

Comparison of Communication Patterns of Students in Online and Face-to-Face Collaborative Learning Environments with Discourse Analysis

Duygu Mutlu-Bayraktar¹ and Nesrin Ozdener Donmez²

¹*Istanbul University, Faculty of Education, Department of Computer Education and Instructional Technology*

E-mail: dmutlu@istanbul.edu.tr

²*Marmara University, Ataturk Faculty of Education, Department of Computer Education and Instructional Technology*

E-mail: nozdener@marmara.edu.tr

KEYWORDS Discourse Analysis. Online Learning Environment. Collaborative Learning

ABSTRACT This study aims to utilize discourse analysis to uncover similarities and differences in communication patterns shown by students in online learning environments comprising face-to-face, text, audio and video. For this purpose, project studies employing the collaborative learning method were recorded and investigated in face-to-face and online environments. Two groups randomly chosen from among 11 groups performed in online environments using face-to-face, text, audio and video. One finding of the research is that online environments are effective environments for collaborative learning in terms of participation. It appears that online video environments most closely mirror face-to-face environments. Although high participation rates are present in text-based, online learning environments, it seems that task-oriented discourses decrease and more non-task discourses are present compared to other environments. It is noted that this situation can cause negative effects in terms of collaborative learning environments in which task-oriented interactions should be high, and such an environment can prolong the process.

INTRODUCTION

Rapidly developing technology has played an important role in making communication, which is one of the essential components of educational environments, easier. Innovations in communication technology are effective in education, as well as in other fields. Educational environments are developing rapidly via these technologies, and they can be designed more effectively with new tools. Computer-mediated communication is seen as an ideal tool for providing opportunities, particularly for discussion groups, collaboration-based tasks, and interactions. In particular, online learning environments are designed with rich tools for encouraging student participation (Gu et al. 2015; Bernard et al. 2000; McAteer et al. 1997). As classroom communication structures and classroom situations

are important, technological advances should approximate or conform to face-to-face, skillfully navigate, ignore, or openly contest (Martin-Jones 2015).

The collaborative learning method implemented in online learning environments is one of the methods by which communication is actively implemented. In collaborative learning, all group members study together, as they are responsible for specific tasks; moreover, they are responsible for each other's learning as well as for their own (Stacey 1999). The goal of the online collaborative learning method is to encourage students and allow technology-supported group studies for gathering new knowledge in discussion environments (Bélanger 2008). Jonassen and Kwon (2001) emphasize their support for technology in collaboration by stating that students demonstrate more participation in communication via computer-mediated environments than via face-to-face environments, and they interact with each other more frequently.

Information obtained via analysis of synchronous or asynchronous, oral or visual computer-mediated communication patterns is quite important in terms of devising the teaching-learning

Address for correspondence:

Dr. Duygu Mutlu-Bayraktar

Research Assistant

Istanbul University, Faculty of Education,
Department of Computer Education and
Instructional Technology Beyazit Kampus
Fatih/Istanbul, Turkey

Telephone: +90 (212) 440 00 00/26062

process in online learning environments. Learning involves systematic changes and processes; students present behaviors only in writing, examination and interpretation of behaviors with regard to linguistic performance (discourse), providing significant information in terms of tasks, roles of students, and analysis of the process (Wortham and Reyes 2015; Gee 2014). This information sheds light on issues such as socialization and management of groups by teachers or leaders, allocation of tasks to students in collaborative studies, acquisition of knowledge about learning styles of students, and reduction of non-task discourse (Wortham and Reyes 2015; Gojkov et al. 2013; Mercer et al. 2004; Anderson 2001).

According to Van Dijk (1997), discourse includes structures of linguistic performance, especially language and speech used in general or specific conversations. Beyond language, Gee (2014) explains discourse as a path for integration and aggregation of activities, ways of thinking, interaction, faith, values, various symbols used, and tools and equipment of language within the scope of social identity defined by individuals. On the other hand, beyond the use of language at a basic level, discourse analysis is the interpretation of units, such as who, how, why, and when to use (Jones et al. 2015; Mazur 2004; Turoff et al. 1999). Within the education process, discourse analyses of conversations recorded in classroom or online environments are performed. Studies of discourse analysis emphasize conversations recorded in online learning environments via innovations provided by today's instructional technologies. Haslaman et al. (2008) examined what kinds of communication patterns students showed in online learning environments by performing discourse analysis of messages sent on discussion platforms created for given tasks. Messages were evaluated by classifying them in particular categories according to function. As a result, it was reported that most of the discussions were about the task, and group members did not perform any research on the topic. In addition, they continued to discuss their knowledge and experiences.

In a study performed by Scharllert et al. (2009), impromptu discourse that arose from two types of regular course activities composed of synchronous or asynchronous computer-based discussions was analyzed. Messages sent by mem-

bers of a master's course were assessed in terms of discourse functions and types of politeness strategy. The results stated that synchronous computer-based discussions led to more information searches, more information obtained, and greater social interpretation than asynchronous computer-based discussions. It was indicated that asynchronous discussions were more appropriate for generating discussion, sharing experiences, explaining opinions, and performing self-assessments when compared to synchronous discussions. Regarding politeness, it was discovered that students do not behave more gently when they transfer their messages via functions such as positive assessment and managing group discussions within the scope of politeness and other functions. It was stated that they were less gentle in transferring messages when they were performing experience-sharing functions (Schallert et al. 2009).

Yagelski and Grabill (1998) performed discourse analysis of conversations occurring during activities carried out in classroom and online environments, comparing electronic and in-class, face-to-face discourse. E-mail and in-class meeting data was recorded and analyzed in English and communication courses. The results of the study demonstrated complicated relationships between online discourse and in-class discourse in terms of context of a particular course. In online discourse especially, communication technologies by instructors, the structure of courses, and the perceptions of students about the importance of computer-mediated communication technologies warrant attention to the results.

Comparing and contrasting discourses in face-to-face and online collaborative learning environments under specific categories reveal significant information in terms of communication patterns (Jones et al. 2015; Bower and Hedberg 2010; Potter 2004). In light of these demonstrated effects and examined studies, it is posited that similarities and differences between discourses in face-to-face and online collaborative learning environments will reveal significant information with regard to participation of students, tasks, flow of conversation, speech, collaboration, and social sharing. This study aims to reveal similarities and differences between conversations of students in collaborative studies in terms of face-to-face and online (text, audio and video-based) environments. To this end, the following questions will be answered.

1. Is there any difference in the participation of group members in face-to-face and on-line collaborative learning environments?
2. Do group interaction patterns that are present during the task-completion process differ with regard to face-to-face and on-line collaborative learning environments?
3. Do the flow of conversation and speeches demonstrate any differences in terms of face-to-face and online collaborative learning environments?
4. Which topic headlines did group members discuss while they were studying in face-to-face and online collaborative learning environments?
5. Does sequential expression differ between face-to-face and online collaborative learning environments?
6. Are there any differences demonstrated in in-group roles between face-to-face and online collaborative learning environments?

MATERIAL AND METHODS

Research Design

In this study, activity research from qualitative research designs was preferred because the goal was to examine a complicated process, acquire in-depth information, and carry out research and implementation together. Activity research is based on in-depth scrutiny of both conditions and practical experiences. It aims to make deductions that will guide further research and activities (Koklu 2001).

Working Group

This study was performed with the participation of 36 Computer and Instructional Technologies Education Department sophomores taking the course 'BT203 Instructional Design' and participating in collaborative learning activities defined by researchers during the spring semesters of 2010-2011. Students were separated into 11 groups containing three or four people each. Then, two groups of three people were randomly selected for discourse analysis.

Data Collection Instrument

The program Skype 5.0 was preferred for students to record their conversation during text,

audio, and video-based online interviews. In addition, audio and video recordings for documenting students' display images and interviews were made via the program Camtasia Studio 7. In face-to-face interviews, images were recorded via a video recorder.

Study Media

In this study, face-to-face and online environments were defined. Three environments, namely, text, audio and video-based media were defined as online environments.

In face-to-face environments, where students work on projects and come together in person, recordings were carried out in real time. Images of students during collaborative learning were recorded via a video camera device. In text-based online environments, students communicated only via instant messaging. In audio-based environments, voice recordings of telephone conversations were taken using necessary programs. In video-based online environments, interviews were performed with programs allowing video calls, and they were recorded.

Voice recordings of collaborative studies, discussions and assessment activities during the semesters were conducted to reduce the effects of recording students' conversations. Moreover, students were asked to complete part of their homework with video and audio-based interviews and to record those sessions.

Data Analysis

The discourse analysis method was used for data analysis. Conversations of two groups randomly selected were evaluated via decoding, with the goal of revealing differences in conversations and collaborative studies between face-to-face and online environments in terms of communication patterns. To achieve this, participation, interaction patterns, flow of conversation, topics discussed, sequential expression types, and distributions of roles were examined.

Participation

Number of messages sent and total percentages of each group member were calculated to determine participation levels of students in discussions. Moreover, contributions of participants in discussions were revealed through ex-

amination of their functional speech-act. Group members were named A1, A2, A3, B1, B2 and B3.

Interaction Patterns

While assessing their interaction patterns, an analysis was performed to reveal how students studied tasks together and how they interacted to complete the tasks. For this purpose, some of the categories used by Haslam et al. were used in this study. Explanations, requests for explanations, suggesting alternatives, providing information, requesting information, asking opinions of others, requests for action, resistance, submitting a proposal or counterproposal, requesting or submitting an approval, approval support, and restatement of categories were handled in terms of interaction patterns (Haslam et al. 2008). Examples of interaction patterns are presented in Table 1.

Topic Headlines

For the purpose of determining topic headlines, discussion headlines were defined, and a

list containing the topics of all discussions was created. Then, each message was coded according to the topic headline and category to which it belonged. Topic headlines were divided into three, namely, group-oriented (social), task-oriented, and non-task oriented (Howell-Richardson and Mellar 1996) (See Table 2).

Sequential Expressions

Subgroups of analysis called ‘consecutiveness containing expression’ and ‘consecutiveness containing opposed recommendation’ are important in terms of defining participation, objection, and expression cycles.

Stages of Expression Process

Stage 1: A1 makes suggestion or submits a proposal to take action (with or without explanation).

Stage 2: A2 or A3 accepts/supports the suggestion (with or without explanation).

Stage 3: A4 proposes alternative suggestions.

Stage 4: A5 or A6 presents/requests explanation, approval, or information.

Table 1: Examples of interaction patterns

<i>Interaction patterns</i>	<i>Examples</i>
<i>Providing Information</i>	B2: I've added an anonymous banner for now. It will constant at the left and right sides and the middle part will be the side to display context. You know that teacher and student access is present at the right side. Under this, quote of the day part will be present. I've placed menus at the left side.
<i>Requesting Explanation</i>	A3: Learning period is about course hours of second semester. Do you think that the work we will do is enough? A2: We find it enough because children will look at, watch and ask questions they do not understand to the teacher. In addition, they will have time for practice in the course.
<i>Requesting Information</i>	A1: Yes my friends, what is the teacher asking from us, now? Environment analysis! What for will our environment serve, what for is the environment to be prepared by us serving? A2: To gain basic skills in forth-class first aid course.
<i>Suggesting Alternatives</i>	A2: Everybody watch the video tonight. Do things continue to happen like this or will it be like that everybody open the site after completion of topics? A3: I think it proceed simultaneously. A1: In my opinion, let the students follow themselves at home.
<i>Asking Opinions of Others</i>	B1: How do we go, now? Do I add as a conversation or do we write in the form of questions and answers?
<i>Approval</i>	B2: No, in my opinion, let us put in order on abstract and concrete. B3: I think, we said that let's do it like this.
<i>Submitting a Proposal</i>	B2: These will be sub-menus for each topic. After implementation of all these, we ask general final questions as main assessment. B3: Yes, it could be. Let us talk about important issues to be found in the site.
<i>Speech-acts</i>	A2: Okay, Let A1 gather all of them, many have already done. A1 give a voice. A1: Wait my dear, I am adding something.

Table 2: Discourse examples according to topic headlines

<i>Topic headlines</i>	<i>Examples</i>
<i>Task-oriented</i>	A2: The first that we started 'Decide what will be learned'. A1: Secondly, to list candidate topics. We've already taken out topics and units in first aid course. Let us write the topics one by one.
<i>Group-oriented</i>	B1: Let's talk about and note all these topics and each other at the weekend? B2: Let's talk next time. Will we see
<i>Non-task-oriented</i>	B3: Do you control your attendance situation? B1: In which do we fail the course?

Stages of Proposing Counterproposal Process

Stage 1: A1 makes suggestion or requests explanation.

Stage 2: A2 proposes counterproposal.

Stage 3: A3 presents/requests explanation, approval, or information.

Stage 4: A4 presents/requests explanation, approval, or information (Paulus 2005).

Example of Consecutiveness Containing Explanation

B3: We have 49 test questions. Let's take 30 of them.

B2: Yes, but the number of questions must be less than 10.

B1: Do not evaluate only that which they know. Let's do satisfaction tests for the effectiveness of the site.

B3: Questions about usability of the site, such as whether it is used easily should be present.

Example of Consecutiveness Containing Counterproposals

A1: Then, suggest the ones that you see well, according to order, of course. Let's add accordingly.

A2: It can be like defining material, classifying and giving examples.

A1: It will not be like this A2. We should write them one by one due to the presence of gains. I am writing them as separate. Is that OK?

A3: It is OK for me. It defines material, it classifies... All should be separated.

Role Distributions

Within the scope of the study, analysis was performed by examining communication patterns of conversations and contributions of the students to discussions in terms of the roles of ini-

tiator, coordinator, information presenter, information requester, explicator and proposer.

Implementation Process

Collaborative studies in the projects were performed by students within the scope of the instructional design course. Instructional design analysis and assessment steps were considered to be steps that provided opportunities, such as discussions with students, sharing information, and working together. Face-to-face conversations of students in 4-week collaborative studies were performed for assessment steps, which included needs, learner features, and content analysis as the stages of instructional design, while message, voice and video calls in online environments were recorded. Collaborative learning was defined as learning activities that students implemented together during analysis, and wherein all group members were responsible for the work. Within this period, students completed collaborative learning processes with activities involving obtaining information, evaluating information, discussion-like arrangements, and collaboration.

Students were asked to record voices in face-to-face course environments for two weeks in order to create familiarity with the audio recording to be performed in activities. Then, groups including two people were established, and they were asked to do the homework in the online environment using voice calls and to record their voices to gain familiarity with using online environments and with audio-video recording.

After a preliminary study was performed, groups and topics that students were to implement using collaborative studies were explained for the course project due by the end of the semester. A total of 11 groups, each of which contained 36 people, were created. Groups determined candidate topics and target markets for which they would carry out instructional design for the next week, and they clarified the final

shape of the course with the instructor. Within the same course hour, it was determined which of the environments groups would study for needs analyses to be performed during the first week. Every week, it was determined which environments students would be used for the next stage.

For the purpose of performing discourse analysis, two of the 11 groups were randomly selected. Decoded conversations were analyzed by two different researchers to increase reliability. In addition, conversations of two different groups defined within the scope of the study were analyzed, and they were compared with each other to reveal differences in the environments.

FINDINGS

Participation

When the conversations of the students in face-to-face based, text-based, audio and video-based online environments were examined, members of the group made a total of 428 contributions. Descriptive statistics of participation by group member and environment are given in Table 3.

When the percentages of participation were examined, the most participation and the least participation occurred in text-based (30.6%) and face-to-face (20.9%) environments, respectively (See Table 3). When discourse texts were analyzed, it was observed that the topic changed very rapidly and students participated more to express themselves in the text-based environments than in the other three environments. In the environments where the images were available, it was found that participation decreased due to head movements and mimicking during approval or rejection situations.

A2 (104) and B1 (79) were the most participatory members within the conversations (See Table 4). In the meantime, when interaction patterns were examined, A2 and B1 were the most significant contributors in terms of speech acts. A2 mostly used the strategies of providing information, making suggestions, and approval speech acts. On the other hand, B1 primarily used providing information and approval speech acts. In the studies, the group member with the least participation was B2. B2 mostly used approval speech acts. When examining role distributions in the groups, the most participatory individuals were those who had the roles of a coordinator, providing information and making suggestions. It was observed that the members with the least participation had approval roles (Table 3).

Interaction Patterns

As a result of analysis carried out for the purpose of revealing how students collaboratively studied the task and how they interacted to complete the task, it was found that Groups 1 and 2 interacted 261 and 220 times, respectively. The percentages related to interaction patterns of the groups according to the environments are presented in Tables 4 and 5.

When Tables 4 and 5 were examined, it was determined that the most-used functional speech acts were providing information (104-67), approval (53-60), making suggestions (50-49), and requesting information (32-16). On the other hand, asking the others' opinions (6-11) and addressing (3-4) speech acts appeared to be the least used strategies.

Comparison of Environments:

- ◆ Providing information speech acts were the most used in each of the four environments.

Table 3: Participation numbers and percentages of group members according to the environments

Group member	Text based		Audio based		Video based		Face to face		Total
	%	f	%	f	%	f	%	f	
A1	30.1	22	26	19	23.3	17	20.6	15	73
A2	28.8	30	25.9	27	24	25	21.3	22	104
A3	29	18	25.8	16	25.8	16	19.4	12	62
B1	30.3	24	20.2	16	24	19	25.5	20	79
B2	34	17	22	11	24	12	20	10	50
B3	31.6	19	28.3	17	21.6	13	18.5	11	60
Average/ Total	30.6	130	24.7	106	23.8	102	20.9	90	428

Table 4: Group 1's frequencies and percentages of the interaction patterns

<i>Interaction patterns</i>	<i>Text based</i>		<i>Audio based</i>		<i>Video based</i>		<i>Face to face</i>		<i>Total</i>
	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	
Providing information	35.8	28	37.33	28	39.13	27	40.38	21	104
Requesting explanation	8.9	7	-	-	-	-	-	-	7
Requesting information	2.56	2	13.33	10	11.24	9	15.15	11	32
Suggesting alternatives	-	-	4	3	2.89	2	1.92	1	6
Asking opinions of others	-	-	2.66	2	4.34	3	1.92	1	6
Approval	29.48	23	17.33	13	14.49	10	13.46	7	53
Submitting proposal	23.07	18	14.4	10	20.28	14	15.38	8	50
Speech-acts	-	-	1.49	1	2.89	2	-	-	3
Total	100	78	100	67	100	67	100	49	261

Table 5: Group 2's frequencies and percentages of the interaction patterns

<i>Interaction patterns</i>	<i>Text based</i>		<i>Audio based</i>		<i>Video based</i>		<i>Face to face</i>		<i>Total</i>
	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	
Providing information	21.12	15	26.98	17	38	19	43.9	18	67
Requesting explanation	5.63	4	-	-	-	-	-	-	3
Requesting information	2.81	2	9.52	6	10	5	9.75	4	16
Suggesting alternatives	-	-	9.52	6	4	2	4.87	2	10
Asking opinions of others	-	-	7.93	5	4	2	-	-	11
Approval	35.21	25	26.98	17	18	9	26.8	11	60
Submitting proposal	32.39	23	17.46	11	24	12	14.6	6	49
Speech-acts	2.81	2	1.58	1	2	1	-	-	4
Total	100	71	100	63	100	50	100	41	220

- ♦ Requesting expression speech acts were only used in text-based environments.
 - ♦ The lowest number of requesting information speech acts was found in text-based online environments.
 - ♦ Making alternative suggestion speech acts were not used in text-based online environments, but were used in the others.
 - ♦ Asking the opinions of others speech acts were used in all of the environments.
 - ♦ Approval speech acts were the second most widely used after providing information speech acts in all environments.
 - ♦ Making suggestions speech acts were used in all four environments.
 - ♦ Although addressing speech acts were used in the online environments, they appeared not to be used in face-to-face environments.
 - ♦ In the environments where text-based conversations were carried out, students expressed themselves more during texting, and they tended towards providing information, making suggestions, and explaining speech acts via providing short answers to others' texts.
 - ♦ In the environments where text-based conversations were carried out, topics seemed to change very rapidly, and short approvals were preferred.
 - ♦ Collaboration-based speech acts occurred less in text-based environments than in the other three environments.
- When functional speech acts were discussed in terms of the roles of group members, A2, who had the role of a coordinator and group manager in Group 1, mostly used providing information

speech acts. On the other hand, B2, the coordinator in Group 2, primarily used providing information and making suggestion speech acts. In the studies, B2, the least participatory member, primarily used approval speech acts.

Topic Headlines

As a result of examination of records in the online and face-to-face collaborative environments, topic headlines were determined as task-oriented (social), group-oriented, and non-task-oriented. When looking at the conversation records of Groups 1 and 2, task-oriented conversations (198-288) were carried out in four environments. Except in the environment where text-based conversations were carried out, group-oriented conversations outnumbered non-task-oriented conversations in other environments. In text-based environments, non-task conversations (18-15) were more prevalent than group-oriented conversations (7-5) in both groups (See Tables 6 and 7).

Sequential Expressions

In terms of ‘consecutiveness containing expression’ and ‘consecutiveness containing opposed recommendation,’ it was found in subgroups of analysis that although consecutiveness containing opposed recommendation was occasionally included consecutiveness containing expression was generally seen in interaction

patterns of the groups. Consecutive expressions were shorter and less evident in text-based environments than in the other three environments. This situation is due to a rapid change of topics in text-based environments. There are consecutive expressions that are not completed as discourse because head movements and facial expressions come into play.

Role Distributions

Within the scope of the study, the coordinator, initiator, explicator, proposer, approver, alternative suggestion maker, and information presenter roles were seen to be present via examining communication patterns of conversations and contributions of students in discussions (See Table 8).

Table 8: Role distributions of group members

Group member	Role distributions
A1	Information presenter, Proposer
A2	Coordinator, Information presenter, Approver and Explicator
A3	Approver, Proposer
B1	Coordinator, Information presenter, Approver, and Explicator
B2	Approver, Proposer
B3	Explicator, Approver

When observing the role distributions of group members according to participation, the most participatory group members served in the roles of a coordinator, initiator, information pro-

Table 6: Group 1's frequencies and percentages about topic headline

Topic headlines	Text based		Audio based		Video based		Face to face		Total
	%	f	%	f	%	f	%	f	
Task-oriented	67.9	53	88	59	70.1	47	79.6	39	198
Group-oriented	10.3	7	9.1	6	19.4	13	16.3	8	34
Non-task-oriented	21.8	18	2.9	2	10.5	7	4.1	2	29
Total	100	78	100	67	100	67	100	49	261

Table 7: Group 2's frequencies and percentages about topic headline

Topic headlines	Text based		Audio based		Video based		Face to face		Total
	%	f	%	f	%	f	%	f	
Task-oriented	80	51	83.3	60	86.5	83	86.13	87	288
Group-oriented	8.33	5	5.55	6	5.2	8	8.92	9	23
Non-task-oriented	11.66	15	11.11	6	8.3	5	4.95	4	28
Total	100	71	100	63	100	50	100	41	339

vider and explicator in both groups. The second most participatory members were information providers, suggestion givers, and counter-suggestion proposers. On the other hand, the least participatory members held the approval and suggestion proposer roles. Members of both groups showed similarities in terms of the relationship between roles and participation.

DISCUSSION

When online environments are used as collaborative learning environments, they provide quite effective group studies to strengthen communication through the support of technology (Belanger 2008). Online environments presenting various communication avenues to students, such as text-based, audio-based, and video-based, allow them greater participation in collaborative learning activities (Jonassen and Kwon 2001). Video-based online environments, where movements, gestures, and facial expressions are used as in face-to-face environments, remove many restrictions in terms of communication as they present the opportunity for location-independent communication. The working strategies provide a strong positive interdependence among members (Diana et al. 2015).

In this study in which similarities and differences in communication patterns of students in face-to-face and online collaborative environments were examined, the discourse analysis method was used. Communication was grouped into particular categories according to their functions to reveal participation, the flow of conversation and speech, interaction patterns, topic headlines, consecutive expressions, role distributions, and communication patterns representing these categories. Moreover, an analysis of communication patterns was carried out according to task-oriented, group oriented, and non-task-oriented types.

During collaborative studies, students contributed to others' learning as well as to their own learning (Stacey 1999). Interaction patterns and participation revealed during this process also demonstrated students' contributions to the learning process. At the end of the research, when examining student participation levels, the greatest participation was seen in face-to-face environments, and the least participation was observed in text-based environments. When observing the context of the conversations, topics

changed rapidly in text-based messages; thus, students demonstrated more participation in expressing themselves. In the instances of approval or rejection in video-based and face-to-face environments, participation decreased because students used facial expressions and head movements.

At the end of the analysis performed for determination of interaction patterns, it is noted that the most-used speech-acts were providing information, approving, making suggestions, and requesting information within the scope of all activities carried out by students in performing the task. Similar task and speech acts are also seen in the study by Haslam et al. (2008) on the collaborative learning process. When the least-used speech acts were examined, asking opinions and addressing were prominent. It was found that students demonstrated a preference for requesting information or making suggestions instead of asking opinions during the learning process. In the study by Lu et al. (2011), it was stated that students frequently used presenting evidence, verification, and claiming speech acts.

Surprisingly, it was found that students only used requesting explanation in text-based environments with messages, and they did not use making alternate suggestions or asking opinions of others' speech acts in text-based environments. Students seemed to prefer to explain rather than ask for the opinions of other group members in text-based online environments due to difficulty expressing themselves and due to rapid topic digression. As a result, collaborative speech acts appeared to occur more often in the other three environments. Imafuku et al.'s (2014) discourse study examined the processes of collective knowledge construction in Japanese students in the tutorials. The students' learning processes were mediated by their cultural assumptions, professional identities, understanding of other professionals, and perceptions of collaborative learning. The finding suggests that problem-based learning has the potential to enhance students' collaborative learning skills, and students' participation is situated within a cultural context.

In conversations carried out in technological, text-based social areas, absence of some effects, such as eye contact, body movements, gestures, and facial expressions, found in face-to-face education can lead to negative results in terms of coordination of speakers (Duranti 1997),

whereas in text-based conversations and absence of taking turns at talking cause digression of topic and non-compatibility of conversations (Herring 1999).

Consecutive expressions containing explanations were generally used in the four environments in which the collaborative learning process was implemented. When compared to the other three environments, consecutive expressions were shorter and less evident in text-based environments. This is due to rapid topic changes in text-based environments. In face-to-face and online video environments, there are consecutive expressions, which are not completed as discourse because head movements and facial expressions come into play.

When role distributions of group members during learning were examined, group members with significant rates of participation took active roles as the initiator, information provider and explicator. Group members participating less often occupied approver and proposer roles. If this study is performed in a mobile computer-based environment, it will likely show greater participation of students because of ubiquitous availability (Ke and Hsu 2015).

In light of the results of the study, discourse analysis of conversations in online collaborative and discussion environments should be studied further. The results can be evaluated by comparing analyses, such as what kinds of speech acts students use in collaborative and discussion environments, their rates of participation, and the roles they undertake.

CONCLUSION

It can be said that online environments are proper environments for collaborative learning in terms of participation. When examining functional speech acts, it can be demonstrated that online video environments are the closest to face-to-face environments. Although high participation rates are present in text-based online learning environments, it seems that task-oriented discourses decrease and more non-task discourses are present than in other environments. In these environments, it appears that the subject rapidly digresses, the effort of expressing oneself increases, and discourses of obtaining information, suggesting and explaining by giving short answers to others' writings, are led. Among the results of analyses, it seems that stu-

dents as coordinators have difficulty directing task-oriented conversations and preventing non-task conversations in text-based environments. This situation can lead to negative outcomes in terms of collaborative learning environments in which task-oriented interactions should be high, and this situation also prolongs the process. From this perspective, it would be useful to evaluate the results by comparing analyses of which types of speech acts students use, their rates of participation, and the roles undertaken in collaborative and discussion environments.

RECOMMENDATIONS

This study focused on collaborative learning environments. Further study of cooperative, problem-based and project-based learning environments are recommended. Different learning environments should be compared to each other. It would be useful to use discourse analysis to examine the effects of leaders or instructors in online environments. More groups may also be included in further study.

REFERENCES

- Anderson GL 2001. Disciplining leaders: A critical discourse analysis of the ISLLC National Examination and Performance Standards in educational administration. *International Journal of Leadership in Education: Theory and Practice*, 4(3): 199-216.
- Bernard M, Chuang T, Ali S 2000. Does computer-mediated collaboration really improve group communication? Our general findings. *Usability News*, 2(1): 2-4.
- Bower M, Hedberg J 2010. A quantitative multimodal discourse analysis of teaching and learning in a web-conferencing environment - The efficacy of student-centred learning designs. *Computers and Education*, 54(2): 462-478.
- Belanger M 2008. Online collaborative learning for labor education. *Labor Studies Journal*, 33(4): 412-430.
- Diana P, Maddaloni D, Melillo L, Moffa G 2015. Teaching migration studies through collaborative learning practices in an intercultural environment: The case of the Erasmus IP "Sono un Migrante". *Procedia - Social and Behavioral Science*, 174: 510-517. ISSN:1877-0428.
- Dijk TAV 1997. Discourse as interaction in society. In: TAV Dijk (Ed.): *Discourse as Social Interaction*. London: SAGE, P. 17.
- Duranti A 1997. *Linguistic Anthropology*. Cambridge, MA: Cambridge University Press.
- Gee JP 2014. *An Introduction to Discourse Analysis: Theory and Method*. 4th Edition. London, New York: Routledge.

- Gojkov G, Stojanović A, Babić S 2013. Cognitive and learning styles and a method of discourse in higher education teaching. *Procedia – Social and Behavioral Sciences*, 93: 762-774.
- Gu X, Shao Y, Guo X, Lim C 2015. Designing a role structure to engage students in computer-supported collaborative learning. *The Internet and Higher Education*, 24(2015): 13–20.
- Haslam T, Demiraslan Y, Mumcu FK, Donmez O, Asfkar P 2008. Cevrimici ortamda yapilan grup tartismasindaki iletisim oruntulerinin soylem cozumlemesi yoluyla incelenmesi. *Hacettepe Universitesi Egitim Fakultesi Dergisi*, 35: 162-174.
- Herring SC 1999. Interactional coherence in CMC. *Journal of Computer Mediated Communication*, 4(4): Special issue on Persistent Conversation.
- Howell-Richardson C, Mellor H 1996. A methodology for the analysis of patterns of participation within computer mediated communication courses. *Instructional Science*, 24: 47-69.
- Imafuku R, Kataoka R, Mayahara M, Suzuki H, Saiki T 2014. Students' experiences in interdisciplinary problem-based learning: A discourse analysis of group interaction. *Interdisciplinary Journal of Problem-based Learning*, 8(2): 1-18.
- Jonassen DH, Kwon HI 2001. Communication patterns in computer-mediated vs. face-to-face group problem solving. *Educational Technology: Research and Development*, 49(10): 35-52.
- Jones RH, Chik A, Hafner CA 2015. Introduction: Discourse analysis and digital practices. In: RH Jones, A Chik, CA Hafner (Eds.): *Discourse and Digital Practices: Doing Discourse Analysis in the Digital Age*. London: Routledge, pp. 1 - 17.
- Ke F, Hsu YC 2015. Mobile augmented-reality artifact creation as a component of mobile computer-supported collaborative learning. *The Internet and Higher Education*, 26: 33-41.
- Lu J, Chiu MM, Law NW 2011. Collaborative argumentation and justifications: A statistical discourse analysis of online discussions. *Computers in Human Behavior*, 27: 946-955.
- Martin-Jones M 2015. Classroom discourse analysis as a lens on language-in-education policy processes. In: FM Hult, DC Johnson (Eds.): *Research Methods in Language Policy and Planning: A Practical Guide*. Hoboken NJ: John Wiley & Sons, Inc. pp. 94-106.
- Mazur J 2004. Conversation analysis for educational technologists: Theoretical and methodological issues for researching the structures, processes and meaning of on-line talk. In: D Jonassen (Ed.): *Handbook of Research for Educational Communications and Technology*. New York: McMillan, pp. 1075-1098.
- McAteer E, Tolmie A, Duffy C, Corbett J 1997. Computer-mediated communication as a learning resource. *Journal of Computer-assisted Learning*, 13: 219-227.
- Mercer N, Littleton K, Wegerif R 2004. Methods for studying the processes of interaction and collaborative activity in computer-based educational activities. *Technology, Pedagogy and Education*, 13: 2.
- Paulus TM 2005. Collaboration or cooperation? Analyzing small group interactions in educational environments. In: TS Roberts (Ed.): *Computer-supported Collaborative Learning in Higher Education*. Hershey: IDEA Group Publishing, pp. 100-124.
- Potter J 2004. Discourse analysis as a way of analysing naturally occurring talk. In: D Silverman (Ed.): *Qualitative Analysis: Issues of Theory and Method*. 2nd Edition. London: Sage, pp. 200-221.
- Schallert D, Chiang Y, Park Y, Jordan M, Lee Haekyung L, Cheng A, Chu H, Lee S, Kim T, Song K 2009. Being polite while fulfilling different discourse function in online classroom discussions. *Computers and Education*, 53: 713-725.
- Stacey E 1999. Collaborative learning in an online environment. *Journal of Distance Education*, 14(2): 14-33.
- Turoff M, Hiltz SR, Bieber M, Rana A, Fjermestad J 1999. Collaborative discourse structures in computer mediated communications. *Journal of Computer Mediated Communication*, 4(4).
- Worham SEF, Reyes A 2015. *Discourse Analysis beyond the Speech Event*. New York: Routledge.
- Yagelski RP, Grabill JT 1998. Computer mediated communication in the undergraduate writing classroom: A study of the relationship of online discourse and classroom discourse in two writing courses. *Computers and Composition*, 15: 11-40.