Communication Behaviors and Trust in Collaborative Online Teams

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ABSTRACT

This study investigates preservice teachers' trust levels and collaborative communication behaviors namely leadership, feedback, social interaction, enthusiasm, task and technical uncertainties, and task-oriented interactions in online learning environment. A case study design involving qualitative and quantitative data collection and analysis was employed. The sample consisted of 32 (24 female, 8 male) 3rd year foreign language education students who enrolled in the "Instructional Technology and Material Development" course at Middle East Technical University in Ankara, Turkey. The participants were involved in a four-month online project in the 'Learning to Teach with Technology Studio' (LTTS) course at Indiana University in the US to create a technology supported project-based learning unit for foreign language learners. At the end of the fourteen-week period, the participants filled out the online Group Trust Questionnaire consisting eight five-point Likert-type items and two open-ended questions. To identify the participants' online interactions, online discussion archives of the groups were analyzed. The findings showed that the groups with different trust levels showed different communication behaviors throughout the study, and midpoint of the group life was found critical moment for increasing or decreasing pattern of communication behaviors.

Keywords

Group trust, Communication behaviors, Collaborative online teams

Introduction

With the advancements in the Internet and communication technologies, CMC has contributed to interaction among learners, and between learners and instructors in distance learning environment. Since interaction between the social environment and the individual is considered as a critical factor in facilitating learning (Dewey, 1916; Vygotsky, 1978), the use of collaborative learning in education is promoted even more today. Many studies on collaboration have shown the advantages of collaborative learning over individual learning (Johnson & Johnson, 1989). As well as supporting individualized learning, CMC environments support collaboration among distance learners.

Although there are empirical studies that show the contribution of synchronous communication technologies to student learning, they are not as effective as asynchronous communication technologies in supporting collaborative learning among learners. Asynchronous communication technologies provide students with time to think about a problem, and the opportunity to discuss possible solutions in a group independent from time and space (Hiltz, 1998). Because of their flexible and independent features, these technologies are essential for creating collaborative and cooperative distance learning environments (McIsaac & Gunawardena, 1996). Even though asynchronous communication technologies are the most common applications in current online courses (Hiltz & Wellman, 1997; Klobas & Haddow; 2000, Stacey, 1999), the field lacks the sufficient research studies that examine social interaction in online learning environments.

The term *cues-filtered-out perspective* is used to describe antisocial and impersonal communication in CMC (Culnan & Markus, 1987). In line with this perspective, s*ocial presence theory* (Short, Williams & Christie, 1976), *lack of social context cues hypothesis* (Sproull & Kiesler, 1986), and *media richness theory* (Daft & Lengel, 1984) are the main approaches that argue antisocial and impersonal communication in CMC, and they point out that media eliminate social cues. They assert that major features of CMC affect the development of relationships in online environment and result with antisocial and impersonal communication. However, Gunawardena (1995) argue that CMC "creates a unique social climate that impacts interactions and group dynamics online" (p.148).

Social presence is defined as "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al. 1976, p.65). They contend that when media lack channels and modes, individuals avoid interaction requiring a higher sense of social presence. Gunawardena and Zittle's (1997) study showed that social presence is not the only factor of the medium, but also the participants' interactions and their sense of community. According to *lack of social context cues hypotheses*, CMC is different from face-to-face interaction (Sproull & Keisler, 1991). CMC reduces the impact of social norms and relationship. According to *media richness theory,* media differ in their richness based on their bandwidth, and rich media convey rich information that can resolve uncertainty at a high rate. (Daft & Lengel, 1984).

However, Walther's (1992; 1993) *social information processing theory* declares that there is not a critical difference between computer-mediated communication and face-to-face communication in terms of capability of social information processing, and they are only different in terms of 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.

According to Jarvenpaa and Leidner (1999), the media richness and social presence theories question the possibility of relationship development and subsequently trust development in online environments. Ishaya and Macaulay (1999) defined trust as "a characteristic for collaboration where members believe in character, ability, integrity, familiarity and morality of each other" (p. 145). According to Rotter (1967, 1980), absence and presence of the trust affects the efficiency, adjustment, and even survival of any social group. Building and maintaining trust is acknowledged as necessary condition for cooperation and as a key factor for effective functioning of collaborative computer-mediated groups (Johnson & Johnson, 1975; Lewicki & Mcallister, 1998; O'Hara-Devereaux & Johansen, 1994).

Regular and predictable communication is essential to sustain trust (Crisp & Jarvenpaa, 2000). Particularly the mid-point of the project is a critical moment for accelerating or decelerating initiation-response cycles (Iacono & Weisbend, 1997). Jarvenpaa and Leidner (1999) mentioned that the trust in virtual teams was fragile. They observed that while groups with low trust were not focused, groups with high trust were focused on the task. Moreover, task focus was found in parallel with social focus. They indicated that trust was higher in virtual teams that communicate predictable and give prompt responses. Similarly, Ishaya and Macaulay (1999) mentioned that frequent communication, pre-categorized messages, clearly defined task, constant feedback, commitment, 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.

Lewicki and Mcallister (1998) contend that trust is a necessary precondition for team cohesion. Moreover, excessive trust is seen at the root of group dynamics. Some theorists claim that trust is systematically created or developed (Lewicki & Bunker, 1995). Development model of trust is closely related with the development of relationship in groups, and supports the idea that trust is built on step by step agreements among the members of group (Lewicki & Bunker, 1996). On the other hand, Meyerson, Weick and Kramer (1996) claim that trust is imported from outside rather than developed, and explain temporary groups' behaviors by *swift trust theory*. They argue that temporary group members are thrown together and developed swift trust, and quickly become productive regardless of the lack of interpersonal relationship. Unlike development model of trust, swift theory does not take into account socio-emotional need of members. Swift theory assumes that clear role division among group members lead to more rapid development of trust.

The literature in interpersonal and organizational trust argues that trust cannot exist without social context, communication, and interaction (Jarvenpaa & Leidner, 1999). Handy (1995) argues 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 could change the trust level over time.

There have been research studies in business, and organizational science literature about trust in virtual teams and their behaviors. 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 the change in group dynamics and interpersonal communication in online learning (Gunawardena, 1995). Although computer mediated collaboration is prominently used in distance education, none of the studies in educational research specifically examine the nature and development of trust in online groups. Majority of studies on virtual teams examined communication behaviors in virtual teams while different collaborative communication behaviors in groups with high and low level of trust are not dealt much. Additionally few studies investigate interaction of online collaboration and trust levels at teacher education level. Ministry of Education in Turkey has attempts to form online communities of teachers to have them share their experience through the Internet. Therefore, there is a need to explore this issue to contribute to effective implementation of collaborative learning through CMC and to the related literature. The research questions lead to this study are as follows:

1. What is the distribution of online posts of the groups at different trust levels?
2. What are the collaborative communication behaviors (*leadership, feedback, social interaction, enthusiasm*, *task and technical uncertainties, and task oriented interactions)* of online groups at different trust levels throughout the study?

Method

Design

A case study design was used in this study to investigate the group trust and communication behaviors of online teams across online discussions. Case study methodology is appropriate when the researcher has questions of "how" and "why", and does not have control over events (Yin, 1989). Moreover, case study allows the researcher to investigate a phenomenon within its real-life context. In this study both qualitative and quantitative methods were employed to collect and analyze the data. Qualitative methods were used to analyze the online discussion archives and open-ended responses in the questionnaire. Quantitative methods were used to analyze the data gathered through the questionnaire. Triangulations of the data sources and of the methods were used to ensure the credibility and the trustworthiness of the findings (Patton, 1990).

Participants

The participants were 32 (24 female, 8 male) 3rd year foreign language education students who attended "Instructional Technology and Material Development" (ITMD) course at Middle East Technical University in Ankara, Turkey. The purpose of Instructional Technology and Material Development course is to help prospective teachers gain knowledge and skills in a variety of instructional technologies, and in developing and evaluating technology based instructional materials (HEC, 1998). The participants' ages were between 19 and 23, and their cumulative GPAs were in the range of 1.90-3.96. In this study, purposive sampling approach was used. Since English competency for the study was required for this study, and the online learning environment was developed for the purpose of foreign language teaching, foreign language education students were selected as participants. Another requirement for the study was that the participants should be knowledgeable about using computers. Before conducting this study, the participants took two courses related with computer literacy during their university education. Participants were placed in teams by the instructor considering their GPAs and gender to have heterogeneous groups. Originally 63 students (15 groups) enrolled in the course. 8 groups (32 students) from Trust Level 1 (at high trust level), Trust Level 2 (at average trust level), and Trust Level 3 (at low trust level), were selected randomly for this study.

Procedures

The study participants were involved in a 15-week project in the *Learning to Teach with Technology Studio* (LTTS) course as part of the "Instructional Technology and Material Development" course (see Figure 1). Before the first session, an orientation text informing the participants about the study was sent to each participant through e-mail. At the first session of the course, the participants were provided information on the project, and an orientation was given on the LTTS environment. Then, students registered for the LTTS course LA301, "Technology and Foreign

Language Learning: How can I create a technology supported project-based learning unit for foreign language learners?" The participants were informed at the beginning of the study that online discussions within online teams would be archived. Throughout the course, the students worked on their projects consisting of 6 activities, and submitted each activity in accordance with the timeline given. After getting feedback from the facilitator, they continued to work on the next activity. The students were provided with timely feedback on their work and offered suggestions to stimulate their thinking and make sure they stay on track. At the end of 15-week period, the participants finished their projects and they filled out the online group trust questionnaire.

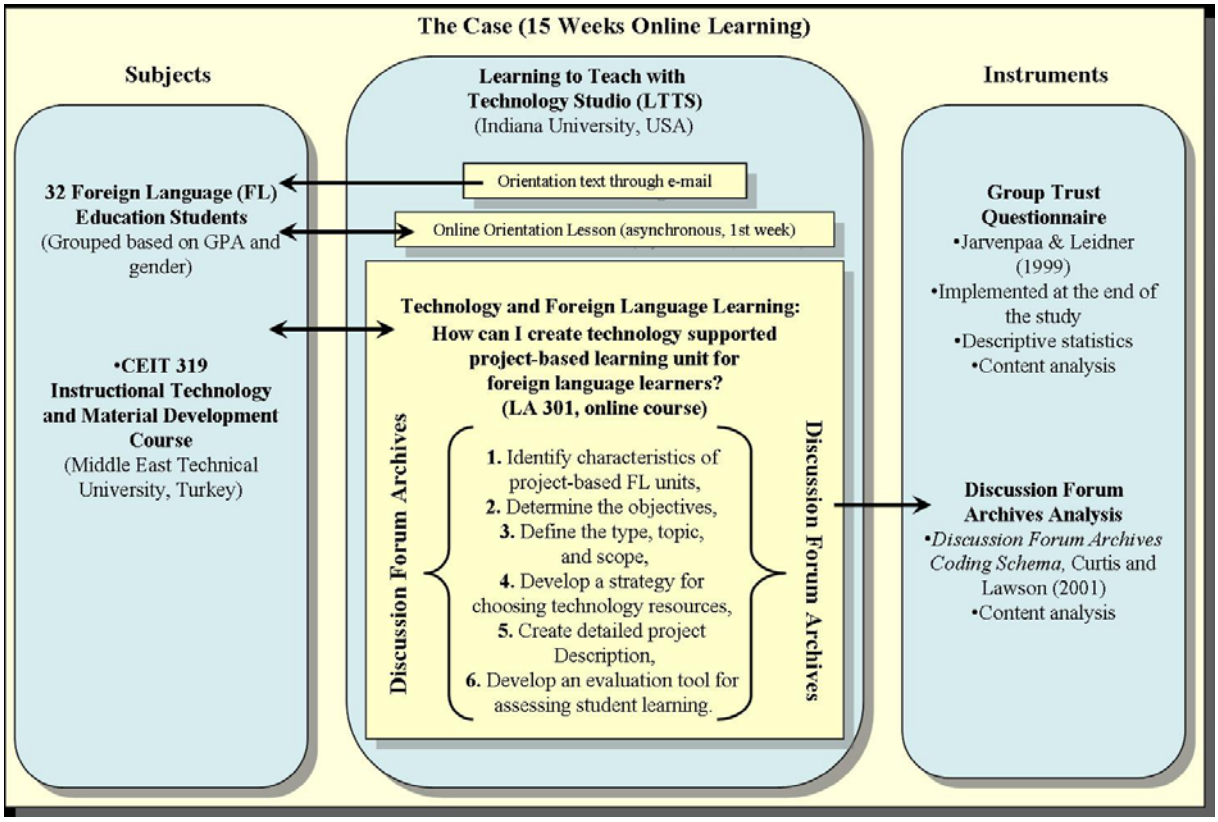

Figure 1. Procedures of the Study

The Case: Learning to Teach with Technology Studio (LTTS)

"Learning to Teach with Technology Studio" (LTTS) was developed at Indiana University in the US as a Web-based professional development system (www.ltts.org). LTTS offers a range of short and problem-centered courses to provide online learning experiences for in-service and preservice teachers. LTTS helps teachers learn to integrate technology into their teaching and use technology to support student inquiry and problem solving in the classroom. The goals of ITMD course were in line with those of LTTS. In line with ITMD course goals, the LTTS course, "Technology and Foreign Language Learning: How can I create a technology supported project-based learning unit for foreign language learner?" (LA 301) developed by Trena Paulus was integrated into this course.

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. After participants log with their username and password, they enter LTTS "My Desk" working space that enables users to access and manage the course, enroll in the course, access online tools and high quality resources.

There are five main areas within each LTTS course, *problem, process, resources, solution, and assessment*. The '***problem***' area presents learners a teaching challenge. It also includes the ideas about how this challenge can be addressed throughout the course project. The '***process***' area of the course has six activities to help learners develop a solution to the challenge presented. The '***resources***' area organizes all of the resources available for the course into

one comprehensive list. Resources are available within each activity in the process section of the course. The final solutions to the course challenge are created and submitted in the **'*solution*'** area. Preservice teachers' solutions to the challenge would be a product that they can use in their classrooms. In the '***assessment***' area, the learners can evaluate their own work, and receive feedback from the facilitator on their solutions to the course challenge as a final step to complete the course.

In the course toolbar, there are four LTTS tools available, M*y Profile, Notepad, Messenger,* and *Discussion Forum* for the online learners. '***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 a built-in e-mail system that allows learners to e-mail to the facilitator, any member of the team, or the entire team. '***Discussion Forum***' is the primary place for the online team discussions including private discussion folder for each group. Only the group members were allowed to access their own folder. Facilitator was able to access all groups' folders. Under each group's folder, there were discussion folders for orientation, for each activity (Activity 1 to Activity 6), and for solutions. In orientation discussion folder, each group set their rules with their group members before starting the project. In addition to the private group folders, there were two other discussion folders 'weekly tasks' and 'frequently asked questions' folders that all groups were allowed to access. The facilitator posted the messages to weekly tasks folder about the task for each week. Each participant was able to send messages about their questions to the frequently asked questions discussion folder. This area provided communication among different groups and all participants.

Online teams worked by following the timelines determined at the beginning of the study. For each activity and the final product, participants worked as a team collaboratively by using discussion forum. Then, group members submitted their group works to the facilitator in order to get feedback. The facilitator assessed the participants' performance on the quality of their collaboration in the discussion forum, the quality of their thinking in the course activities, and quality of their final project.

Data Collection and Analysis

Group Trust Questionnaire (Appendix A)

"Group Trust Questionnaire" was used to determine the trust levels of the groups at the end of the study. The questionnaire had two parts. The first part included 8 five point Likert-type items (5 for strongly agree and 1 for strongly disagree). They are modified by Jarvenpaa & Leidner (1999) from Pearce, Sommer, Morris and Frideger (1992) to reflect the team level. Jarvenpaa and Leidner found the reliability coefficient as .92. For this study, the reliability coefficient was found as .94. The data gathered from this part analyzed by descriptive statistics. The second part of the questionnaire included 2 open-ended questions to gather the detailed information from the participants on their group trust. The data gathered from open-ended questions were subjected to content analysis.

Discussion Forum Archives Coding Schema (Appendix B)

Curtis and Lawson (2001) coding schema, designed to assess the collaborative behaviors described by Johnson and Johnson (1996), was modified and used for this study to analyze, and identify the preservice foreign language teachers' online interactions. There were 15 codes for behaviors. In order to examine the factors that deepen or fail trust, behavior codes were categorized based on the related 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 feedback and task-oriented actions categories. The communication behaviors examined in this study are leadership, feedback, social interaction, enthusiasm, task and technical uncertainties, and task oriented interaction.

Results

At the end of the 15 weeks period, all groups created their FL technology integrated project-based unit plans in the context of LTTS online environment at satisfactory level. With this project, the students fulfilled the ITMD course requirements which were parallel to LA 301 course requirements. Below, the findings of the study were provided.

Group Trust Levels of the Groups at the end of the Study

Group trust levels of the online groups are presented in Table 1. There were three groups (M=4.50, M=5 and M=4.65) at high trust level (L1), two groups (M=3.63 and M=4.07) at average trust level (L2) and three groups (M=3.19, M=3.04 and M=2.34) at low trust levels (L3).

Table 1. Group Trust Levels of Online Teams at the End of the Study

Group Trust Levels	Online Groups	N	Group Trust Mean
Trust Level 1 (L1)	L1-1	4	4.50
(High Trust Level)	L1-2	4	5
Strongly Agree	L1-3	4	4.65
Trust Level 2 (L2)	L2-1	4	3.63
(Average Trust Level) Agree	L2-2	4	4.07
Trust Level 3 (L3)	L3-1	4	3.19
(Low Trust Level)	L3-2	4	3.04
Undecided and Disagree	L3-3	4	2.34

The findings from the open-ended questions were compared with the findings from the group trust questionnaire to check the accurateness of the groups' trust levels. The open-ended questions asked in the questionnaire were "Do you really recall having to think about whether you trusted your team mates?" "Did you feel that you were at risk during the study?" Analysis of the responses to the open-ended questions revealed that groups' trust levels obtained from trust questionnaire were parallel.

The followings are the example statements of groups with different trust levels.

> "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." L1
> "I did not think about any of the members. They were just the people whom I do not care much." L2
> "I thought at the beginning, but I understood that they do not care about anything which cause me lose my trust." L3

Table 2. Distribution of Groups' Online Posts

Level 1	Number of Posts	%	Level 2	Number of Posts	%	Level 3	Number of Posts	%
L1-1	32	24%	L2-1	45	36%	L3-1	21	31%
	34	25%		22	17%		27	39%
	22	16%		20	16%		8	12%
	48	35%		40	31%		12	18%
Total	**140**		**Total**	**127**		**Total**	**68**	
L1-2	25	20%	L2-2	26	27%	L3-2	50	52%
	45	36%		15	15%		23	23%
	22	18%		34	35%		12	12%
	32	26%		23	23%		13	13%
Total	**124**		**Total**	**98**		**Total**	**98**	
L1-3	64	24%				L3-3	20	9%
	48	18%					144	63%
	108	39%					32	14%
	50	19%					32	14%
Total	**270**					**Total**	**228**	

Majority of the group members at L3 stated that some of them were not sure to trust or distrust especially at the beginning of the study. However, they ended with low trust level at the end of the study. Moreover, some members of the groups at L1 were not sure to trust or distrust at the initial period of the study, and they ended with high trust. On the other hand, some of them at L1 level definitely trusted their team members throughout the study.

Distribution of Groups' Online Posts

Total number of posts in the discussion forum for each group, and frequencies and percentages of group members' contribution to the online discussions are presented in Table 2. Results showed that while L3-1 group had the lowest total posts, L1-3 group had the highest total of posts. However, there was an inconsistency in other groups' posts numbers with different trust levels. The members of the groups have different number of posts and in most groups there were dominant members in regard to number of posts. When distribution of communication examined over time, while L1 groups presented regular pattern of communication over time, groups at L3, and L2-2 group at L2 presented irregular patterns of communication.

Collaborative Communication Behaviors of Online Groups

Content analysis of online groups' discussion archives revealed that groups with different trust levels showed certain collaborative communication behaviors such as *leadership, feedback, social interaction, enthusiasm, task and technical uncertainties,* and *task oriented interaction.*

Gersick's (1988) findings showed that teams' starting behaviors persisted through the first half of the group working, and there was dramatic change at the midpoint of group life. Among the behavior categories, enthusiasm, social interaction, technical and task difficulties, task-oriented interactions were analyzed as early (first half) and later periods (last half).

Leadership Behaviors in Online Teams

Table 3 presents the leadership behaviors in online teams. Most groups had one member who had more leadership statements relative to other group members (L1=78%, 53%, 41%; L2= 53%, 49; L3=72%, 50%, 82%).

Table 3. Leadership Behaviors of Members of Online Teams

Level 1	Number of Posts	%	Level 2	Number of Posts	%	Level 3	Number of Posts	%
	1	4%		19	53%		6	19%
L1-1	2	7%	L2-1	5	14%	L3-1	23	72%
	3	11%		4	11%		2	6%
	21	78%		8	22%		1	3%
	2	13%		9	23%		9	13%
L1-2	8	53%	L2-2	5	13%	L3-2	35	50%
	1	7%		20	49%		12	17%
	4	27%		6	15%		14	20%
	15	19%					33	82%
L1-3	15	19%				L3-3	5	12%
	31	41%					1	3%
	16	21%					1	3%

Some of leadership statements in discussion forum as follow:

> "We should carry out our duties together. One' poor' person should not do the entire job on behalf of others. This is not fair, and everybody must have a role in the project." L1
> "It seems like nobody has started Activity 6. Have you checked what it is?" L2
> "I am really waiting for your mails, friends. Please send your ideas and start discussing!!! Time is running out." L3

Feedback Behaviors in Online Teams

The findings showed that L1 groups had more feedback giving (FBG) statements than feedback seeking (FBS) statements, while L3 groups had more FBS statements than FBG statements (Table 4). On the other hand, frequency

of FBS and FBG statements in L2 groups vary. While L2-2 showed more FBG statements, L2-1 group showed more FBS statements through out the study.

Table 4. Feedback Behaviors in Online Teams

Groups	Frequency of **FBS** statements	Percentages of **FBS** Statements	Frequency of **FBG** statements	Percentages of **FBG** Statements
L1-1	9	6%	33	13%
L1-2	8	6%	49	20%
L1-3	39	27%	80	32%
L2-1	20	14%	14	6%
L2-2	15	10%	31	13%
L3-1	13	9%	14	6%
L3-2	14	10%	10	4%
L3-3	26	18%	15	6%
Total	**144**	**100%**	**246**	**100%**

Some of the feedback giving and feedback seeking statements in discussion forum as follow:

"What do you think about portfolio-assessment? Can it be appropriate?" FSS-L2

"I agree with what… said about group special test. That might be a good way to evaluate the students especially while they are dealing with their role plays." FGS-L3

"I have read your ideas about assessment. It is good to divide assessment part into three as self-assessment, process assessment and product assessment." FGS-L1

Responses gathered from the open-ended questions indicated that some students criticized their group members about sending little or no feedback. They stated that it caused loosing their trust. One of the students from group with L2 said: "I had this feeling a lot since I was sending my ideas and I was not taking any feedback or answer most of the time. As I did not want to send my own ideas for the project alone, I had to wait until the last day of the activities." Moreover others highlighted the importance of getting feedback for trust development.

Table 5. Social Interaction in Online Teams

	Early Period		**Later Period**	
Groups	Frequency of **SI** Statements	Percentages of **SI** Statements	Frequency of **SI** Statements	Percentages of **SI** Statements
L1-1	2	4%	12	23%
L1-2	21	47%	11	20,5%
L1-3	7	16%	9	17%
L2-1	0	0%	9	17%
L2-2	1	2%	7	13%
L3-1	0	0%	2	3.8%
L3-2	6	13%	2	3.8%
L3-3	8	18%	1	1.9%
Total	**45**	**100%**	**53**	**100%**

Social Interaction in Online Teams

As presented in Table 5, there are differences among groups in relation to the social interaction (SI) statements in early and later periods. While group L1-2, L3-2 and L3-3 showed decrease in their SI statements, the other groups showed increase in their SI statements in the later period. Even though there are differences in groups SI statements in early and later periods, Trust Level 1 groups generally had more social interaction statements in the later period.

Some of the social interaction statements in discussion forum as follow:

"Take care and good luck in your exams." L3

"Happy new year to you☺." L2

"By the way, I forgot to send you my wishes about the new-year. I hope there will be no wars but more peace." L1

Enthusiasm in Online Teams

As it is shown in Table 6, in the early period of the group life, online groups showed more enthusiasm than that of in the later period as a total. L3 groups showed more enthusiasm than the other groups in the early period. In the later period of the group life, only trust Level 1-1 and trust Level 2-2 groups' enthusiastic statements increased. While L1-2 and L2-1 groups' enthusiastic statements remained the same, the other groups' enthusiastic statements were decreased in the later period of the group life. L3-1 group did not have any enthusiastic statement in the later period of the group life.

Table 6. Enthusiasm in Online Teams

	Early Period		**Later Period**	
Groups	Frequency of **Ent.** Statements	Percentages of **Ent.** Statements	Frequency of **Ent.** Statements	Percentages of **Ent.** Statements
L1-1	2	4%	7	20.5%
L1-2	5	11%	5	15%
L1-3	13	28%	7	20.5%
L2-1	1	2%	1	3%
L2-2	3	6%	10	29%
L3-1	4	9%	0	0%
L3-2	9	19%	1	3%
L3-3	10	21%	3	9%
Total	**47**	**100%**	**34**	**100%**

Some of the social enthusiasm statements in discussion forum are as follow:

"No matter how far we are, I will get in touch with you and present my views about this project." L3

"I hope for the members of our project to achieve our goal in the way that is joyful and efficient." L2

"I just want to say that it is nice to work with you. This project is becoming fun as we get the idea of what we are doing." L1

The findings from open-ended questions indicate that enthusiasm plays an important role to develop and maintain trust. One student from the group with L3 stated "Since they were not eager to do this project, this discouraged me from time to time." In addition, some highlighted the value of enthusiasm for the group life. Another student from the group with L2 mentioned that "we trusted each other, but if there were no trust, I would not be eager to take part in the project." The other student from the group with L1 indicated that "I personally trusted my group members and felt the trust of group members towards me. If there were less trust in our group, I would not study as enthusiastic as now…"

Table 7. Task and Technical Uncertainties in Online Teams

	Early Period		**Later Period**	
Groups	Frequency of **TTU** Statements	Percentages of **TTU** Statements	Frequency of **TTU** Statements	Percentages of **TTU** Statements
L1-1	5	8%	2	6%
L1-2	4	6%	1	3%
L1-3	13	20%	3	8%
L2-1	14	22%	7	19%
L2-2	8	13%	2	6%
L3-1	5	8%	6	17%
L3-2	6	9%	4	11%
L3-3	9	14%	11	30%
Total	**64**	**100%**	**36**	**100%**

Task and Technical Uncertainties in Online Teams

The total number of task and technical uncertainties (TTU) in groups' communication decreased about half in the later period of the group life. As it is presented in Table 7, L1 and L2 groups have large portion of decrease in their task and technical uncertainties in the later period of the group life. While L3-2 group had small decrease, L3-1 and L3-3 groups had increase in their task and technical uncertainties in the later period of the group life.

Some of the task and technical uncertainty statements in discussion forum as follow:

> "Could you please tell us shortly what we will do in this activity?" L2
> "What do you think about the first activity? When do we start to deal with about it? How will the cooperation be? L1
> "To be honest, I do not understand what we will do exactly and how we will do them. If you have any suggestions I will be glad to hear. Thanks." L3

Students' answers to the open-ended questions revealed that while some groups helped each other and could manage to solve problems, others did not. For example one student from the group with L2 said: "Sometimes I cannot understand what I have to do for the activities, so I waited to get an answer from my friends. When I cannot receive an answer from them, I feel depressed." Another student from group with L1 said: "When I don't understand a point related with our group work or project, they helped me cover it well, and so I can really trust them." The other student from the group with L1 said: "Because this kind of group work is very new to us, I felt a risk about the performance of the project. But when they performed well, I felt self confident." As reflected in the discussion, help deepened students' trust level.

Task Oriented Interactions in Online Teams

As presented in Table 8, there are more task-oriented actions (TOA) in the later period of the group life in total. However, while there was an increase in L1-1, L1-3 and L2-2 groups' task oriented interactions, there was a decrease in other groups' task oriented interactions in the second period of the group life. The findings showed that almost half of the TOA statements in group discussions were made by the groups in L1 in the early and later stages of the group life.

Table 8. Task Oriented Actions in Online Teams

	Early Period		**Later Period**	
Groups	Frequency of **TOA** Statements	Percentages of **TOA** Statements	Frequency of **TOA** Statements	Percentages of **TOA** Statements
L1-1	32	9%	68	17%
L1-2	64	18%	55	14%
L1-3	87	23%	100	24%
L2-1	44	12%	30	8%
L2-2	38	10%	65	16%
L3-1	28	8%	19	5%
L3-2	39	11%	37	9%
L3-3	31	9%	26	7%
Total	**363**	**100%**	**400**	**100%**

Discussion

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 ended up with higher group trust levels. This showed that trust could 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 relationship can be formed in a virtual setting (Ishaya & Macaulay, 1999; Jarvenpaa & Leidner, 1999). As it is indicated by Ishaya & Macaulay, (1999), and Jarvenpaa & Leidner (1999), it can be concluded from the results of this study that the types of interaction or the types of communication behaviors including distribution of the communication, feedback, social interaction, enthusiasm, coping with technical problems, task oriented interactions may affect trust levels of the online teams.

Content analysis of online groups' discussion archives showed that the groups with different trust levels showed different communication behaviors throughout the study. The findings revealed that certain collaborative communication behaviors should be presented by the team 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 pattern of communication behaviors.

The findings showed that even though there was unequal distribution in communication among the members of the groups at L1, the group members' number of posts were closer to each other when it is compared to the groups at L2 and L3. The literature indicates that equal active participation is critical component for maintaining social climate (Last et al., 2000; Salmon, 2000; Soller, 2001). The research results of Zafeiriou (2000) support this indication that if there is division of labor and equal participation in the group work, the reasons for conflicts and disagreements are minimized, and trust deepens.

Even though the group with high trust level had less discussion posts, they showed more regular pattern than the other groups. It can be concluded that regular communication is necessary to deepen trust. Coppola, Hilts and Rotter (2001) also found that predictable communication foster the later trust development. However the participants of this study explained several difficulties related with the Internet connection. Such kinds of technical problems could have been barriers for them, and such difficulties might affect their contributions and communication. Another factor that affects communication might be the invisibility of the participants in online learning environment. Some group members read messages but may not send message to the discussion list. Some group members solved this problem by sending messages indicating that they are there and reading the messages.

Although all groups had a leader, there were differences in leadership behaviors and contribution among the groups. In L-1 groups all group members took initiatives and there were roles for all. However the groups with average and low trust levels presented unequally distributed communication. The group members did not follow the leader, therefore their participation in discussion were not equal. This might be due to the ineffectiveness and negative behaviors of the leader. As reflected in sample leadership statements, there was negative leadership in the groups with L3. Moreover, there were always additional notices to urge others to contribute group effort. On the other hand, there was positive leadership in the group with L1, and positive comments about the group's progress and achievement. Moreover, the statements were encouraging.

In this study, the groups with L1 showed more feedback giving statements than the other groups. However L2 and L3 groups showed more feedback seeking statement. Not receiving enough feedback may result in decrease in trust level. As stated in the literature, peer feedback is one of the main factors that affect success of the team, increase social presence, and maintain social climate in the group (Last et al., 2000; Salmon, 2000; Stacey, 1999).

The results showed that all groups faced with task and technical uncertainties in the early period of the group life. This could be the result of the low competency in technologies and new learning strategy in online learning environment. However, while uncertainty statements decreased over time in groups with L1 and L2, it increased overtime in the groups with L3. This could be the result of member support and social interaction in the groups, and between the groups. This result is consistent with Stacey's (1999) statements that providing technical and task related help develop social presence and trust. Moreover orientation period could play critical role for decreasing the members' technical and task uncertainties.

The results revealed that initial enthusiasm and social interaction can help build trust in the early period. However it should be continuous to maintain trust. Social interaction by itself may not be enough to maintain and build trust, and additionally, task oriented interaction should take place. This result is in consistent with Walther & Burgoon's (1992) findings 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 result from several reasons. Learning styles, such as preferring to study individually or in groups, might be one reason. Moreover, not all people may need the same amount of socio-emotional needs. For some, focusing on the task might be enough, but others may require more social interaction. The group members may discuss their preferences, and they could use those ways to express themselves.

In this study, the groups with L1 focused more on task than the groups with L2 and L3. Contrary to swift trust theory, group development models emphasize that member-support and group well-being function as critical components of groups. The findings of this study support the group development models in that social interaction plays an important role of development of trust when they faced task and technological uncertainties. Moreover these results are consistent with Bales Equilibrium Model (Bales, 1970) and Tuckman Model (Tuckman & Jensen, 1977), which focus on both task related and socio emotional need of the groups. It can be stated that members of groups with L2 and L3 may not meet their needs in regard to task related and socio emotional needs. 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 interactions. Participants' previous experience with the task could also affect their task orientation.

Conclusion

It can be concluded that trust is a critical component of satisfaction from any kinds of experiences. For that reason, practitioners of online learning need to give special attention to trust in online learning. Despite limitations, this study provides important insights for online team facilitation. Maintaining social interaction throughout the course/program is as important as creating friendly social environment. They could motivate and encourage groups to build a sense of community. Defining roles in the group may help closer/equal distribution of communication among group members. Because leadership behaviors may require more time, leaders could be purposively assigned to groups. Some management guidelines could be provided such as project management, time management and conflict management. Onsite orientation can be conducted at the beginning of the study so that members' relationships could be built, and task and technical orientation can be provided in the beginning of the online learning. Further research with different learners and in different subject areas could help examine the trust and collaboration behaviors in online learning environments.

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Appendix A

Group Trust Questionnaire

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

Direction for the 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

	Statements	**SD**	**D**	**U**	**A**	**SA**
1	Members of my 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 whom I work.					
8	We have confidence in one another in this group					

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

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

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

Appendix B

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 expression that encourages 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 organizing group work.
	*	Ef	Advocating effort: Urging others to contribute to the group effort.
	*	ME	Monitoring group effort: Comments about the group's process 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 activity6 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 task.