are continue to be the common manifestation of CMC. Turoff (1990a) states that fundamental reasons for this tendency is because of the properties of asynchronous CMC including availability of 24 hours/day and in anytime/anywhere, supporting specialized communication structures, low cost relative to other conferencing technologies, and most importantly promoting collaborative learning.

Arrival of the Internet and other communication technologies enable small groups work collaboratively in an environment that is geographically and temporally dispersed through CMC. Virtual team, online team, computer mediated team are used to refer to small groups that work collaboratively through CMC. Recently, the number of virtual teams is rapidly increasing in both educational and workplace settings.

Sudweeks & Allbritton (1996) differentiate the terms collaborative communication and communication by saying that collaborative communication can be always communication; however communication cannot be always

collaborative. Their definition of the terms communication, computer-mediated communication, collaborative communication, and collaborative computer-mediated communication is presented in Table 2.2.

Table 2.2: Definitions of Terms

Communication	Communication is a process in which participants create and share information with one another to reach mutual understanding (Rogers & Kincaid, 1981).
Computer-mediated communication	Computer-mediated communication is human communication between two or more individuals through the use of central computers that store and process message content, and are connected to users in a communication network.
Collaborative communication	Collaborative communication is a process of communication in which participants share in the process of creating meaning and mutual understanding of meaning, in a shared space for a specific purpose (Schrage, 1990).
Collaborative computer-mediated communication	Collaborative computer-mediated communication is a process of collaborative communication in which participants use computer-mediated communication.

2.3.1 Social Interaction in CMC

As explained in the previous sections, group development, trust building, and group dynamics have been ongoing issues in the face-to-face group literature. Recently, CMC literature also focuses on the social interaction issues. Berge (1995) specified his opinion regarding social interaction by stating:

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Regarding social interaction, it is my assumption that a goal of distance teaching is an environment that both foster trust among the learner and the instructor and also seek to promote a cooperative and collaborative environment, allowing students to learn course materials, the instructor, and each other (p. 23).

He further noted that while some media channels promote particular interactions, other channels can hinder interaction. There are different perspectives related to social interaction in CMC: Impersonal (Cues-filtered-out), interpersonal, hyperpersonal.

2.3.1.1 Cues-filtered-out Perspective

An early perspective on social interaction in CMC, cues-filtered-out perspective, is used for the theories that accounts for antisocial and interpersonal effects of CMC (Culnan & Markus, 1987). Social presence theory, lack of social context cues hypothesis, and media richness theory are the examples for the cues-filtered-out theories. The unifying theme central to these theories is that text-based computer-mediated communication lacks non-verbal channels and social cues which make communication depersonalized and interpersonal relationships uninhibited that make trust harder to build and maintain.

Social Presence Theory. Short et al. (1976) assume that "communications media vary in their degree of Social Presence and that these variations are important in determining the way individuals interact." (p.65). They contend that when media lack channels and modes, individuals avoid interactions requiring a higher sense of social presence. Social presence is defined as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al., p. 65).

Namely, when social presence decline, interpersonal relationship are more impersonal. With its nonverbal cues and channels, CMC is acknowledged to be extremely low in social presence in comparison to face to face communication.

The social presence definition of Gunawardena and Zittle (1997) is different from the definition of Short et al. (1976) in that they focused on the impact of social presence as the degree to which a person is perceives as real in a mediated communication. Their research showed that social presence is not only the factor of the medium, but also the participants' interactions and their sense of community.

Lack of Social Context Cues Hypothesis. Sproull and Kiesler (1991) claimed that CMC is different from face to face interaction. In face to face communication cues are conveyed by the aspects of environment and individuals' nonverbal behaviors in the communication situation. However, CMC lack of social context cues. They argued that absence of social context cues in CMC reduced the impact of social norms and relationship. Therefore, conversations are more ambiguous and less socially inhibited. Moreover, in the absence of social context cues, the level of uninhibited verbal behavior increased (Siegel, Dubrovsky, Kiesler, & McGuire, 1986). In the literature, uninhibited verbal behavior is known as flaming which consists of swearing, shouting at their terminals, and groups refusing to make a group decision until a group member gave in (Siegel, et al., 1986; Sproull & Kiesler, 1986).

Media Richness Theory. Media richness theory suggests that media differ in their richness based on their bandwidth (Daft & Lengel, 1984). Theory

suggests analyzing and selecting appropriate media in order to reduce the ambiguity of communication. Daft and Lengel (1984) argue that rich media convey rich information that can resolve uncertainty at a high rate. Face-to-face communication is considered a rich media and is predicted the best choice to resolve ambiguity.

Judgment of the richness of media is based on the four criteria (Daft & Lengel, 1984): 1) the availability of instant feedback, 2) the capacity of the medium to transmit multiple cues such as body language, voice tone, and inflection, 3) the personal focus of the medium, 4) the use of natural language. As presented in the Table 2.3, synchronous media types tend to be richer than asynchronous media types.

Table 2.3: Ratings of Synchronous and Asynchronous Media Richness (Newberry, 2001)

	Media Rating		
	High	Medium	Low
Feedback	Face to Face Video Conferencing Synchronous Audio Text Based Chat	-	E-mail Threaded Discussion Asynchronous Audio
Multiple cues	Face to Face	Video Conferencing	Synchronous Audio Asynchronous Audio Text Based Chat E-mail Threaded Discussion
Message Tailoring	Face to Face	Video Conferencing Synchronous Audio E-mail	Text Based Chat Asynchronous Audio Threaded Discussion
Emotions	Face to Face	Video Conferencing Synchronous Audio Asynchronous Audio	Text Based Chat E-mail Threaded Discussion

A number of research studies examined the effects of different CMC channels on trust development. They generally showed that it is more difficult to develop trust in online environment than face to face environment.

Bos, Olson, Gergle, Olson, and Wright (2002), for example, tested effects of CMC on trust development in a social dilemma game which is "situations where the best interest of the group as a whole conflicts with the best interest of each individual, so that if each looks out only for themselves, all lose." (p. 2). They examined the effect of four CMC channels which are face-to-face, video conferencing, audio conferencing, and text chat. They found that three conditions, face-to-face, video, and audio, were significant improvements over text chat. Moreover, video and audio conferencing were almost as good as face-to face. However, they further found that both audio and video conferencing showed delayed trust-*slower progress toward full cooperation*, and fragile trust-*vulnerability to opportunistic behavior*.

Wilson, Straus, and McEvily (2000) found that trust was failed as members interacted through e-mail rather than face to face. Rocco (1998) also found that significant progress in cooperation in of face to face interaction over e-mail communication among the six member group playing social dilemma game. Taken together, literature agrees on that text-based interaction is less effective than other CMC channels.

2.3.1.2 Interpersonal Perspective

Social identity theory and de-individuation processes (SIDE) model, based on interpersonal perspective, presents alternative point of view to the early cues-filtered-out theories. Interpersonal perspective examines beyond physicality in order to understand how people build relationships in the absence of physical cues.

Social Identity Theory and De-individuation Processes (SIDE) Model.

In the SIDE model, there is a shift from individual identity to group or social identity by adhering to group norms. The SIDE model suggests that CMC reinforces existing boundaries and interpersonal attraction come from identification with group norms (Postumes, Spears, & Lea, 1998).

Lea and Spears (1995) claim that personal relationships can develop in CMC more but slowly because the lack of cues toward self-disclosure, development of trust, and communication of intimacy, take longer than in face-to-face communication. They found there can be socioemotional communication in addition to task-oriented communication.

According to their SIDE theory, analogous to swift trust theory, individuals make inferences about others on the basis of minimal information and language content of messages under these conditions (Lea & Spears, 1992). Relevant information cues either emerge from text-based discourse or individuals' communication styles.

SIDE theory argues that individuals perceive themselves as either part of the group or out of the group based on the positive and negative feelings toward members and intensified attributions of similarity. Positive similarities with others intensify group identity and members become more willingness to collaborate. In contrast to cues-filtered-out theories, lack of social and interpersonal cues produce more intense and exaggerated positive and negative impressions of communicative members depending on the social context and process.

2.3.1.3 Hyperpersonal Perspective

Like interpersonal perspective, hyperpersonal perspective is also alternative perspective to the cues-filtered-out theories. While cues-filtered-out theories argue that CMC makes communication depersonalized and interpersonal relations inhibited, hyperpersonal perspective argue that individuals make more intense attributions in CMC.

Social Information Processing Theory & Hyperpersonal Model. Social information processing theory also questions the assumptions and research findings of the cues-filtered-out theories (Walther, 1992, 1993; Walther, Anderson, Park, 1994). Social information processing term is used to describe "(individual) cognitive processing of socially revelatory information" (Walther, 1992, p. 68) which is different than definition of the Fulk, Steinfield, Schmitz, and Power (1987) that focus on the social processing of information about a medium.

Walther (1992) propose that will take longer to reduce their uncertainty about others' intentions and trustworthiness in the physical absence of cues, individuals will take longer to reduce their uncertainty about others' intentions and trustworthiness. Therefore, he proposes the long term examination of communication patterns in CMC alternative to the experimental method that is commonly used in cues-filtered-out perspective. According to Walther (1992), relational communication alters when the number of exchange increases. He argues that relational communication is different in the initial interactions than in the later interaction. Therefore, changes in relations requires more time in CMC than face to face interaction, development of relations depend on sufficient time and messages.

Walther (1996) has developed a hyperpersonal model, extends social information-processing theory, based on the SIDE model. He proposes that online communication enable more positive and intimate relationship. Because sender has control, s/he can take the advantage of communication limitations and engage in selective self-presentation by including socially favored personal and relational cues in their messages.

CMC users tend to develop impressions of others by decoding text-based cues. Namely, individuals develop individuating representations about other's personality and characteristics through accumulated messages. Receiver, in turn to sender, idealizes the image of sender by overestimating qualities in the sender.

Hyperpersonal model also addresses the affordances of the asynchronous channel. As asynchronous communication does not demand real time interaction, individuals have enough time to edit their communication and making interactions more manageable and controllable in CMC. Finally, as the stereotypes representations accumulate, individuals use more personal messages and request or give feedbacks. Consequently, feedback loop can build intensify relationship among the individuals.

2.4 Dynamic Nature of Trust in Online Environment

Numerous research studies have focus on the dynamic nature of trust in online environment.

Kanawattanachai and Yoo (2002), for instance, examined the nature of trust and its changing patterns between high and low performing four-member teams over eight-week periods. Based on the swift trust theory, they examine trust in terms of cognitive (e.g. competence, reliability) and affective (e.g. emotional connection, caring) dimensions. They found that virtual teams start same level of trust in both cognitive and affective dimension. However teams developed a higher degree of cognitive based trust than that of affective based trust. Their findings are corresponding with swift trust theory in that cognitive element is more important than affective element. Moreover, they found that high performing teams were able to develop trust during the first half of the project and maintain trust level in the second half of the project. They conclude this result as "high-performing teams were able to perform at a high level since

trust among team members facilitated the flow of knowledge and cooperation while reducing the level of uncertainty." (p.14)

The study done by Jarvenpaa and Leidner (1999) examined the question "how trust might be developed in a virtual team?". They categorized 12 virtual teams according to their initial and final level of trust. Analyses of virtual teams' e-mail messages showed that teams with initial high trust level were more socialized with other members at the beginning of the project. Their findings indicate that trust is developed swiftly based on the members' initial exchanges on background and personal information rather than based on any particular stereotypes.

Another study conducted by Crisp and Jarvenpaa (2000) examined five-member teams over eight-week period through group project. They found that teams begin with relatively high trust and it decreases over time. However, they did not examine whether high and low initial trust level teams experienced the same decreasing pattern of trust. Finding of the study is consistent with assumption of McKnight et al. (1998) that is initial trusting intention is fragile.

2.5 Variables Affecting Trust in Online Environment

Although trust may not be easy to build, it is not easy to maintain it among team members particularly in online environment. Researches have found several factors that destroy and maintain the interpersonal relations and trust in online collaboration.

Crisp and Jarvenpaa (2000), for example, examined the roles of communication and control on trust development. Findings of the study point to the fragile nature of trust. They found that initial communication was crucial to trust formation. Moreover, regular and predictable communication is obviously necessary to sustain trust, namely it is "lifeblood" of virtual teams. Furthermore, they reported that team process control is positively related to trust, namely it increases and maintain trust over time.

Another study done by Iacono and Weisbend (1997) examined the factors that affect developing and maintaining trust in virtual teams in both low and high performing teams. They measured trust level of 14 teams by coding e-mail messages for interaction initiation and responses to initiations. They found that there were more initiation and responses in the high performing teams than low performing teams. They suggested that continuous and frequent interactions maintain trust. Their results also proposed that high performing teams were more efficient in moving through the phases of project than low performing teams did. Moreover, they proposed that high performing teams were more focused on the task and they also engage in social interaction parallel to task focus. Corresponding with swift trust theory, they found that trust can be either more thin or thick over time. They found the mid-point of the project as a critical moment for accelerating or decelerating initiation-response cycles.

Another contribution done to this area was by Jarvenpaa and Leidner (1999) who conducted a study about the creation and maintenance of trust in virtual teams. They also found that the trust in virtual teams was fragile. Their

study identified various communication behaviors that built the trust among group members. They observed that while groups with low trust level were not focus on task, groups with high trust focus on the task. Moreover, task focus was found in parallel with social focus. They also highlight the importance of initial interaction. They found that high trust level was developed at the early period of the group through mix of task and social interaction and enthusiasm. Furthermore, they found that trust was higher in virtual teams that communicate predictably and gave prompt responses.

Another study done by Ishaya and Macaulay (1999) examined the factors responsible for the groups' high and low performances. Mostly in consistent with previous researches, they indicated that frequent communication, pre-categorizes messages, clearly defined task, constant feedback, commitment and keeping promise, and support of members to each other are the main features of high performance groups. On the other hand, little and infrequent communication, lack of task identification, little or no feedback, unequal distribution of communication among members, and lack of commitment are found as main features of low performing teams. Ishaya and Macaulay (1999) concluded this result by linking performance and trust by saying that "groups trust their members had high performance whereas, distributed membership had low performance" (p. 151). Furthermore, they proposed a sequential five-stage trust development model: 1) Transparent 2) Calculus 3) Predictive 4) Competence 5) Intensive. Based on these similarities between online teams in their study, they apply the proposed five-stage processes to virtual teams (see Table 2.4).

Table 2.4: Applied Model of Five-Stage Processes to Virtual Teams

Stages	Propositions	Findings
Transparent	A process that provides an unclear, doubtful and swift kind of trust between members.	The transparent process operates initially in virtual teams.
Calculus	A process in that trust is rooted in the rewards and punishments associated with a particular collaborative task.	This process was discovered too weak because of the temporary nature of virtual teams.
Predictive	A process in that trust depends on members knowing each other well.	This process can only be successful if the members know each other very well and have long-term relationship.
Competence	A process that determines the capabilities of other members to perform.	Ways of building this level of trust include; joint celebrations of interim deliverables provide positive feedback to improve participants' trust for one another.
Intensive	A process that follows from the two parties identifying with each other's common objectives and goals.	This process of trust follows from the two parties identifying with each other's goals.

Series of researches were conducted beneath the Runestone Project, sponsored by the Swedish Council for Renewal of Undergraduate Education, encompasses three year 1998-2000. Preliminary findings from Runestone 1999

project revealed that major group process problems among students in virtual teams including poor communication, member non-participation, poor leadership, lack of technical skills, procrastination, and differences in motivation (Last, Almstrum, Daniels, Erickson & Klein, 2000). Moreover, findings of the Runestone 2000 project showed that communication among all members is indeed crucial but more importantly that the timing of specific categories of communications impacts a team's performance. Furthermore, they concluded that student feedback and peer evaluations are two main factors that influence the success of a team.

There are numerous studies that identify specific characteristic exhibited by effective collaborative learning teams. Active participation, sharing of ideas, providing feedback, maintaining social climate, performance analysis and group processing, and promotive interaction were stated as important characteristics of effective online collaboration (Salmon, 2000; Soller, 2001).

Another research done by Stacey (1999) examined effects of the use of the computer-mediated group conferences on the group interaction of the students. Feedback giving & getting, providing technical and task related help, commitment to the group's expectation, flexible structure of the group roles, and posting supportive comments and sharing personal anecdotes are found as factors that help students develop online social presence and successful collaborative group process. Findings of the study support that "as the social relationships maintained online enabled the development of the trust and

emotional support that facilitated computer-mediated social conversation and provided the learners with a context and stimulus for thinking and learning."

Ragoonaden and Bordeleau (2000) identified problematic elements that can hamper collaboration between distance education students. They found that technical difficulties created a high level of frustration among the learners. Various mechanisms of collaboration such as explanations, sharing answers, negotiating an answer and peer encouragement and peer sympathy, were not present. They interpret this result as a lack of trust and norms among group member. They suggest that establishing norms of communications between partners before the collaborative tasks begin is crucially imperative. Another factor they found was the fact that some autonomous, highly independent students preferred working alone without peer interaction. They concluded this result as students are not engage in social framework.

Zafeiriou (2002) explored the issues and factors that influence the development of conflicts and lack of interpersonal relationships in online computer conferencing. He found several conditions that cause online argument including non-participation of a certain group member, division of labor, and work-orientation. He found that if there were division of labor and equal participation to the group work, the reasons for conflicts and disagreements are minimized, therefore interpersonal relationships deepen. Moreover, it was found that some groups perceived online environment as work-orientated and did not have any experience of on-line group interaction that cause relationships.

In summary, there is a growing body of research n CMC. Recently, much more attention has given to the social interaction and personal relationships in CMC.

Numerous researches examined nature of trust and interpersonal relations in online teams. Moreover, communication behaviors that build and maintain trust in were examined in collaborative computer-mediated communication. However, methods applied in existing studies are purely qualitative methods. Moreover, most researches done in business and organizational sciences and they focus on work groups rather than learning groups. Therefore, recent CMC literature has little educational research related to trust and collaborative communication behaviors. Chenault (1998), for instance, noted that for future work to study "How CMC participants manage uncertainty and build trust?"

CHAPTER 3

METHOD

This chapter presents the research questions, design of the study, participants, the case, instruments, data collection procedures and methods, data analysis procedures, and limitations of the study.

3.1 Research Questions

The purpose of the study was to explore different communication behaviors, technology beliefs and competencies, and distribution of the communication in the collaborative online teams with different trust level.

The research questions investigated in this study were:

Question 1:

What are the online groups' technology beliefs and competencies in the beginning of the study?

Question 2:

What are the online groups' social trust levels in the beginning and at the end of the study?

Question 3:

What are the online groups' group trust levels at the end of the study?

Question 4:

What is the distribution of groups' online posts?

Question 5:

What are the collaborative communication behaviors of online groups throughout the study?

3.2 Design of the Study

In this study, both qualitative and quantitative research methods were employed to collect and analyze data. Qualitative methods were used to analyze the online discussion archives and open-ended questions in the questionnaire. Quantitative methods were used to gather participants' technology beliefs and competencies and their social and group trust levels.

The research followed a multiple case study methodology that examines individuals or small groups within the specific context. For this study, case study is chosen to investigate communication behaviors of online teams across online discussions. According to Yin (1989) case study methodology is appropriate, when researcher have questions that ask "how" and "why", and when researcher does not have control over the events. Moreover, case study allows to researcher investigate a phenomenon within its real-life context.

Triangulation of the data sources and the methods was used to ensure the credibility and the trustworthiness of the findings (Patton, 1990). As outlined in the data collection methods, data were collected by using different methods and sources. Because the qualitative techniques provide a richer context of understanding for the quantitative methods, data obtained through quantitative information was checked through triangulation with the qualitative information. For example, data from the open-ended questions were analyzed and compared with the data from group trust questionnaire.

3.3 Participants

The participants of this study were 61 foreign language education preservice teachers who attended the CEIT 319-Instructional Technology and Material Development course in the fall term of the year 2002 at Middle East Technical University (METU) in Turkey. Two of them were fourth year, the rest were third year preservice teachers. 44 of the participants were female and 17 were male. Their ages range between 19 and 23. Participants' cumulative GPA's were in the range of 1.90-3.96 with a mean of 2.98. Only four of the participants had had an online learning experience before this study, but the rest of them were participating in online education for the first time. Table 3.1 shows a brief description of the participants in the study.

Table 3.1: Description of the Participants in the Study

Variables		Frequency	Percentage
Gender	Male	17	28%
	Female	44	72%
Computer usage	Never	0	0%
	Once a month and less	2	3%
	Once a week	12	20%
	Several times a week	35	57%
	Every day	12	20%
Perceived Stages of Adoption of Technology	Stage 1: Awareness	1	2%
	Stage 2: Learning the process	9	15%
	Stage 3: Understanding and application of the process	10	16%
	Stage 4: Familiarity and confidence	19	30%
	Stage 5: Adaptation to other contexts	18	30%
	Stage 6: Creative application to new contexts	4	7%

In this study purposive sampling approach was used. Since English competency for the participants was required for the study, foreign language education students were selected as participants. Because researcher was the teaching assistant of the course in the previous year and had knowledge about the format of the course, CEIT 319 course was selected for this study. Another requirement for the study was that the participants should be knowledgeable about using computers to eliminate computer training prior to the study. Before conducting this study, the participants took two courses (IS 100 and CEIT 300) related with computer literacy. CEIT 319 course is taught in four sections by two different instructors. Because of the availability, two of the sections of the

same instructor were participated in this study, one of them had 27, and the other had 34 students.

From the purposeful sampling approaches, stratified purposeful sampling technique was employed to form the online groups. Participants did not have chance to select the team members. In order to limit face to face interaction and have heterogeneous groups, fifteen teams were formed according to member's sections and GPA. The researcher identified three groups of students as above average, average, and below average in terms of their GPA in each section. Afterwards, groups were formed according to members' GPAs by selecting from two different sections. Membership descriptions of each of the online teams are presented in Appendix A.

Participants of this study worked as a team for four-month project. There were a total of fifteen online teams in two sections. Each online team was made up of four students. However, because of the participant number, one team is composed of five people. For the analysis of discussion forum archive, eight groups (Group 2, 5, 7, 8, 9, 10, 13, and 14) were randomly selected.

The researcher participated in the study as an online facilitator of each team to support teams' efforts, give them feedback on their work, offer suggestions and stimulate their thinking, make sure they stay on track. Because the facilitator was in the US, participants and the facilitator have not met face to face until the end of the project. The facilitator regularly contacted with the course instructor via e-mail and consulted instructions and talked about participants' problems and other issues that might have arisen.

3.4 The Case - Learning to Teach with Technology Studio

Learning environment for this study was Learning to Teach with Technology Studio (LTTS) that was developed at Indiana University. LTTS is a Web-based professional development system at www.ltts.org. LTTS offers a range of short and problem-centered courses to provide online learning experiences for inservice and preservice teachers. Teachers can develop projects and materials for use in their classroom. LTTS helps teachers learn to integrate technology into their teaching and use technology to support student inquiry and problem solving in the classroom.

Participants of the study enrolled the LTTS course which is "Technology and Foreign Language Learning: How can I create a technology supported project-based learning unit for foreign language learners?" (LA 301) developed by Trena Paulus.

During the LTTS online course, participants worked as a team to design a technology-supported project-based unit plan for grade 6, 7, or 8 by collaborating online. Collaborative online teams were the unit of analysis for this study. These online teams were used as cases for this research.

After participants log in with their username and password, LTTS working space called "My Desk" appears (see Figure 3.1). This working space enables them to access and manage the course, enroll in the course, access online tools for use with the course, and access high quality resources.
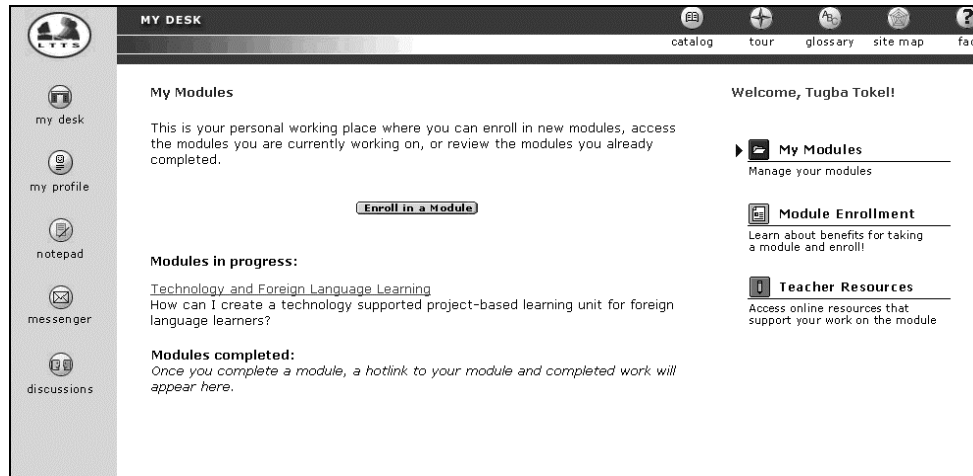
Figure 3.1: My Desk Page of the LTTS Course

There are five main areas within each LTTS course which are problem, process, resources, solution, and assessment.

The "problem" section of the course presents learners with a teaching challenge. It also includes ideas about how this challenge can be addressed throughout the course project (see Figure 3.2).
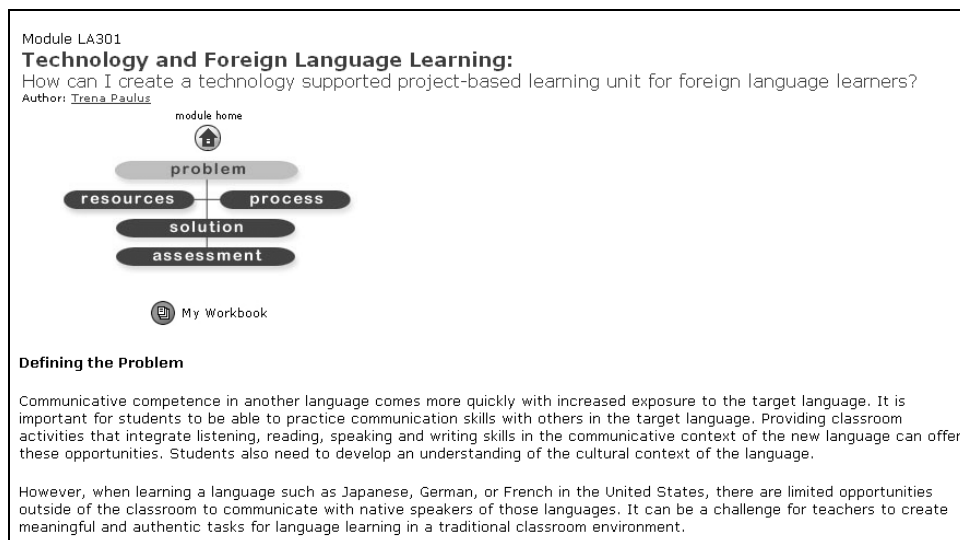
Figure 3.2: Problem Section of the LTTS Course

The "process" section of the course has six activities to help learners develop a solution to the challenge presented (see Figure 3.3). By doing each activity within the section, learners worked towards building their solution to the course challenge. The content of each activity can be accessed by clicking on the activity links at the top right of the process screen.

Figure 3.3: Process Section of the LTTS Course

The "resources" are primarily websites that aid learners in addressing the course challenge (see Figure 3.4). This section organizes all of the resources available throughout the course into one comprehensive list. Resources are also available within each activity in the process section of the course.

Figure 3.4: Resources Section of the LTTS Course

The final solution to the course challenge are created and submitted in the "solution" section (see Figure 3.5). The responses of online facilitator to the course activities help learners in developing a comprehensive solution to the course challenge. Their solution will be a product that they can use in their classroom.

Figure 3.5: Solution Section of the LTTS Course

In the "assessment" section, learners can evaluate their own work and receive feedback from a facilitator on their solution to the course challenge as a final step to completing the course (see Figure 3.6).

Figure 3.6: Assessment Section of the LTTS Course

On the course toolbar there are four LTTS tools available as shown in Figure 3.7: My Profile, Notepad, Messenger, Discussions.

Figure 3.7: Course Toolbar of LTTS Course

"My Profile" is a personalized space where learners access and update their personal profile information. "Notepad" is a personalized space where learners can keep notes while they are taking courses. "Messenger" is an internal email system that allows learners to email facilitator, any member of the team, or the entire team. "Discussion forum" was the primary place for the online team discussions. All discussion took place in English.

The facilitator set up the discussion forum so that there were private folders for each group. (METU Group 1, METU Group 2,…, METU Group 15). Only group members could be able to access their own folder. Facilitator could be able to access all groups' folder. Under each group's folder, there were discussion folders for orientation, for each activity (Activity 1, 2, 3, 4, 5, 6), and for solution as shown Figure 3.8. In orientation discussion folder, each group set their rules with their group members before starting activities. Online group discussions for each activity took place under related folder.

Figure 3.8: Folder for Each Online Team in Discussion Forum

In addition to private group folders, there were two other discussion folders that all groups could be able to access (see Figure 3.9). They were "weekly tasks" and "frequently asked questions" folders under the "METU – GENERAL" folder. Facilitator posted a message to weekly tasks folder about the task for the each week. Each participant could be able to sent messages about their questions to the frequently asked questions discussion folder. This area provided communication across different groups and participants.

Figure 3.9: METU General Discussion Folder

Online teams worked by following the timeline that was determined by the facilitator. For each activity and final product, participants worked as a team collaboratively by using discussion forum. Afterwards, group members submitted their group's work to the facilitator in order to get feedback. The facilitator assessed the participants' performance on the quality of their collaboration using the discussion forum, the quality of their thinking in the course activities, and the quality of their final project.

3.5 Instruments

Three instruments were used to collect the data: 1) Preservice teachers' technology beliefs and competencies survey, 2) Social trust questionnaire, and

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3) Group trust questionnaire. In addition to the questionnaires, groups' online discussion forum archives were analyzed according the coding schema.

3.5.1 The Preservice Teachers' Technology Beliefs and Competencies Survey

The preservice teachers' technology beliefs and competencies survey was administered at the beginning of the course in order to determine the participants' entry characteristics (see Appendix B). Questions were asked for demographics and background information as well as data describing the participants' computer and information technology beliefs and competencies. The preservice teachers' technology beliefs survey modified from different instruments and it consisted of four sections: 1) Background information, 2) Technology skills and competencies (Brush, 2000), 3) Computer and information technology beliefs (Brush, 2000; Kay, 1993), and 4) Stages of adoption of technology (Christensen, 1997).

The background information section contained 12 questions covering frequency and purpose of computer usage and previous online learning experiences.

The second section, technology skills and competencies, included 26 Likert-style items ranked on a four-point scale from "I can't do this" to "I can teach others how to do this". It covers six categories including basic operation, productivity software use, electronic communication and collaboration skills,

use of electronic references, World Wide Web utilization. For this study, the reliability coefficient was found as $\alpha = .95$ (n=61).

Computer and information technology beliefs section include two parts. First part had 12 Likert-style items regarding the integration of technology into classroom instruction on a four-point scale from "Strongly disagree" to "Strongly agree". The reliability coefficient was found as $\alpha = .87$ (n=61) for this study. Second part of the third section included Kay's semantic perception of computers (Kay, 1993). Semantic perception of computers had 10 adjective pairs with seven response blanks. The reliability of Kay's semantic perception of computers was calculated by Christensen & Knezek (1998) in another study. They found the reliability coefficient as $\alpha = .94$ (n=114). For this study, the reliability coefficient was found as $\alpha = .94$ (n=61).

The final section, stages of adoption of technology, asked participants to choose the perceived stage of the adoption of technology. Stages of adoption is a six-point scale from 1 "Awareness" to 6 "Creative application to new contexts" developed by Christensen (1997) based on Russell's (1995) stages.

3.5.2 Social Trust Questionnaire

McKnight et al. (1998) argued that individual's general predisposition toward trust can affect the individual's trust. The social trust questionnaire (Yamagishi & Yamagishi, 1994) was administrated to check the social trust levels of online groups in the beginning and at the end of the study. The questionnaire had total 13 Likert-style items - 6 general trust and 7 caution items

on a scale ranging from 1 "Strongly disagree" to 5 "Strongly agree" (see Appendix C). Yamahisgi & Yamagishi (1994) calculated the reliability coefficient for general trust separately for two different groups and found varying between α = .70 (n=206) and alpha=.78 (n=244). They found the reliability coefficient of caution items for two different groups varying between α = .72 (n=206) and α =.71 (n=244). For this study, the reliability coefficient was found for general trust items as α = .70 (n=57) and for caution items as α = .76 (n=57).

3.5.3 Group Trust Questionnaire

The group trust questionnaire was administrated to determine the level of trust in the online teams. Presented in Appendix D, group trust questionnaire has two parts. First part includes 8 Likert-style items on a five-point scale from "Strongly disagree" to "Strongly agree". They are modified by Jarvenpaa & Leidner (1999) to reflect the team-level rather than original dyadic-level items from Pearce, Sommer, Morris, & Frideger, M. (1992). Jarvenpaa & Leidner (1999) found the reliability coefficient as α =.92. For this study, the reliability coefficient was found as α= .94 (n=56). Second part of the questionnaire included 2 open-ended questions to gather the detailed information from the participants about their group trust.

3.5.4 Discussion Forum Archives Coding Schema

Curtis and Lawson (2001) coding schema, designed based on the collaborative behaviors described by Johnson & Johnson (1996) to describe

behaviors of students and to identify their online interactions, was modified and used to analyze online teams' discussion forums (see Appendix E).

There are 15 codes for behaviors including group skills, organizing work, initiating activities, advocating effort, monitoring group effort, feedback seeking, feedback giving, exchanging resources and information, sharing knowledge, challenging others, explaining or elaborating, social interaction, eagerness, facing with technical problems, and help seeking. Behaviors codes were categorized to indicate factors that deepen or fail trust. Categories used in this study were selected from the prior literature. When counting the statements for each category, group skill code was used for both leadership and enthusiasm categories. Moreover, feedback seeking and feedback giving codes were used for both task oriented interaction and feedback categories.

3.6 Data Collection Procedures and Methods

The participants of this study were involved in a four-month project in the LTTS course as a part of the CEIT 319 course. One day before the first lesson, orientation text was sent to each participant's university e-mail addresses to inform them about the study. At the first lesson of the course, course instructor explained the project and interface of the LTTS environment. Afterwards, students registered for the LTTS course LA 301: "Technology and Foreign Language Learning: How can I create a technology supported project-based learning unit for foreign language learners?". A few days later, a personalized e-mail was sent to a few participants who were not registered for the LTTS course.

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Students worked as a team for the project. Online teams were formed by the researcher from different sections to limit the face-to-face interaction. Online teams studied for the LTTS course throughout the four-month. Participants were informed at the beginning of the study that all online discussions within online teams will be archived. Throughout the course, students worked on the project and submit each activity according to timeline (see Table 3.2). After getting feedback from the facilitator, they continued to working on the next activity.

Table 3.2: Timeline

Task	Starting Date	Ending Date
Orientation	14-Oct-02	17-Oct-02
Activity 1	18-Oct-02	29-Oct-02
Activity 2	30-Oct-02	10-Nov-02
Activity 3	11-Nov-02	20-Nov-02
Activity 4	21-Nov-02	2-Dec-02
Activity 5	3-Dec-02	15-Dec-02
Activity 6	16-Dec-02	25-Dec-02
Solution	26-Dec-02	29-Dec-02

At the first lesson of the course, announcement was also sent to participants' e-mail addresses requesting that they complete the online teachers' technology beliefs and competencies survey and social trust questionnaire. After a day, personalized messages e-mailed individually to non-respondents to the surveys. No other additional notice was sent to the non-respondents not to violate the atmosphere by repeated reminders. At the end of the study group trust and social trust questionnaire were administrated in the same fashion (see Table 3.3).

Table 3.3: Data Collection Procedures

At the beginning of the study	Process		At the end of the study
Technology beliefs and competencies survey	Orientation Activity 1 Activity 2 Activity 3	Group discussion archives	Group trust questionnaire
Social trust questionnaire	Activity 4 Activity 5 Activity 6 Solution		Social trust questionnaire

3.7 Data Analysis Procedures

For the analysis, both quantitative and qualitative data analysis methods were used. Because questionnaires were completed online, all data were coded electronically. Preservice teachers' technology beliefs and competencies survey, social trust questionnaire, and group trust questionnaire were analyzed through descriptive statistical methods including percentages, frequencies, and means.

Content analyses were used to analyze qualitative data. Miles and Huberman (1994) suggested that three activities of data analysis should take place in qualitative case-study research: 1) data reduction, 2) data display, 3) conclusion drawing. Data reduction included various methods to focus, simplify, and form distinct categories of raw data. Data display comprised organizing the information within the categories. Finally conclusions were drawn to make more general conclusions rather than particular ones. Analyses of open-ended questions in the group trust questionnaire followed those three steps. First, data

were reduced and categorized according to their frequencies and then patterns were identified. Finally, general conclusions were drawn.

Both content analysis and descriptive statistical methods were used to determine the communication behaviors which deepen or fail trust. Henri (1992) proposed a method of content analysis which involves breaking messages down into unit of meaning because of the fact that a single message might contain several units of meaning. This method includes both qualitative and quantitative analyses using specific categories. It involves assigning codes to units of meaning and counting the number of items in each category. This counting technique enables analyzing data as a whole rather than referring only specific examples of the discussion. Messages in the discussion forum were arranged chronically by date and time. Later, each message was coded into statements according to coding scheme. A statement is a complete sentence or complete idea within a sentence (Hathorn & Ingram, 2002). If there was more than one statement reflecting collaborative behavior in a message, more than one code was assigned. However, only one category was assigned to each statement.

3.8 Limitations of the Study

This study has several limitations. First one is the measure of the trust. In this study, single measure of group trust was used after the completion of four-month project. It would be useful to design a pilot study. Afterwards, group trust questionnaire could be administrated both at the beginning and at the end of the project. Moreover, project duration can be longer to replicate the results.

Second one is the probability of the face-to-face communication of the students. Groups were formed according to their sections to limit face-to-face interaction and participants told that they didn't know much about their team members. Even some of them met at this project for the first time. Moreover, they acknowledged that they could not meet face-to-face because of the sections' time conflict. However, the validity of this study was limited to the truthful of the participants.

Third one is the data analysis of online discussion forum. It would be more valid if more than one person involve in coding and analyzing the discussion forum archives.

Lastly, although online teams were observed naturally, risks and rewards were grade based because participants were students. The validity of this study was limited to the honesty of the participants' responses to the instruments.

CHAPTER 4

RESULTS

In this chapter, the results of the data analysis are presented. This chapter is presented under five major sections: online groups' technology beliefs and competencies in the beginning of the study, online groups' social trust levels, online groups' group trust levels, distribution of groups' online posts, and collaborative communication behaviors

4.1 Online Groups' Technology Beliefs and Competencies in the Beginning of the Study (R.Q.1)

Preservice teacher's technology beliefs and competencies data gathered from 61 foreign language education preservice teachers- 44 female and 17 male. Means of the responses for the six subscales of the technology skills and competencies survey are presented in Table 4.1. The means represent responses on a four-point Likert scale (i.e. 1: I can't do this, 2: I can do this with some assistance, 3: I can do this independently, and 4: I can teach others how to do this). Following is the scale that is used for analyzing results of technology competencies and beliefs.

	1.75		2.5		3.25	
1	2		3			4

I can't do this | I can do this with some assistance | I can do this independently | I can teach others how to do this

Table 4.1: Technology Skills and Competencies Reponses of Online Groups with Different Trust Levels

Variables	Trust Level 1 (strongly agree level) (N=20)	Trust Level 2 (agree level) (N=29)	Trust Level 3 (unsure and disagree level) (N=12)
	Mean	Mean	Mean
Basic Operation	2.63	2.55	2.52
Productivity Software	2.56	2.57	2.24
Communication and Collaboration	3.24	3.29	2.77
Electronic References	2.48	2.49	2.45
World Wide Web	2.40	2.29	2.07

Responses of all groups with Trust Level 1, 2, and 3 on the Basic Operation were similar (M=2.63, M= 2.55, and M=2.52, respectively). Their means indicated that they felt that they can do this skill independently.

Responses of groups with Trust Level 1 and 2 were in agreement on the Productivity Software (M=2.56 and M= 2.57, respectively). However, groups with Trust Level 3 were not in agreement with other two groups (M=2.24).

While groups with Trust Level 1 and 2 felt that they can perform this skill independently, groups with Trust Level 3 felt that they can perform with some assistance.

Communication and Collaboration (Trust level 1: M=3.24, Trust level 2: M=3.29, and Trust level 3: M=2.77) is the technology skills with which they felt most competent. Their means indicated that all groups believed that they can perform Communication and Collaboration skill independently.

Responses of all groups with Trust Level 1, 2, and 3 on the Electronic References were also in line (M=2.48, M=2.49, and M=2.45, respectively). All groups did not feel confident in Electronic References. Their means indicated that they felt that they can perform with some assistance.

Lastly, all groups' technology skills and competencies on World Wide Web which they felt least comfortable were also parallel to each other. World Wide Web was ranked lowest by groups with Trust Level 1, 2, and 3 (M=2.40, M=2.29, and M=2.07, respectively). Their means indicated that all groups believed that they can perform World Wide Web skill with some assistance.

Information technology beliefs and computer attitudes are reported in Table 4.2. The means for information technology beliefs represent responses on a four-point Likert scale ranging from one (i.e. 1: Strongly disagree, 2: Disagree, 3: Agree, and 4: Strongly Agree); for computer attitudes on 10 adjective pairs with seven response blanks. Following is the scale that is used for analyzing results of the technology beliefs.

```
          1.75              2.5              3.25

1 |_____|_____2_____|_____3_____| 4
  ⌣_____⌣   ⌣_____⌣   ⌣_____⌣   ⌣_____⌣

   Strongly       Disagree        Agree      Strongly Agree
   disagree
```
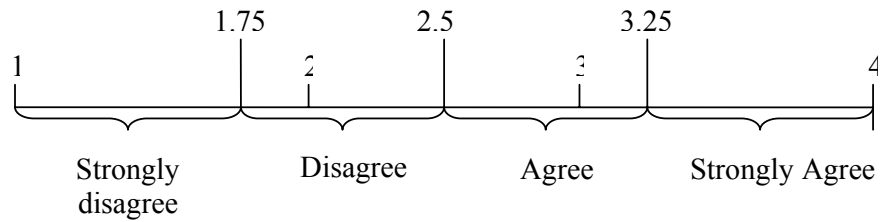
Table 4.2: Information Technology Beliefs and Computer Attitudes Reponses

of Online Groups with Different Trust Levels

	Trust Level 1 (strongly agree level) (N=20)	Trust Level 2 (agree level) (N=29)	Trust Level 3 (unsure and disagree level) (N=12)
Variables	**Mean**	**Mean**	**Mean**
Information technology beliefs	3.21	3.06	3.23
Computer attitudes	5.55	4.93	5.61

All groups agreed with the statements regarding information technology (Trust level 1: M=3.21, Trust level 2: M=3.06, and Trust level 3: M=3.23). Moreover, all groups' attitudes towards computers were positive (Trust level 1 M=5.55, Trust level 2 M=4.93, and Trust level 3 M=5.61).

4.2 Online Groups' Social Trust Levels in the Beginning and at the End of the Study (R.Q.2)

Social trust levels of online groups were calculated in the beginning and at the end of the study. As presented in Table 4.3, mean scores of the groups 4, 5, 14, and 15 decreased slightly over time. Moreover, the rest of the groups' mean scores increased. Overall mean changed from 2.93 to 3. Although there

were some changes in the social trust level of groups, all groups' level of agreement were unsure both in the beginning and at the end of the study.

Table 4.3: Pre and Post Social Trust Mean Scores of Online Groups

Online Groups	Pre Social Trust	Post Social Trust
Group 1	2.79	2.98
Group 2	3.36	3.38
Group 3	2.85	3.02
Group 4	3.27	3.16
Group 5	2.97	2.77
Group 6	2.62	2.79
Group 7	2.88	2.92
Group 8	2.64	2.82
Group 9	3.12	3.39
Group 10	2.77	3.06
Group 11	3.10	3.23
Group 12	2.75	2.85
Group 13	2.81	2.82
Group 14	3.04	2.87
Group 15	3.06	3.00
Overall Mean	2.93	3.00

4.3 Online Groups' Group Trust Levels at the End of the Study (R.Q.3)

In order to determine the level of trust in the online teams, participants answered eight questions. Mean of the group trust scores were calculated for each group. The means represent responses on a five-point scale (i.e. 1: Strongly disagree, 2: Disagree, 3: Unsure, 4: Agree, and 5: Strongly Agree). Means and trust level for online groups are presented in Table 4.4. The following scale shows the intervals used for the analysis of the results.
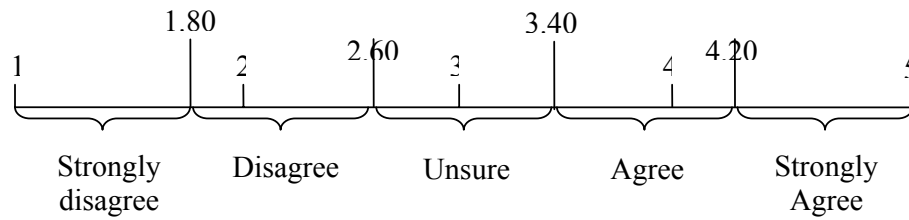
Table 4.4: Group Trust Levels of Online Groups at the End of the Study

Online Groups	Group Trust Mean	Group Trust Level
Group 1	3.59	Agree
Group 2	4.07	Agree
Group 3	4.19	Agree
Group 4	4.35	Strongly agree
Group 5	2.34	Disagree
Group 6	3.85	Agree
Group 7	4.65	Strongly agree
Group 8	3.04	Unsure
Group 9	3.19	Unsure
Group 10	4.50	Strongly agree
Group 11	4.59	Strongly agree
Group 12	4.16	Agree
Group 13	5.00	Strongly agree
Group 14	3.63	Agree
Group 15	3.75	Agree

Eight groups (Group 2, 5, 7, 8, 9, 10, 13, and 14) were randomly selected for analysis of discussion forum archives. Groups in strongly agree level were labeled as Trust Level 1, groups in agree level were labeled as Trust Level 2,

and groups in unsure and disagree level were labeled as Trust Level 3. Labeled and numbered group names are presented in Table 4.5.

Table 4.5: Trust Levels of Online Groups

Trust Level 1 (Strongly Agree)	Level 1-1	Group 10
	Level 1-2	Group 13
	Level 1-3	Group 7
Trust Level 2 (Agree)	Level 2-1	Group 14
	Level 2-2	Group 2
Trust Level 3 (Undecided & Disagree)	Level 3-1	Group 9
	Level 3-2	Group 5
	Level 3-3	Group 8

Data from the open-ended questions were compared with the data from group trust questionnaire to check the accurateness of the groups' trust level.

Open-ended questions were "Do you recall actually having to think about whether you trusted your team mates? Who? How? When? Why?"; "Did you feel that you were at risk during the study?". Analyses of the responses to the open-ended questions revealed that groups' trust levels obtained from group trust questionnaire is parallel.

The followings are the example statements of groups with different trust levels. As members of the groups with unsure or disagree level stated, some of them were not sure to trust or distrust especially at the beginning of the study. However, they ended with disagree level. Moreover, some of the members of the groups with strongly agree level were not sure to trust or distrust at the initial period of the study. However, they ended with strongly agree level. On the other hand, some of them definitely trust their team members throughout the study.

Although one of the members of group with agree level said that s/he did not trust group members, other group member with agree level was sure to trust group members.

> *"I thought at the beginning, but I understand that they do not care about anything which cause me to lose my trust"*, **Trust level 3**
>
> *"I generally do not trust them because they did not send anything on time; it was not a group work"*, **Trust level 3**
>
> *"To some extend I trust in my team members, but in fact, it is not a good group work"*, **Trust level 3**
>
> *I did not think about any of the members. They were just people whom I do not care much"*, **Trust level 2**
>
> *"I was surely trusted my group members, I was never in doubt"*, **Trust level 2**
>
> *"At the beginning of the project since I did not know my team members I felt at risk if they did not perform well. However, after a few weeks, I realized that I could trust each of them."*, **Trust level 1**
>
> *"I trusted my team members very much from the beginning of the project"*, **Trust level 1**
>
> *"No, I do not recall having to think about I do not trust my team members"*, **Trust level 1**
>
> *"In the beginning of the task I used to but later I started to trust them."*, **Trust level 1**

4.4 Distribution of Groups' Online Posts (R.Q.4)

Discussion forum was the primary place for communication. There were folders for each group under discussion forum. Under each group's folder, group members have discussion folder for orientation, for each activity (Activity 1, 2, 3, 4, 5, 6), and for solution. Total number of post in the discussion forum is presented in Table 4.6. Results showed that while Level 3-1 group had the lowest total of posting, Level 1-3 group had the highest total of posting. Moreover, Level 2-2 and Level 3-3 groups had the same number of post. However, there was an inconsistent relation among the other groups with different trust levels.

Table 4.6: Number of Posts in the Discussion Forum

Groups	Total Number of Posts in the Discussion Forum
Level 3-1	68
Level 3-2	228
Level 3-3	98
Level 2-1	127
Level 2-2	98
Level 1-1	140
Level 1-2	124
Level 1-3	270

Distribution of the communication among group members

Table 4.7 summarized the frequencies and percentages of members' contribution to the online discussions. Online teams were not expected to submit an equal number of posts. Therefore, the percentage of statements contributed

by each member was measured. Because each online team was made up of four students, it was expected that each member have one-fourth of the statements.

As observed from the Table 4.7, percentages of the posts were not close to each other among the members of Level 3-2 and Level 3-3 groups. One member of each group had half of the messages (63% and 52%, respectively). Moreover, percentages of the others' post were under the expected percentages such as 9%, 12%, 13%, 14, and 23%. In the Level 3-1 and Level 2-1 groups, two members in each group had more post than the other members (31%, 39%, and 36%, 31%, respectively). However, other two members had post less than the expected percentages of post such as 12%, 16%, 17%, and 18%. Therefore, distribution of the communication among members was not so close to each other in groups in Trust Level 3.

In the Level 2-2, Level 1-1, Level 1-2, and Level 1-3 groups, at least two members in each group had close or more post than the expected percentages of post (27%, 35%, and 23%; 24%, 25%, and 35%; 36%, 26%, and 20%; 24%, 39%). Although other members had post less than expected percentages, contributions of the group members in Trust Level 1 are relatively close to each other than that of groups in Trust Level 3. Relative contributions of members of each online group are also graphically presented in Figure 4.1.

Table 4.7: Results of Observed Percentages and Frequencies of Posts

Groups	Observed Percentages	Observed Frequencies	Groups	Observed Percentages	Observed Frequencies
Level 3-1	31%	21	Level 2-2	27 %	26
	39 %	27		15 %	15
	12 %	8		35 %	34
	18 %	12		23 %	23
Level 3-2	9 %	20	Level 1-1	24 %	32
	63 %	144		25%	34
	14 %	32		16 %	22
	14 %	32		35 %	48
Level 3-3	52 %	50	Level 1-2	20 %	25
	23 %	23		36 %	45
	12 %	12		18 %	22
	13 %	13		26 %	32
Level 2-1	36 %	45	Level 1-3	24 %	64
	17 %	22		18 %	48
	16 %	20		39 %	108
	31 %	40		19 %	50
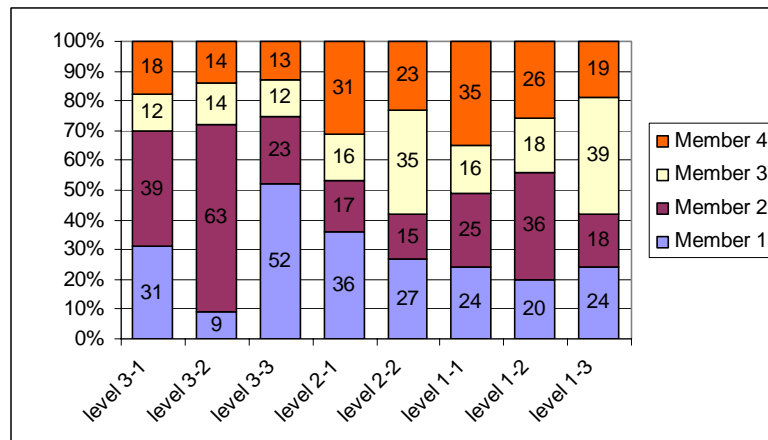
Figure 4.1: Percentages of Member's Participation in Online Discussion

68

Distribution of the communication over time

As seen in the Figure 4.2, groups in Trust Level 3 presented irregular pattern of communication. Sometimes, nobody sent anything almost for a week. For example, Level 3-1 group members did not post for 7-9-6 days, Level 3-2 group members did not post for 7-9, and Level 3-3 group members did not post for 10 days.

Groups in Trust Level 2 presented different patterns (see Figure 4.3). For example, Level 2-1 group presented irregular pattern of communication. Their members did not post for 6-8 days. On the other hand, Level 2-2 group members' communication was regular. Although they had not send anything for 7 days, that was at the end of the study.

As presented in the Figure 4.4, groups in Trust Level 1 showed regular patterns of interaction. Some members did not send post for a few days but they generally sent post to the discussion every other day.
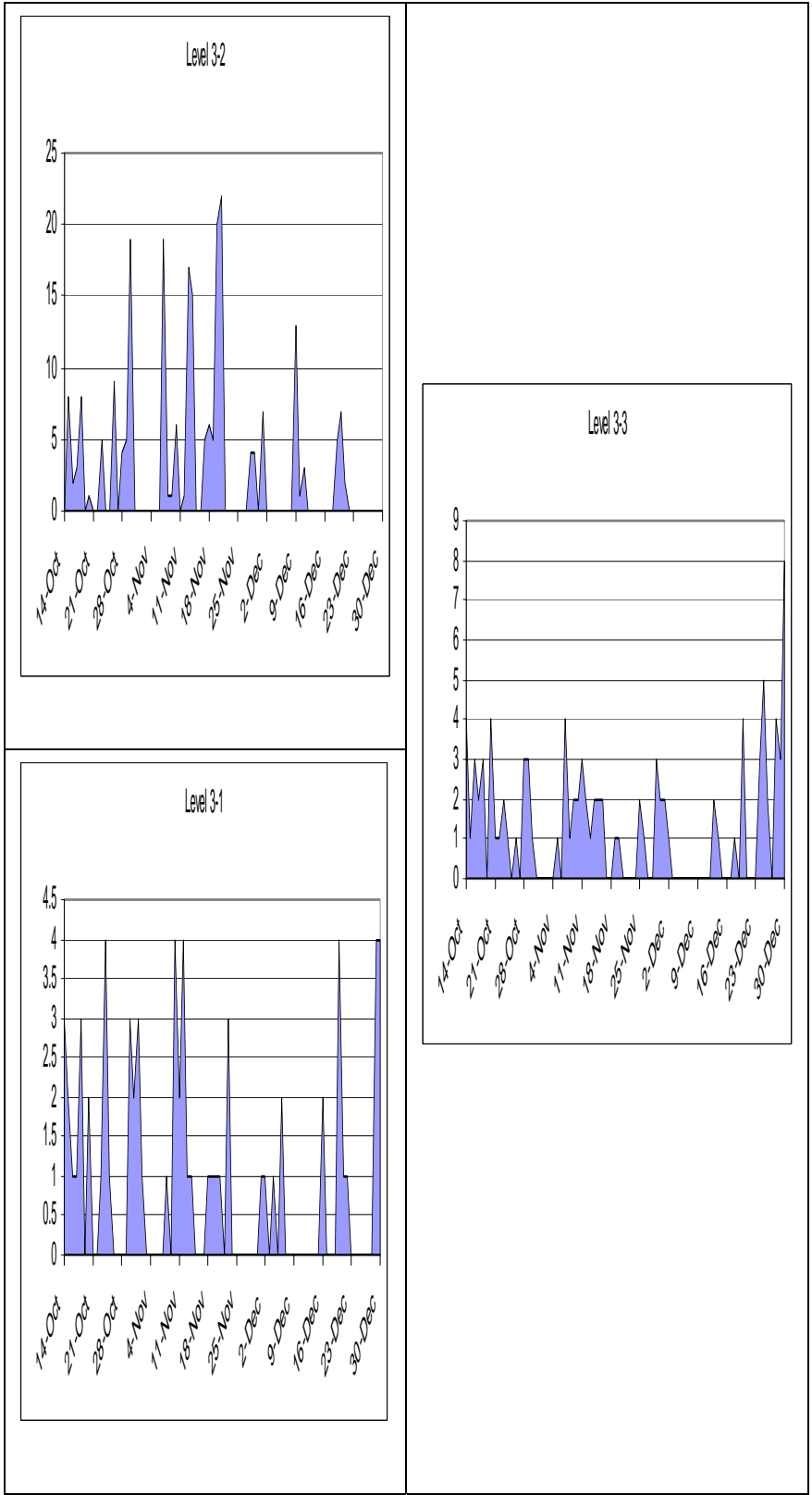
Figure 4.2: Communication Patterns of Groups in Trust Level 3
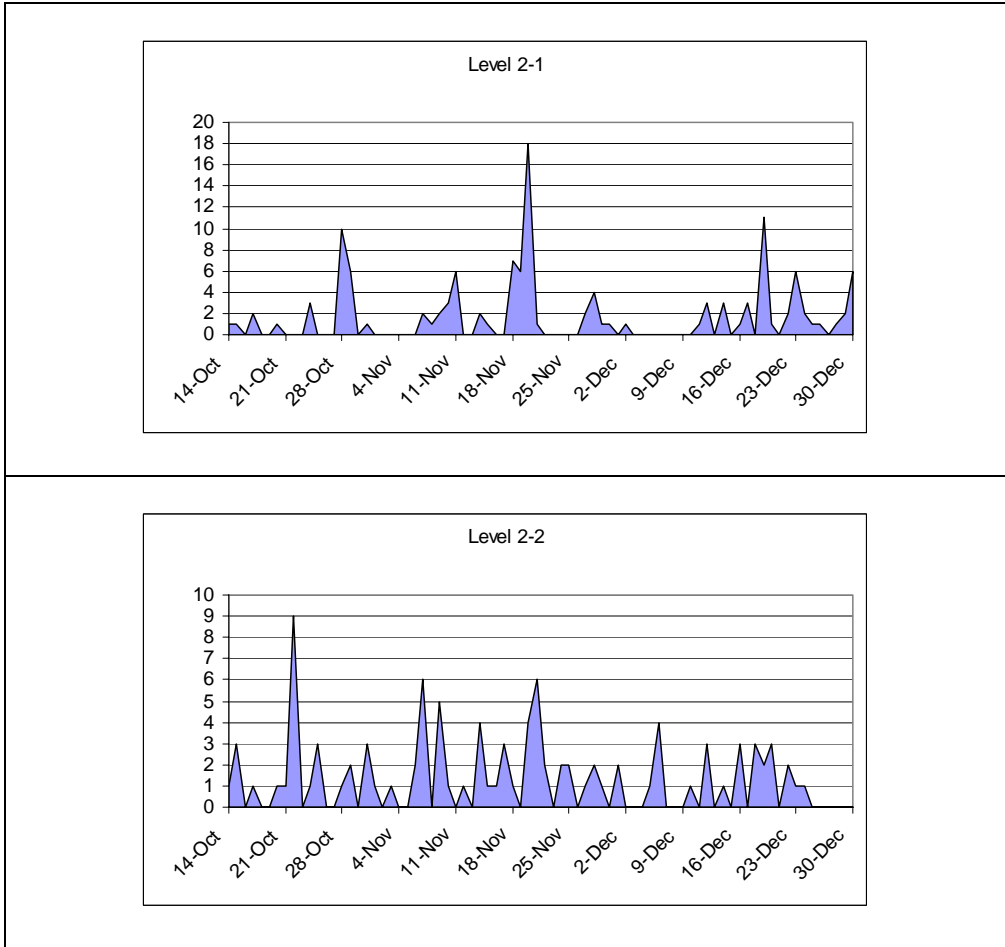
Figure 4.3: Communication Patterns of Groups in Trust Level 2
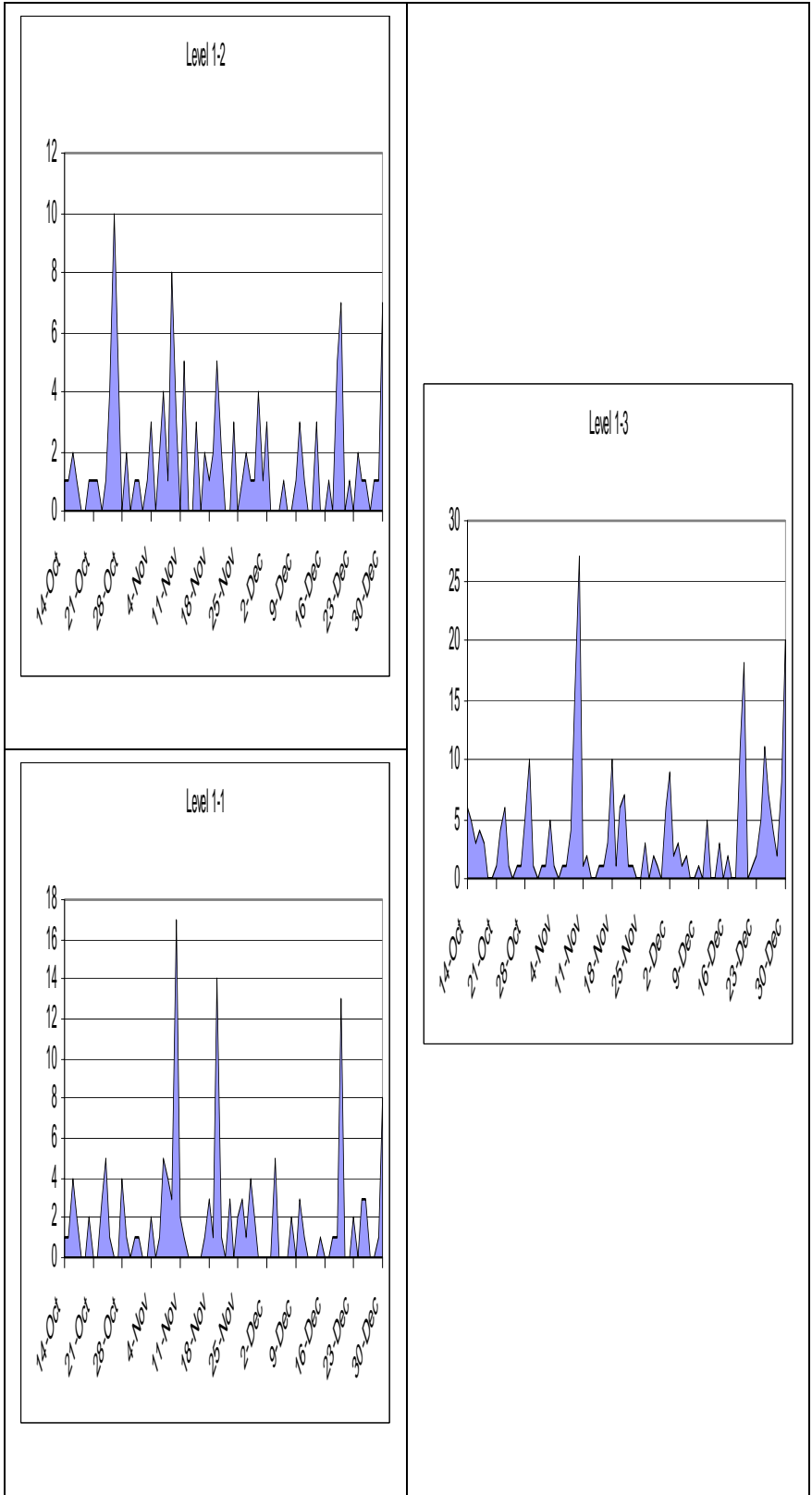
Figure 4.4: Communication Patterns of Groups in Trust Level 1

4.5 Collaborative Communication Behaviors of Online Groups throughout the Study (R.Q.5)

Content analysis of online groups' discussion archives revealed that groups with different trust levels showed certain collaborative communication behaviors throughout the study. These collaborative communication behaviors were leadership, feedback, social interaction, enthusiasm, task and technical uncertainties, and task oriented interaction. Each of the collaborative communication behaviors of online teams are presented in this section.

Gersick (1988) findings showed that teams begin with behavior in the first meetings persisted through the first half of the group working and there is dramatic change at the midpoint of group life. Behavior categories including *enthusiasm, social interaction, technical and task difficulties, task oriented interactions* were analyzed as early and later periods which were determined according to Gersick's findings. First half of the discussion was analyzed as early period and last half of the discussion was analyzed as later period.

Leadership behaviors in the online teams

The following table summarized the frequencies and percentages of leadership behaviors in online teams. As observed from Table 4.8, almost each group had one member that showed nearly or more than 50% leadership statements relative to other group members (72%, 50%, 82%, 53%, 49%, 78%, 53%, and 41%).

Table 4.8: Frequencies and Percentages of Leadership Statements

Groups	Frequencies	Percentages	Groups	Frequencies	Percentages
Level 3-1	6	19%	Level 2-2	9	23%
	23	72%		5	13%
	2	6%		20	49%
	1	3%		6	15%
Level 3-2	9	13%	Level 1-1	1	4%
	35	50%		2	7%
	12	17%		3	11%
	14	20%		21	78%
Level 3-3	33	82%	Level 1-2	2	13%
	5	12%		8	53%
	1	3%		1	7%
	1	3%		4	27%
Level 2-1	19	53%	Level 1-3	15	19%
	5	14%		15	19%
	4	11%		31	41%
	8	22%		16	21%

The followings are the examples of leadership statements in discussion forum.

*"Please do not forget that this a group work and all of us should do our best because we are studying for the same goal.", **Trust level 3***

*"Don't demoralize, the whole psychology of our group is very crucial, anyway, be calm and forget your lateness of last act.", **Trust level 1***

*"Pheeew.. I really don't know what to say. You've done it great.", **Trust level 1***

"I know it's really tough to work in that period (assignments+exams=hell).. But anyway, we gotta work somehow", **Trust level 1**

"Since we stay at different places and we are from different sections firstly we should take our telephone numbers and we should phone to each other in case we might need to communicate emergently for an activity or for a problem.", **Trust level 2**

"I think it is high time that we put an end to this and activity 1 is waiting us", **Trust level 3**

"You know we are a group and we should communicate well and in order to do this, first we should understand each other.", **Trust level 3**

"I think it is time to start to begin activity 1.", **Trust level 3**

"Hope you are fine??? I am looking forward to hearing your ideas about this project.", **Trust level 3**

"I am really waiting for your mails, friends. Please send your ideas and start discussing!!! Time is going on.", **Trust level 3**

"It is nice to see your ideas tonight, as you know today is the last day of activity", **Trust level 1**

"It seems like nobody has started Activity 6. Have you checked what it is?", **Trust level 2**

"Hi folks, I think we are gonna finish the project successfully.", **Trust level 1**

"We should never forget that we are responsible for the other members, only in that way, we can trust each other, and get the success together.", **Trust level 3**

"We should carry out our duties together. One poor person does not have to do all the job on behalf of others. This is not fair, so we will carry out the job all together and everybody has a role in the project.", **Trust level 1**

*"The most important thing is friendship. In this project, we may be unsuccessful. But we must do our best. We will see that we will learn many new things which help us in our teaching career", **Trust level 3***

*"One of our group members, …. says that the module seems complex, but I think we'll learn it step by step, and at the last step we will have created our final solution, that is our project, so being patient is also important:)", **Trust level 1***

*"Nothing so far?! Let's get started quickly because I won't be online during the weekend!", **Trust level 3***

*"Hi people! Iit seems as if you are NOT aware of the timeline? As none of you have sent anything, I had to prepare a few objectives depending on my OWN opinions. ",**Trust level 3***

*"Ok! Now that there has been no discussion at all, I think we all have to accept …'s objectives. I think two other members are not interested in this job!!!", **Trust level 3***

*"This is a group work and WE SHOULD COMMUNICATE SOMETIMES!!! Nobody has to take the responsibility of others!", **Trust level 3***

*"I didn't want to hurt your feelings, ok? I was just too aggressive about our situation and I wanted to put things a bit clearer. Look everybody, if this is a group work and if we are a group, we should stick to it. ", **Trust level 3***

Feedback behaviors in the online teams

Figure 4.5 present the percentages of feedback seeking statements (FBS) and feedback giving statements (FBG) within the groups. As observed from the figure, there are differences between groups with different trust level regarding feedback seeking and giving statements in the discussion forum throughout the study. It can be observed that, in the groups with Trust Level 3, percentages of

feedback seeking statements are either almost equal (Level 3-1: FBS=48%, FBG=52% and Level 3-2: FBS=58%, FBG=42%) or higher (Level 3-3: FBS=63%, FBG=37%) than percentages of feedback giving statements. The groups with Trust Level 2 presented different patterns. While Level 2-1 group showed more feedback seeking statements than feedback giving statement (FBS =59%, FBG=41%), Level 2-2 group presented more feedback giving statements than feedback giving statements (FBS =33%, FBG=67%).

It can be observed that, in the groups with Trust Level 1, percentages of feedback seeking statements are lower than percentages of feedback giving statements (Level 1-1: FBS=21%, FBG=79%; Level 1-2: FBS=14%, FBG=86%; and Level 1-3: FBS=33%, FBG=67%).
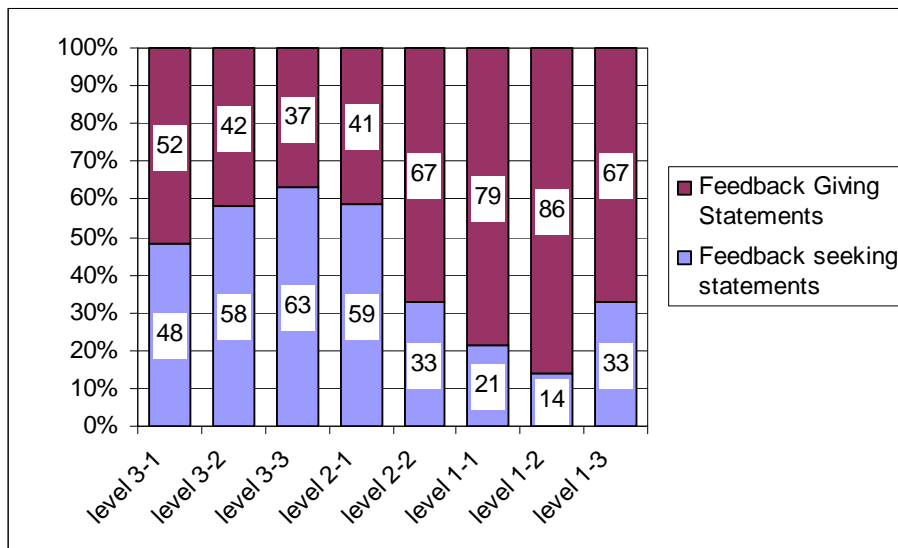
Figure 4.5: Percentages of FBS & FBG Statements in Online Teams

Table 4.9 summarizes the frequencies and percentages of FBS and FBG between the groups. As observed from the table, percentages of the FBG in

groups with Trust Level 1 (Level 1-1: 13%, Level 1-2: 20%, Level 1-3: 32%) are relatively higher than those in groups with Trust Level 3 (Level 3-1: 6%, Level 3-2: 4%, Level 3-3: 6%). One of the groups in Trust Level 2 had more FBG statements similar to the groups in Trust Level 1 (Level 2-2: 13%), other group had not many FBG statements similar to the groups in Trust Level 3 (Level 2-1: 6%).

On the other hand, FBS statements did not show the same pattern. Comparing to Level 1-3 group, FBS statements are very low in the rest of the groups ranging from 6% - 18%. Frequencies of FBS and FBG statements are also graphically presented in Figure 4.6.

Table 4.9: Frequencies and Percentages of Feedback Statements

	Frequency of FBS Statements	Percentage of FBS Statements	Frequency of FBG Statements	Percentage of FBG Statements
Level 3-1	13	9%	14	6%
Level 3-2	14	10%	10	4%
Level 3-3	26	18%	15	6%
Level 2-1	20	14%	14	6%
Level 2-2	15	10%	31	13%
Level 1-1	9	6%	33	13%
Level 1-2	8	6%	49	20%
Level 1-3	39	27%	80	32%
Total	144	100%	246	100%
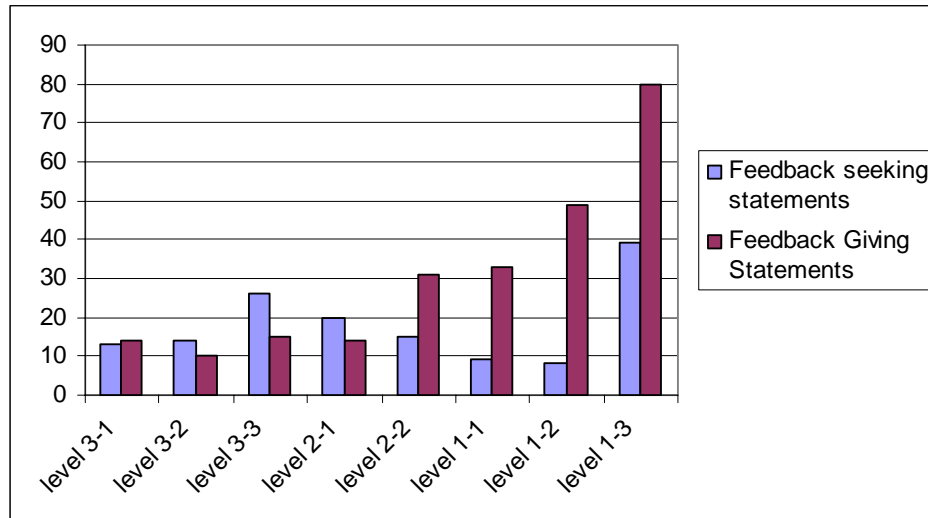
Figure 4.6: Frequencies of FBS & FBG Statements in Online Teams

The followings are the examples of feedback seeking and feedback giving statements in discussion forum.

"I think it is better to choose a grammar topic. What do you think?" FBS, **Trust level 3**

"What do you think about portfolio-assessment? Can it be appropriate?" FBS, **Trust level 2**

"What about your ideas about the scope of our project and our students' roles in this project?" FBS, **Trust level 3**

"Hi friends I have prepared something as an introduction to the final work but I am sure there are some missing parts. Could you please add the parts I have forgotten to put?" FBS, **Trust level 2**

"I read the related pages about the websites criteria and found the ideas of ... very well about the rationale and the usage of the site..." FBG, **Trust level 3**

"I agree with what ... said about group special tests. That might be a good way to evaluate the students especially while they are dealing with their role plays" FBG, **Trust level 3**

"...... I have read your ideas about assessment. It's good to divide assessment part into three as self-assessment, process assessment and product assessment." FBG, **Trust level 1**

"Friends I am waiting for your comments about my suggestion." FBS, **Trust level 1**

"I agree with the rationale part about the grades of the students, the prerequisite knowledge needed and the topic "if clauses" with my friend ...." FBG, **Trust level 3**

"I have noticed that you omitted the topic 'wish clauses'. It is very good decision to omit it because 'wish clauses' does not have any subtopics" FBG, **Trust level 3**

"I liked your ideas, ... As you also mentioned we aim our students to be able to communicate by using the target language, so they should always interact with other learners to share their knowledge, or problems." FBG, **Trust level 2**

"Hi friends I have also finished looking at all projects and I liked .... suggestion. Especially the opportunity of interacting with students from another country and making the students to work also outside the class are good ideas" FBG, **Trust level 2**

"...... I think you are right that we should limit the countries. Your suggestions are really wonderful" FBG, **Trust level 1**

"You are right ......I think students should be 8 grade intermediate level and topic is modals." FBG, **Trust level 1**

"I agree with ... but with some additional points..." FBG, **Trust level 1**

Regarding the participants' responses gathered from open-ended questions, some of the students criticized their friends about sending little or no feedback and they stated that it caused their trust. One of the students from group with Trust Level 2 said: "I felt this feeling a lot since I was sending my ideas and I was not taking any feedback or related answers most of the time. As I did not want to send the ideas that are only my own, I had to wait for the last date of the activities." Moreover, some of the students talked about importance of getting feedback. One student from group with Trust Level 2 said: "Once, I had to think about whether I could trust my teammates in sharing my extra opinion with them, afterwards, some of them gave a positive respond that make me trust them." Another student from group with Trust Level 1 stated the importance of timely and expected responses: "I always knew that they would reply to my each mail."

Social interaction in the online teams

Table 4.10 summarizes the frequencies and percentages of early and later social interaction (SI) statements between the groups. As observed from the table, there are differences among groups in Trust level 3 regarding social interaction throughout the study. While there are not any SI statements in Level 3-1 group (0%), percentages of the SI statements are relatively high in the Level 3-2 and Level 3-3 groups (13% and 18%, respectively) in the early period of the group life. While SI statements in Level 3-1 group (4%) increased, SI statements in Level 3-2 and Level 3-3 groups (4% and 2%, respectively) decreased in the

later period of the group life. Although statements in Level 3-1 group increased, it is still relatively low.

Groups in Trust Level 2 showed similar patterns. As observed from the table, there are not any SI statements in Level 2-1 (0%); there are less SI statements in Level 2-2 (2%). However, both of the groups' SI statements increased in the later period of the group life (17% and 14%).

Like groups in Trust Level 3, groups in Trust Level 1 showed different social interaction patterns in the early period of the collaboration. While there is less SI statements in Level 1-1 group (4%), percentages of the SI statements are high in the Level 1-2 and Level 1-3 groups (16% and 47%, respectively). Although percentage of SI statements in Level 1-3 group decreased in the later period of the group life, it is relatively high (21%). SI statements of Level 1-1 and Level 1-2 groups increased over time (23% and 18%, respectively). Frequency changes of SI statements are also graphically presented in Figure 4.7.

Table 4.10: Frequencies and Percentages of Social Interaction Statements

	Early Period		Later Period	
	Frequency of SI Statements	Percentage of SI Statements	Frequency of SI Statements	Percentage of SI Statements
Level 3-1	0	0%	2	4%
Level 3-2	6	13%	2	4%
Level 3-3	8	18%	1	2%
Level 2-1	0	0%	9	17%
Level 2-2	1	2%	7	14%
Level 1-1	2	4%	12	23%
Level 1-2	7	16%	9	18%
Level 1-3	21	47%	11	21%
Total	45	100%	53	100%
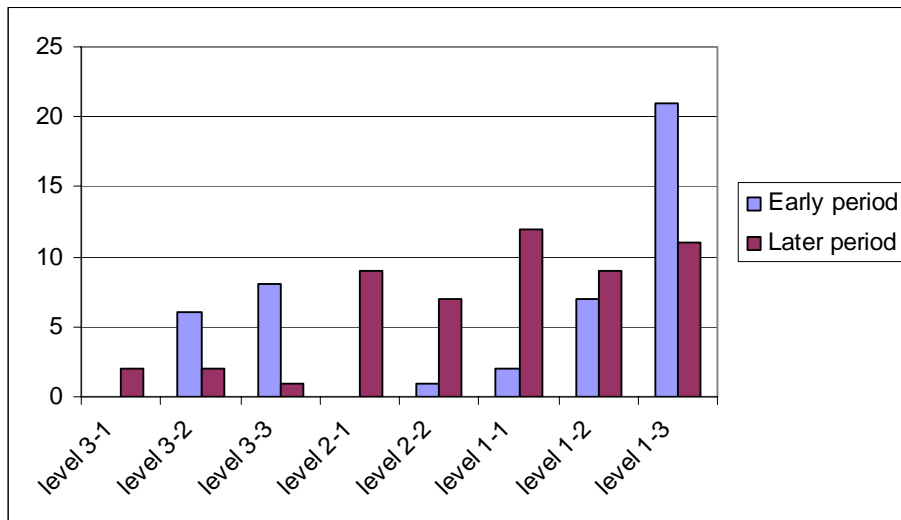
Figure 4.7: Frequencies of Social Interaction Statements in Online Teams

The followings are the examples of social interaction statements in discussion forum.

Tomorrow night, I am going to my hometown for bairam holiday. Have a good holiday with your family!!:)", **Trust Level 3**

"Have patience with the heavy work load. Think about the holiday and by the way take pleasure of the beautiful scenes of the campus and Ankara. Everywhere white worth to see. Do not miss that.", **Trust Level 3**

"Take care and good luck in your exams", **Trust Level 3**

"I'm sending this last final work.. have a nice holiday!", **Trust Level 2**

"I have 3 exams and 2 more projects plus that LES examination :(", **Trust Level 3**

"Happy new year to you all", **Trust Level 2**

"Happy new years to you ! :)", **Trust Level 2**

"Have good holiday take care don't return ill here", **Trust Level 1**

"Happy new year friends! I hope everything will be good for all of us in 2003 :)", **Trust Level 1**

"By the way I forgot to send you my wishes about the new year. Although it is late, I want to say something. I wish 2003 will be a happy, healthy and successful year for all humanity. I hope there will be no wars but more peace.", **Trust Level 1**

"I am going away now. Have a good sleep.", **Trust Level 1**

"Hi sorry for not participating because I had a presentation today", **Trust Level 1**

"Take care, it is becoming cold day by day SI", **Trust Level 1**

> *"Anyway do u know why …. does not participate hopefully she is well"*, **Trust Level 1**
>
> *"I went to my hometown again because of my father' illness"*, **Trust Level 1**
>
> *"Thank you all of you good luck for your exams."*, **Trust Level 1**
>
> *"I extremely busy nowadays. I just got an exam and i'll have a presentation on friday."*, **Trust Level 1**
>
> *"I wish you a happy and healthy and a "love"ly year."*, **Trust Level 1**
>
> *"As I have a very difficult exam tomorrow I must go soon"*, **Trust Level 1**
>
> *"I am on holiday for three days in my hometown, I have a terrible ache and I do not feel good at all in fact I feel terrible"*, **Trust Level 1**
>
> *"I am sorry for you …... Have rest and get well soon"*, **Trust Level 1**

Enthusiasm in the online teams

Frequencies and percentages of early and later enthusiasm statements between the groups are presented in Table 4.11. As observed from the table, While there was less enthusiasm statements in Level 3-1 (9%), percentages of the enthusiasm statements are relatively high in Level 3-2 and Level 3-3 groups (21% and 19%, respectively) in the early period of the group life. Enthusiasm statements in Level 3-1, Level 3-2, and Level 3-3 groups (0%, 9%, and 3%, respectively) decreased over time. In summary, all groups in the Trust Level 3 showed little enthusiasm statements in the later period of study.

There were less enthusiasm statements in Level 2-1 and Level 2-2 groups in the early period (2% and 6%). Although percentage of the enthusiasm

statements of Level 2-2 group (32%) increased over time, it remains almost same in Level 2-1 group (3%).

Like groups in Trust Level 3, groups in Trust Level 1 presented different enthusiasm patterns in the early period of the collaboration. While there is little enthusiasm statements Level 1-1 group (4%), percentages of the enthusiasm statements are high in Level 1-2 and Level 1-3 groups (11% and 28%, respectively). Enthusiasm statements in Level 1-1 and Level 1-2 groups (23% and 16% respectively) increased in the later period of the group life. Although percentage of enthusiasm statements in Level 1-3 group decreased in the later period of the group life, it is relatively high (23%). In summary, all groups in the Trust Level 1 end working enthusiastically. Frequency changes of enthusiasm statements are also graphically presented in Figure 4.8.

Table 4.11: Frequencies and Percentages of Enthusiasm Statements

	Early Period		Later Period	
	Frequency of Enthusiasm Statements	Percentage of Enthusiasm Statements	Frequency of Enthusiasm Statements	Percentage of Enthusiasm Statements
Level 3-1	4	9%	0	0%
Level 3-2	10	21%	3	9%
Level 3-3	9	19%	1	3%
Level 2-1	1	2%	1	3%
Level 2-2	3	6%	10	32%
Level 1-1	2	4%	7	23%
Level 1-2	5	11%	5	16%
Level 1-3	13	28%	7	23%
Total	47	%100	34	%100
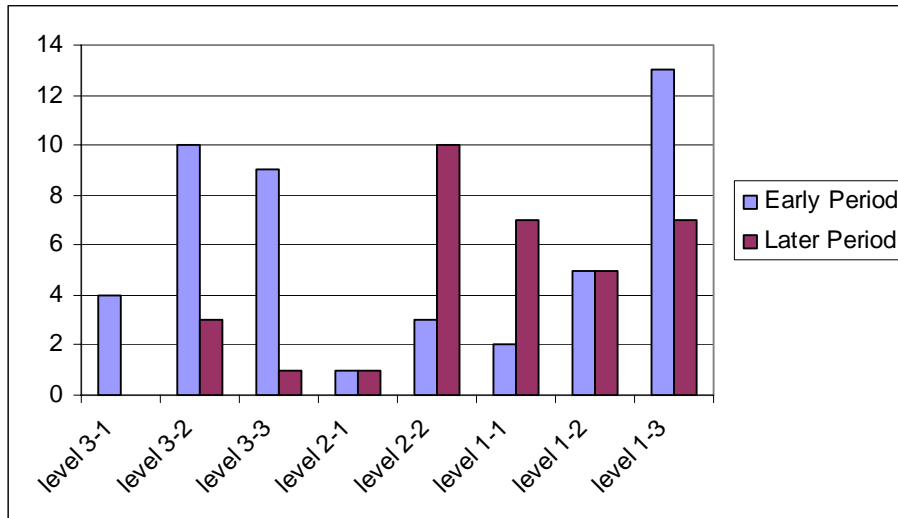
Figure 4.8: Frequencies of Enthusiasm Statements in Online Teams

The followings are the examples of enthusiasm statements in discussion forum.

"Hello my dear group members, such an interesting meeting with new people seem to me very enjoyable and extraordinary.", Trust Level 1

"No matter how far we are, I will get in touch with you and present my views about this project", Trust Level 3

"I hope for the members of our project to achieve our goal in the way that is joyful and efficient", Trust Level 2

"Hope it will be an enjoyable work for all of us. Good luck :)", Trust Level 2

"The ideal group should be us and our production should be the best, though I do not know any of you.", Trust Level 3

"Yes friends, I have new and great ideas", Trust Level 2

"I just want to say that it is nice to work with you. This project has got started to be fun as we get the idea of what we are doing.", Trust Level 1

It can be concluded from the participants' responses gathered from open-ended questions that enthusiasm plays an important role to develop and maintain trust. One student from group with Trust Level 3 said: "Since they were not eager to do this project, this discouraged me from time to time." In addition, some of the students stated the value of enthusiasm. Another student from group with Trust Level 2 said: "We trusted each other but if there had not been any trust, I would not have been eager to take part in the project." The other student from group with Trust Level 1 said: "I personally trusted my group members and felt the trust my friends felt towards me. If there were less trust in our group, I would not study as much and as enthusiastically as now...."

Task and technical uncertainties in the online teams

Frequencies and percentages of task and technical uncertainties (TTU) statements between the groups are presented in Table 4.12. While there are less TTU statements in Level 3-1, Level 3-3, Level 1-1, and Level 1-2 groups (8%, 9%, 8%, and 6%, respectively), percentages of the TTU statements are relatively high in Level 3-2, Level 2-1, Level 2-2, and Level 1-3 groups (14%, 22%, 13%, and 20%, respectively)

While percentages of the TTU statements in Level 3-1, Level 3-2, and Level 3-3 groups (17%, 30%, and 11%, respectively) increased, they decreased in groups in Trust Level 1 and 2. Although percentage of TTU statements in Level 2-1 group decreased in the later period of the group life, it is relatively high (19%).

In summary, all groups in Trust Level 3 could not solve problems and ended with task and technical uncertainties at the later period of the study. However, all groups in Trust Level 1 ended working with little task and technical uncertainties. Frequency changes of TTU statements are also graphically presented in Figure 4.9.

Table 4.12: Frequencies and Percentages of TTU Statements

	Early Period		Later Period	
	Frequency of TTU Statements	Percentage of TTU Statements	Frequency of TTU Statements	Percentage of TTU Statements
Level 3-1	5	8%	6	17%
Level 3-2	9	14%	11	30%
Level 3-3	6	9%	4	11%
Level 2-1	14	22%	7	19%
Level 2-2	8	13%	2	6%
Level 1-1	5	8%	2	6%
Level 1-2	4	6%	1	3%
Level 1-3	13	20%	3	8%
Total	64	100%	36	100%
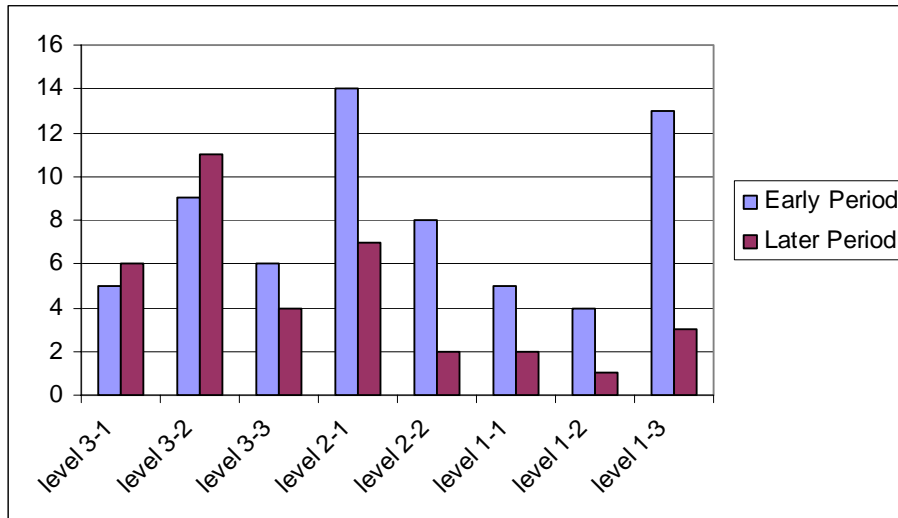
Figure 4.9: Frequencies of TTU Statements in Online Teams

The followings are the example for task and technical uncertainties statement in discussion forum.

> *"I've submitted my work today, but I don't know what to do next. When will we meet and decide on the final work?"*, **Trust Level 2**
>
> *"Let's submit the group product tomorrow at 5 although I am still not sure how to that."*, **Trust Level 2**
>
> *"You are right that it will be very difficult to make the activities, especially for me, without meeting each other, because I'm not good at computer"*, **Trust Level 2**
>
> *"Could you please tell us shortly what we will do in this activity?"*, **Trust Level 2**
>
> *"I could not understand that whether we will examine the projects that we find ourselves from the internet or there are specific addressees that have been stated or will be stated for us. If any one of you knows it please write it to me"*, **Trust Level 3**

> *"What do you think about the first activity? When will we start to deal with about it? How will the cooperation be?"*, **Trust Level 1**
>
> *"I want to ask something related to the project. Our ideas about activity one should be sent to the Activity 1 or orientation part?"*, **Trust Level 1**
>
> *"Hi, do we determine the features of our web sources in this activity? see you!!!"*, **Trust Level 1**
>
> *"I hate computers. I am looking forward your help and assistance"*, **Trust Level 3**
>
> *"To be honest, I do not understand what we will do exactly and how we will do them .If you have any suggestion I will be glad to hear thankssssss:))"*, **Trust Level 3**
>
> *"I have been in the lab nearly for two hours but unfortunately i cannot understand anything. I will go mad..."*, **Trust Level 1**
>
> *"I still cannot find the feedback about activity 1 so if anybody helps me about this I would be informed :(thanks"*, **Trust Level 3**

In addition to the groups' discussion folders, there was "frequently asked questions" folder that each participant could be able to access. All participants could be able to read others questions and facilitator's responses. There were 36 posts from the participants about the activities, deadlines, and technical problems. Interestingly, 19 posts were sent by only one student who was in the group with Trust Level 3.

Participants reported the uncertainties about the task and technical difficulties and uncertainties in the open-ended questions. While some groups helped each other and could manage to solve those problems, others could not.

For example one student from group with Trust Level 2 said: "Sometimes I can not understand what I have to do for the activities so I waited to take an answer from my friends and when I cannot take answer from them I feel depressed." Another student from group with Trust Level 1 said: "When I can not understand a point related with our group work or project, they help me cover it well and so I can really trust them." The other student from group with Trust Level 1 said: "Because this kind of group work is very new to us, I just felt a bit risk about the performance of the project. But when they performed well, I felt self confident". Another student from group with Trust Level 2 said: "From the very beginning of the course we trusted each other. We tried to do our best and help each other when one of us did not understand the topic and did not know what to do." As notified in the discussion, some of the student provided help that make their trust deepen. The followings are the only few examples of help providing in the discussion forum: *"If you have problems to find pc every time, please tell us. Maybe we find solutions together. This is a group work and all of us should participate actively", "...., hope it is clear now?? If not, do not worry and ask everything that comes to your mind."*

Task oriented interaction in the online teams

Frequencies and percentages of early and later task oriented interaction (TOI) statements between the groups are presented in Table 4.13. While there are less TOI statements in all groups in Trust Level 2 and 3, and Level 1-1 group from Trust Level 1, there are more TOI statements in Level 1-2 and Level 1-3 groups (23% and 18%, respectively) in the early period of the study.

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While TOI statements in Trust Level 3 groups, Level 2-1 and Level 1-2 groups decreased (5%, 7%, 9%, 8%, and 14%, respectively), they increased in Level 1-1, Level 1-3, and Level 2-2 groups (17%, 24%, and 16%, relatively). Although statements in Level 1-2 group decreased (14%), it is still higher than that of Trust Level 3 groups. Frequency changes of TOI statements are also graphically presented in Figure 4.10.

Table 4.13: Frequencies and Percentages of TOI Statements

	Early Period		Later Period	
	Frequency of TOI Statements	Percentage of TOI Statements	Frequency of TOI Statements	Percentage of TOI Statements
Level 3-1	28	8%	19	5%
Level 3-2	31	9%	26	7%
Level 3-3	39	11%	37	9%
Level 2-1	44	12%	30	8%
Level 2-2	38	10%	65	16%
Level 1-1	32	9%	68	17%
Level 1-2	64	18%	55	14%
Level 1-3	87	23%	100	24%
Total	363	100%	400	100%
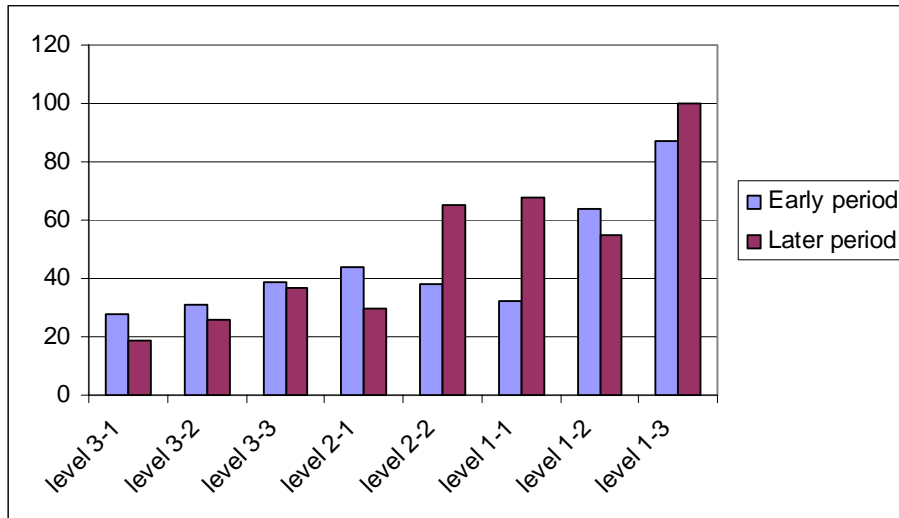
Figure 4.10: Frequencies of TOI Statements in Online Teams

It can be concluded from the participants' responses to open-ended questions that amount of task interaction could affect the trust. One student from group with Trust Level 2 said: "I thought if I can trust on (. …) because they are not as interested in the later activities as in the earlier activities." Another student from group with Trust Level 1 said: "Mostly I trusted all my team mates throughout this project as they were responsible for their task."

4.5.1 Summary of the Discussion Forum Analyses

In summary, groups with different trust level showed different collaborative communication behaviors. Groups with Trust Level 1-strongly agreement level and groups with Trust Level 3-unsure and disagreement level notably showed different communication behaviors.

Communication behaviors of one of the groups with Trust Level 2-agreement level were similar to those groups with Trust Level 1. On the other

hand, other group with Trust Level 2-agreement level showed similar communication behaviors with the groups in Trust Level 3. As their group trust score indicate, mean of the Level 2-1 group was closer to strongly agreement level, mean of the Level 2-2 group was closer to unsure or disagreement level.

Different communication behaviors observed in groups in Trust level 1 and Trust level 3 are presented in Table 4.11. Communication behaviors of groups in Trust Level 2 did not show a consistent pattern.

Table 4.14: Observed Behaviors of Online Groups with Different Trust Levels

Groups with Trust Level 3	Groups with Trust Level 1
- Little social interaction - Little enthusiasm - Less task focus - Less feedback - Ineffective leadership - Task and technical uncertainties - Unequal distribution of communication - Irregular distribution of communication	- Social interaction parallel with task focus - Enthusiasm - Feedback - Effective and positive leadership or roles for all - Coping with task and technical uncertainties - Equal distribution of communication / member support - Regular distribution of communication

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

This final chapter discusses conclusions of the study and suggests implications for practice and further research.

5.1 Conclusions

The purpose of this study was to explore the differences in the groups with different trust levels in terms of their technology beliefs and competencies, distribution of the communication, and different communication behavior patterns.

5.1.1 Technology Beliefs & Competencies of Online Teams and Trust

One of the purposes of the study was to explore the differences between groups with different trust levels in terms of their technology competencies and beliefs prior to the study. The result revealed that all groups with Trust Level 1, 2, and 3 felt confident in Basic Operation and Collaborative & Communication skills. Moreover, all groups did not feel confident in World Wide Web and Electronic References skills. However, while groups with relatively high trust level felt confident, groups in Trust Level 3 did not feel confident in Productivity Software skills. All groups also agreed with the statements

regarding information technology. Moreover, they all had positive attitudes towards computers.

The result of the study showed that other than productivity software confidence, levels of the all groups in other fields of technology competencies were close to each other indicating that previous competencies with computers did not affect their trust levels. This result of the study is consistent with the literature as Iacono and Weisband (1997) argue that neither previous experience with computers nor previous experience with electronic communication were related to trust in the online groups. Further, it is possible to say that interaction and the types of interaction may have effect on the trust levels.

5.1.2 Social and Group Trust Levels of Online Teams

The result of the study showed that even though there was a slight increase in the social trust level of online teams from the beginning to the end of the study, their level of agreement was "Unsure" both in the beginning and at the end of the study.

Although, online groups' social trust levels were not different, the result showed that there were different group trust levels among the groups at the end of the study. There were five groups in the strongly agreement level, seven groups in the agreement level, two groups in the unsure, and one group in the disagreement level.

Literature in interpersonal and organizational trust questions the existence of trust without the traditional face to face contact. For example,

Handy (1995) argued that "trust needs touch" (p. 46). Similarly, Bennis and Shepard's model (1956) also specifically referred to face to face interaction in relationship development. However, the results of this study indicate that although the groups developed their project in an online environment in this study, some of the groups came up with higher group trust levels. This showed that trust can be built in online groups. This result is consistent with the literature that is in favor of trust development in virtual settings. As stated by different authors, social relationships can be formed in a virtual setting (Ishaya & Macaulay, 1999; Jarvenpaa & Leidner, 1999, 1997)

When communication behavior patterns of participants were examined in this study, as Ishaya & Macaulay (1999) and Jarvenpaa & Leidner(1999, 1997) indicated, it can be concluded that the types of interaction or types of communication behaviors including distribution of the communication, feedback, social interaction, enthusiasm, coping with technical problems, task oriented interaction may affect trust levels of the online teams.

5.1.3 Collaborative Communication Behaviors of Online Teams and Trust

Content analysis of online groups' discussion archives showed that the groups with different trust levels showed different communication behaviors throughout the study. The result of the study revealed that certain collaborative communication behaviors should be presented by members for successful collaboration and stronger trust level in online teams. As consistent with the Gersick's (1988) findings, midpoint of the group life was found critical moment for increasing or decreasing patterns of communication behaviors. In this

section, different communication behaviors observed in online groups with different trust levels are presented.

Distribution of the communication among group members

The findings of this study showed that there is unequally distributed communication among the members of groups with strongly agree level. Some members were might have been just waiting for others rather than taking initiative and making contribution. Literature defines those people as lurker. On the contrary, groups with unsure or disagree level generally presented equally distributed communication. Each group member of those groups took initiative roles and supported other members during the study. Based on these findings, it can be stated that there is a relationship between distribution of communication and trust levels of the groups.

This result showed corresponding patterns to the literature which found equal active participation as a critical component for maintaining social climate (Last et al., 2000; Salmon 2000; Soller 2001). This result also seems to be supported by the research of the Zafeiriou (2002) who found that if there is division of labor and equal participation to the group work, the reasons for conflicts and disagreements are minimized and trust deepen.

Defining group rules might be the factor that facilitates communication among group members. Online groups in this study set group rules during the orientation period. However, most of the groups did not spend so much time to define group rules. They only expressed their own ideas, and they did not

discuss how they could deal with a member who did not obey the group rules. Defining applicable group rules and discussing them might make the members' contributions closer during the study.

Distribution of the communication over time

The result of this study showed that there was predictable communication among the members of groups with strongly agree level. Although some of those groups had less discussion post than groups with unsure or disagree level, they showed regular patterns of communication. However, communication among the members of groups with unsure or disagree level was not regular.

Based on these findings, it can be concluded that continuing, predictable, and regular communication is necessary to deepen trust. Coppola, Hiltz, and Rotter (2001) also found that predictable communication foster the later trust development. They suggest online course instructors to reinforce predictable patterns in communication to develop the trust levels of the participants.

There might be several factors affecting communication throughout the study. One of them might be the members' computer and Internet accessibility. Members logged in from different places including home, computer laboratories, and Internet cafe etc. Some participants were expressing several difficulties to access the Internet and computer in online discussions. These difficulties might affect their contributions and communication.

Another factor that affects communication might be the invisibility of the peoples in online learning environment. In online discussions, some events are invisible to other members. For example, although some participants logged in and read the messages, they may not send message to the discussion. Therefore, this may significantly affect the communication. Some groups solved this problem as sending messages not necessarily task related or feedback. They sent single messages indicating they read messages. Moreover, they informed group members about their absences and process of their work.

Leadership behaviors

The result of this study revealed that there were not differences in the groups in terms of leadership behaviors. Although there were differences in the frequencies of leadership behaviors among the groups, all of them had a leader. Differences in the trust levels might be result from other factors. One of the reasons for this result may be the effect of distribution of the communication among groups' members. As stated earlier, there was an equal and regular communications among the members of groups with strongly agree level. It can be stated that although they had a leader, all of them was initiative and there were roles for each of them. However, groups with unsure or disagreement level presented unequally distributed communication. It can be stated that in the groups who relatively had lower trust than others, members did not follow the leader, therefore their communication was not equal. One reason for not following the leader might be the ineffectiveness and negative behaviors of leader. As observed from the example leadership statements, it can be concluded

that there was negative leadership in the groups in Trust Level 3. Because, there were always complains about little communication and less participation, and negative comments about the group's processes. Moreover, there were always additional notices to urging others to contribute group effort. Those repeated reminders might violate the atmosphere. One of the participants from Trust Level 3 stated her opinion about the leader in the open-ended question that *"I sometimes got angry with … because he did not trust us."* Another participant from Trust Level 3 stated that *" … had to learn to appreciate the others' work as he is appreciated his work."* On the other hand, it can be concluded that there was positive leadership in the group in Trust Level 1. There were positive comments about the group's progress and achievement. Moreover, there were more statements that encourage group members.

In summary, although leadership may foster trust in online groups, it depends on the leadership behaviors, properties, and group structure. Leader should be in a positive and effective way. Moreover, group members should be flexible and initiative during the study. This finding is consistent with the literature in that flexible structure of the group roles fosters the collaboration process and relationship among group members in online environment (Stacey, 1999).

In the all online groups, none of the leaders were assigned intentionally rather they emerged during the study. However, because leadership behaviors may require more time, leaders could be purposively assigned to groups. Leadership problems may be solved, if some management guidelines would be

followed. For example members' roles and responsibilities in each group could be defined. Moreover, group work might be divided in a way that each member could contribute equally and take initiation. Furthermore, members' previous experiences with both technology and task could be taken into attention when defining roles and dividing work.

Feedback behaviors

The findings of this study presented that groups with strongly agree level showed more feedback giving statements than groups with unsure or disagree level. However, there were more feedback seeking statements in the groups with unsure or disagree level. It can be concluded that members of those groups could not received answer to their feedback seeking statements from their group members. This result may indicate that less feedback giving statements to those requests may result in to decrease trust level. Moreover, trust level might have been facilitated by feedback giving statements in online groups.

These results obviously present the effect of feedback on trust development in groups. As stated in the literature, peer feedback is one of the main factors that affect success of team, increase social presence and maintain social climate in the group (Last et al., Salmon, 2000, Stacey, 1999).

Group work in online environment was participants' first experience. Therefore, this might affect the feedback and communication behaviors of participants. Amount of requirement needed for the project and complexity of it were higher than some participants' expectations. Some of the groups begin

with more concern about deadlines. Moreover, time restrictions for the activities and deadlines might make those groups feel of urgency to finish on time. However, they could not send the activities on time because of the less feedback among group members in limited time. Giving sufficient time for each activity could increase the feedback levels.

Task and technical uncertainties behaviors

The result showed that all of the groups faced with task and technical uncertainties in the early period of the group life. This might be the result of their low competencies in technologies and new learning strategy in online collaboration. Although they stated their uncertainties in their private discussion forum, they did not send many posts to the frequently asked question folder that each participant could be able to access to ask technical and task related questions. Instead, participants tried to deal with problems and uncertainties in the groups. However, groups with different trust levels showed different patterns in terms of dealing with those problems. As results present, although uncertainty statements of groups with agree and strongly agree level decreased, uncertainty statements of groups with unsure and disagree level increased over time. This could be the result of member support and social interactions in the groups high on trust level. As stated earlier, members of group with unsure and disagree level could not receive enough feedback from their group members. Because of this reason, task and technical uncertainties might increase over time.

This result is also consistent in the literature as Stacey' (1999) statements. She argues that providing technical and task related help develop social presence and trust.

There might be other factors that affected task and technical uncertainties throughout the study. Group members only used the asynchronous communication. Although a few of them attempted to set-up online chat, they did not perform. Members could choose different communication tools with which they feel competent including phone, online chat, and private e-mail addresses etc. This synchronous communication could help to reduce the task and technical uncertainties. Moreover, orientation period could play critical role for decreasing the members' technical and task uncertainties.

Enthusiasm and social oriented interaction behaviors

The findings of the study showed that some of the groups began working more enthusiastically and engaged in social interaction in the early period. Some of them showed the same or increasing pattern, and they ended with relatively higher trust level than others (Level 1-2 and Level 1-3). On the other hand, some of the groups had the decreasing pattern and they ended with relatively lower trust level than others (Level 3-2 and Level 3-3). It can be concluded that although initial enthusiasm and social interaction can help built trust in the early period, it should be continuous to maintain trust.

The findings also indicated that some of the groups showed little enthusiasm and social interaction in the early period. However, some of them

presented social interaction with and without task focus in the later period. Groups who focused on task with parallel to social interaction ended with relatively higher trust level than others (Level 2-1 and Level 1-1). However, groups who show later social interaction without task focus ended with relatively lower trust level than others (Level 2-1 and Level 3-1).

It can be concluded that social interaction alone may not be enough to maintain and built trust. In addition to social interaction, task oriented interaction should take place. The results are also consistent with the findings of Walther and Burgoon (1992) that social exchanges can make groups thicker only if it is not the expense of a task focus.

Differences in social interaction and enthusiasm might be result from several reasons. Not all people may prefer working collaboratively. While some people prefer working individually, others may desire working with group. Online group member's choice of individual or group work might affect their enthusiasm and social interactions with other members.

Moreover, not all people may need the same amount of socio-emotional needs. For some members, only focusing on the task might be enough, but others may require more social interaction. Lack of non-verbal cues including gestures, emotions, and facial expressions might affect groups' relationship and social interaction, especially for those who need more socio-emotions. In the online groups, members were expressing their emotions in a variety of ways including using text-based emotions like smiley face, through case of the words,

and tone of the expressions. Group members could discuss their preferences, and they could use those ways to express themselves.

Task oriented interaction behaviors

The findings of the study showed that groups with agree and strongly agree level focused more on the task than groups with unsure or disagreement level. Considering the previous finding, it can be concluded that groups with strongly agree level managed both social and task oriented interaction throughout the study. Contrary to swift trust theory, group development models, for example TIP model, emphasize the member-support and group well-being functions as a critical component of groups. The findings support the TIP model in that social interaction plays an important role for development of trust when they faced task and technological uncertainties. Moreover, the result of the study is consistent with other group development models, for instance, Bales Equilibrium Model and Tuckman Model, which focus on both task related and socioemotional needs of the groups. It can be stated that, members of groups with unsure or disagree level may not meet their needs in regard to task related and socioemotional needs.

Members' goal might be critically important for their task oriented behaviors. Some of them might focus on grades. Therefore, they might be only doing activities because they were assigned to such a task. However, others might focus on learning and they might really want to learn. Those differences among the members might affect their task oriented interactions.

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Another reason for less task oriented communication might be the challenges that groups faced including inexperience in such a group work, and therefore less and ineffective communication, task and technical problems. These problems might distract members from their goals and affect their task focused interaction. Participants' previous experience with the task could also affect their task orientation.

5.2 Implications for Practice

Trust is very important to be satisfied from any kinds of experiences. For that reason practitioners of online learning needs to give a special attention to trust in online learning.

Despite the limitations, this study provides important insights for online team facilitation. As factors affecting online team's trust were identified, successful facilitating strategies can be derived from the study. Facilitators in online learning environment could pay attention to the development and maintenance of trust among the online team members and follow some strategies. First of all, facilitators could familiarize groups with why trust is important. In addition, they could provide an environment in that both social and task interaction can take place. Facilitators could make students interact with content and with other students. Maintaining the social interaction throughout the study is as important as creating friendly social environment. They could motivate and encourage groups to build the sense of community. Moreover, facilitators could make students define roles in the group. Therefore, distribution of the communication among group members can be closer.

Another implication of this study is for learners who participate in such a group work in collaborative computer mediated communication environment. It seems from the findings of the study that they should learn new roles and new communication patterns which are especially critical for online collaboration. Moreover, another implication may be training group members in a few-week pilot study before the working take place.

The findings of this research can also be considered and used with the design and development of computer mediated collaborative learning environments. Onsite orientation could be designed so that members' relationships could be developed at the beginning. Moreover, in addition to the task focus topics, offline topics, social interactions etc. could be discussed by creating online cafe. In addition, there could be onsite help to decrease the task and technical uncertainties. Moreover, online chat could be provided to facilitate communication.

5.3 Implications for Further Research

Although it is difficult to generalize the findings of the study because of small sample size, results do support the complimentary view of swift trust and development model of trust. Further research is encouraged to consider project duration longer with the larger sample size.

In this study, no interviews were conducted. To get deeper information about the process, focus group semi-structured interviews could be conducted. Moreover, analysis of the discussion archives should go beyond one facilitator.

Since different media affect communication in different way, future research is also encouraged to consider the brand of CMC channels, such as audio and video conferencing to examine the communication behaviors of the participants.

Group trust questionnaire was administrated only at the end of the study. Questionnaire with additional questions may be administrated at the specific phases of the study to see the changes at their group trust levels.

Future research can examine and extend the applicability of the proposed findings other disciplines and other group of students. Moreover, it is suggested to explore the impact of gender and cultural differences on trust in online environment.

To have an effective online learning environment, students should be supported both technically and academically. For that reason facilitating in online environment is a very important issue. The level and the type of support most likely affect group or individual trust levels. In the future studies, interaction between the facilitator and groups/individuals in regard to communication behaviors and trust can be examined.

Although there may be other reasons and factors which facilitate group performance and achievement, link between trust and achievement is important. As individuals' relationships and trust deepen over time, groups' performance and achievement may change in a positive way. In the future studies,

relationship between trust and achievement can be examined to see whether achievement level affect their trust level or vice versa.

Trust is a social issue. In face to face communication or face to face group work, participants may feel socially present and this may affect their trust level in positive ways. However, in online environment it may be difficult for students to be socially present. In future studies, relationship between social presence and trust in online environment can be examined to see if social presence levels of students affect their trust levels.

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APPENDIX A

Membership Descriptions of Online Groups

Online Groups		Gender	GPA	Section
Group 1	M1	male	1.9	3
	M2	female	3.26	4
	M3	male	3.96	3
	M4	female	2.70	4
Group 2	M1	female	3.23	4
	M2	female	2.69	3
	M3	female	3.83	4
	M4	female	1.99	3
Group 3	M1	female	2.05	3
	M2	female	3.66	3
	M3	female	2.74	4
	M4	female	3.21	4
Group 4	M1	male	2.11	3
	M2	female	2.75	3
	M3	male	3.66	4
	M4	female	3.19	4
Group 5	M1	female	3.18	3
	M2	male	3.62	3
	M3	male	2.30	4
	M4	female	2.80	4
Group 6	M1	male	3.17	3
	M2	female	2.35	3
	M3	female	2.76	4
	M4	female	3.59	4
Group 7	M1	female	2.77	3
	M2	female	3.14	3
	M3	male	3.56	4
	M4	female	2.38	4
Group 8	M1	female	3.52	4
	M2	female	3.09	3
	M3	male	2.75	3
	M4	male	2.56	4

Group 9	M1	female	3.42	3
	M2	female	3.13	4
	M3	female	2.86	3
	M4	male	2.58	4
Group 10	M1	female	2.58	4
	M2	female	3.06	3
	M3	female	3.37	4
	M4	male	2.90	4
Group 11	M1	male	2.93	3
	M2	female	3.35	4
	M3	female	3.05	4
	M4	male	2.61	4
Group 12	M1	female	3.02	4
	M2	male	2.63	3
	M3	female	2.94	4
	M4	female	3.33	4
Group 13	M1	female	2.97	3
	M2	female	3.01	4
	M3	male	2.63	4
	M4	female	3.31	3
Group 14	M1	female	3.01	4
	M2	female	2.66	3
	M3	female	3.00	4
	M4	female	3.30	4
Group 15	M1	female	3.14	3
	M2	female	3.00	4
	M3	female	3.28	3
	M4	female	3.01	4
	M5	male	2.96	3

APPENDIX B

Preservice Teachers' Technology Beliefs and Competencies Survey

Part II items are adapted and Part III items 1-12 are adapted from Brush (2000),

Part III items 13-22 are adapted from Kay (1993), and part IV is adapted from

Christensen (1997).

Direction: I am requesting your participation, which will involve filling out this survey which contains 4 parts. Filling out of the survey require no more than 20 minutes. The information in the study records will be kept securely. Your name will be kept confidential, and in reporting any responses, a pseudonym will be used. Thank you for your time and cooperation!

Part I: Background Information

Directions for items 1-12: Please type in your information or click an option to answer each item below.

1. First name:

2. Last name:

3. ID number:

4. E-mail:

5. Gender:

6. Age:

7. Current Class Status:

8. Current GPA:

9. How often do you use computer at dormitories, laboratories, house, etc.?

○ Never

○ About Once a month and less

○ About once a week

○ Several times a week

○ Every day

10. For which purposes do you use computer? Please list them form the most to least usage.

1. _____
2. _____
3. _____
4. _____
5. _____

11. Which of the following technology-computer related courses have you taken before?

○ CEIT 300 Grade: __

○ IS 100 Grade: __

Others specify: Course: ____Grade: __

12. Have you taken a distance education course before? ○ Yes ○ No

If yes, please indicate that how many you have taken, the subject areas, and the last time you enrolled in a Distance Education course.

Part II: Technology Skills and Competencies

Directions for items 1-26: Below is a list of technology skills and competencies. For each item, please determine your skill level and click an option. Use the key below to determine your response:

KEY:

A = I can't do this

B = I can do this with some assistance

C = I can do this independently

D = I can teach others how to do this

	Basic Operation	A	B	C	D
1	Create, save, copy & delete files; move or copy files onto hard disks or floppy disks; find files on a hard disk or a floppy disk; create folders and move files between folders				
2	Print an entire document, selected pages, and / or current page within a document				
3	Cut, paste, and copy information within and between documents				
4	Troubleshooting: When my computer freezes or an error message comes up, I can usually fix the problem				
5	Troubleshooting: I know the things to check if my computer doesn't turn on				
6	Viruses: I can use anti-virus software to check my machine for viruses				
	Productivity Software				
7	Word Processors: Use the functions of a word processor to format text (font colors and styles), check spelling / grammar				
8	Word Processors: Use advanced features of a word processor such as headers / footers, tables, insert pictures				
9	Spreadsheets: Use the basic functions of a spreadsheet to create column headings and enter data.				
10	Spreadsheets: Use advanced features of a spreadsheet (e.g. using formulas, sorting data, and creating charts / graphs)				
11	Presentation: Create a presentation using predefined templates				
12	Presentation: Create a presentation with graphics, transitions, animation, and hyperlinks				
13	Classroom Management: Use an electronic / computer grade book				

	Communication and Collaboration				
14	Email: Send, receive, open, and read email.				
15	Email: Use advanced features of email (e.g. attachments, folders, address books, distribution lists)				
16	Listservs: Subscribe to and unsubscribe from a listserv				
17	Discussion Forums: Read and reply to messages, add new topic.				
	Electronic References				
18	Searching: Use search tool to perform a keyword / subject search in an electronic databases (e.g. CD-ROM, library catalogs)				
19	Use advanced features to search for information (e.g. subject search, search strings with Boolean operators, combining searches)				
	World Wide Web				
20	Navigate the WWW using a web browser (e.g. Netscape Navigator, Internet Explorer, AOL)				
21	Use more advanced features of a web browser (e.g. creating, organizing, and using bookmarks; opening multiple windows; using reload / refresh and stop buttons)				
22	Use advanced features of a web browser (e.g. install plug-ins, download files and programs, download images)				
23	Use a search engine (e.g. Yahoo, Lycos, Google) to search for information on the Web				
24	Use a web authoring tool (e.g. Netscape Composer or FrontPage) to create basic web pages with text and images				
25	Format web pages using tables, backgrounds, internal and external links				
26	Upload web page files to a server				

Part III: Computer and Information Technology Beliefs

Directions for items 1-12: Below is a list of statements regarding computer and information technology. For each statement, please determine your level of agreement and indicate how you feel. Use the key below to determine your response:

KEY: SD = Strongly Disagree **D** = Disagree **A** = Agree **SA** = Strongly Agree

	Statement	SD	D	A	SA
1	I support the use of technology in the classroom.				
2	Using a variety of technology in teaching and learning settings are important for student learning.				
3	Incorporating technology into instruction helps students learn.				
4	Technology skills are as important as content knowledge.				
5	Technology use is a high priority for students although they still have many other needs.				
6	Student motivation increases when technology is integrated into the curriculum.				
7	Teaching students how to use technology is my job.				
8	There is enough time to incorporate technology into the curriculum.				
9	Technology helps teachers do things with their classes that they would not be able to do without it.				
10	Knowledge about technology will improve my teaching.				
11	Technology might enhance the interactions between teachers and students.				
12	Technology facilitates the use of a wide variety of instructional strategies designed to maximize learning.				

Directions for items 13-22: Choose one location between each adjective pair to indicate how you feel about computers.

Computers are:

13	unpleasant	○	○	○	○	○	○	○	pleasant
14.	suffocating	○	○	○	○	○	○	○	fresh
15.	dull	○	○	○	○	○	○	○	exciting
16.	unlikable	○	○	○	○	○	○	○	likeable
17.	uncomfortable	○	○	○	○	○	○	○	comfortable
18.	bad	○	○	○	○	○	○	○	good
19.	unhappy	○	○	○	○	○	○	○	happy
20.	tense	○	○	○	○	○	○	○	calm
21.	empty	○	○	○	○	○	○	○	full
22.	artificial	○	○	○	○	○	○	○	natural

Part IV: Stages of Adoption of Technology

Direction: Please read the descriptions of each of the six stages related to adoption of technology. Choose the stage that best describes where you are in the adoption of technology.

○	**Stage 1: Awareness** I am aware that technology exists but has not used it - perhaps I'm even avoiding it.
○	**Stage 2: Learning the process** I am currently trying to learn the basics. I am often frustrated using computers. I lack confidence when using computers.
○	**Stage 3: Understanding and application of the process** I am beginning to understand the process of using technology and can think of specific tasks in which it might be useful.
○	**Stage 4: Familiarity and confidence** I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer.
○	**Stage 5: Adaptation to other contexts** I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.
○	**Stage 6: Creative application to new contexts** I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.

Thank you for your time and cooperation!

APPENDIX C

Social Trust Questionnaire

Adapted from Yamagishi & Yamagishi (1994)

Direction: Please indicate your level of agreement with the following statements. Use the key below to determine your response:

KEY:
SD = Strongly Disagree **D** = Disagree   **U** = Unsure   **A** = Agree **SA** = Strongly Agree

	Statement	SD	D	U	A	SA
1	Most people are basically honest.					
2	No matter what they say, most people inwardly dislike putting themselves out to help others.					
3	People are always interested only in their own welfare.					
4	Most people are trustworthy.					
5	Most people are basically good and kind.					
6	There are many hypocrites in this society.					
7	In this society, one does not need to be constantly afraid of being cheated.					
8	Most people are trustful of others.					
9	One can avoid falling into trouble by assuming that all people have a vicious streak.					
10	People usually do not trust others as much as they say they do.					
11	I am trustful.					
12	In this society, one has to be alert or someone is likely to take advantage of you.					
13	Most people will respond in kind when they are trusted by others.					

APPENDIX D

Group Trust Questionnaire

Adapted from Pearce et al, 1992 (Jarvenpaa et al., 1999).

Part I - Direction for items 1-8: Please indicate your level of agreement with the following statements. Use the key below to determine your response:

KEY:
SD = Strongly Disagree **D** = Disagree **U** = Unsure **A** = Agree **SA** = Strongly Agree

	Statement	SD	D	U	A	SA
1	Members of my work group show a great deal of integrity.					
2	I can rely on those with whom I work in this group.					
3	Overall, the people in my group are very trustworthy.					
4	We are usually considerate of one another's feelings in this work group.					
5	The people in my group are friendly.					
6	There is no "team spirit" in my group.					
7	There is a noticeable lack of confidence among those with whom I work.					
8	We have confidence in one another in this group.					

Part II - Direction for items 9-10: Please type in the textbox for each item below.

9. Do you recall actually having to think about whether you trusted your team mates? Who? How? When? Why?

10. Did you feel that you were at risk during the study?

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APPENDIX E

A Coding Scheme Used to Describe Utterances in Online Collaboration

Adapted from Curtis & Lawson (2001)

Behavior categories	Codes	Description
Leadership	GS	Group skills: a generic code applied to expressions that encourage group activity and cohesiveness.
	OW	Organizing work: Planning group work; setting shared tasks and deadlines.
	IA	Initiating activities: Setting up activities such as chat sessions to discuss the progress and organization of group work.
	Ef	Advocating effort: Urging others to contribute to the group effort.
	ME	Monitoring group effort: Comments about the group's processes and achievements.
Feedback	FBS	Feedback seeking: Seeking feedback to a position advanced.
	FBG	Feedback giving: Providing feedback on proposals from others.
Task oriented interaction	RI	Exchanging resources and information to assist other group members.
	SK	Sharing knowledge: Sharing existing knowledge and information with others.
	Ch	Challenging others: Challenging the contributions of other members and seeking to engage in debate.
	Ex	Explaining or elaborating: Supporting one's own position (possibly following a challenge).

	FBS	Feedback seeking: Seeking feedback to a position advanced.
	FBG	Feedback giving: Providing feedback on proposals from others.
Social Interaction	SI	Social interaction: Conversation about social matters that is unrelated to the group task. This activity helps to 'break the ice'.
Enthusiasm	EG	Eagerness: Expressions that contain excitement and enthusiasm about group project
	GS	Group skills: a generic code applied to expressions that encourage group activity and cohesiveness.
Technical/Task uncertainties	FT	Facing/having technical problems
	HeS	Help seeking: Seeking assistance from others about task, confusing about the task.