

ANALYSIS OF ONLINE TEXT-BASED DISCUSSIONS FOR SECONDARY SCHOOL STUDENTS IN THE FRAMEWORK OF THE COMMUNITY OF INQUIRY

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ABSTRACT

This study examines influence of online text-based discussions for secondary school students. It aims to analyze students' shares and views with the goal of exploring the implications of online synchronous text-based discussions held in the Information Technology and Software lessons. It was carried out as a case study in which 10 discussion sessions were held involving 26 students enrolled in a state secondary school. The case study was chosen because it makes it possible to examine a situation in detail and in depth. The findings were discussed in relation with the "Community of Inquiry" (CoI). It was found that with online synchronous text-based discussions, the students experienced building of meaning or collaboratively verified mutual understanding in line with the predetermined objectives. Online text-based discussions helped achieve a meaningful learning experience through development of social, cognitive and teaching presence. Student-student interactions in formal educational environments facilitated the formation of social presence in the online learning environment. Peer reviews concerning the discussion topics, shared contents and the teacher feedback contributed to the development of the students' views on the subject. Off-topic or irrelevant shares in the discussion sessions might cause a negative impact on the students.

Keywords: Online learning, text-based discussions, secondary school, community of inquiry.

INTRODUCTION

Rapid developments in information and communication technologies have changed the classrooms of the 20th century. 20th century classrooms have a structure where the teacher directs the teaching, and learning is limited to four walls and a bell. Classrooms, where other communication and interaction opportunities are not common, have changed dimensions with the opportunities offered by today's technology (Yang et al., 2019). Learning in today's classrooms has gone beyond four walls. Access to learning resources at any time and place, flexible communication or interaction opportunities, individualized learning paths are listed as general characteristics of 21st century classrooms. The roles of teachers and students, which are the most important components of these classrooms, are also transforming depending on the possibilities offered by technology. This situation has changed the expectations from today's teachers. Hence the International Society for Technology in Education (ISTE) (2017) defines the 21st century teachers as individuals who are able to (i) build online connection and communities for students, and (ii) manage student learning in the digital platform. As for the standards for students, ISTE (2016) emphasizes collaboration and communication

skills. It assumes that the 21st century students will be able to (i) build networks, (ii) use collaborative technologies to work with others (peers, experts, or community members), and (iii) communicate clearly by using digital tools suitable for their goals and exhibit competences that can express themselves creatively. These all signal increased tendency towards models where learning activities take place over the network and intenser influence of the Internet network in shaping the classrooms of the future (Turnbull et al., 2020). The idea of online education has expanded, no longer being seen as a limited time trend in education (Kim & Gurvitch, 2020). The Internet has become one of the main resources for teachers, students and institutions. The understanding the nature of online learning and designing quality online learning experiences are attracting more and more educators and researchers' attention (Akyol et al., 2009; Huang et al., 2019).

Online learning is becoming increasingly common in professional education programs in K-12, higher education and beyond. Researchers have attempted to create guidelines, explore or develop models to understand the complex nature of online learning and develop educational technologies that support online learning (Akyol et al., 2009; Huang et al., 2019). According to researchers studying online learning, the essential element of a deep and meaningful educational experience is students' community. In a functional CoI, students engage in a combination of dialogue and reflection to question their current assumptions about a topic and ultimately generate new knowledge (Stewart, 2019). CoI provides a framework for integrating the constructivist approach into course design, implementation and evaluation (Kilinc, 2020). CoI is widely used by researchers as a theoretical framework when analyzing online learning environment.

COI

CoI has a history of nearly 20 years and continues to be of interest to researchers working in the field of online learning. Garrison (2011) defines CoI as a group of individuals participating in critical discourse and thinking in a collaborative way to construct personal meaning and validate mutual understanding. The CoI framework suggests that collaborative learning process can be constructed to encourage student engagement and learning, and this can be achieved by promoting three elements: teaching presence, social presence, and cognitive presences (Choy & Quek, 2016).

Social presence is about participants' feeling effectively connected to each other. It is defined as the degree to which individuals are perceived real in online communication. The ability of individuals to present themselves as real individuals by reflecting their personal characteristics to the community makes it easier to experience meaningful online learning (Rourke & Kanuka, 2009). Many studies have confirmed so far that interpersonal connection perception of individuals participating in online learning experience is an important factor in the success of online learning (Swan et al., 2009). Creating a safe learning environment is essential in social presence (Junus et al., 2014). Social being is a key element for collaboration and is built on 3 sub-components: "emotional expression", "open communication" and "group cohesion" (Garrison & Arbaugh, 2007).

Teaching presence means designing, facilitating and guiding cognitive and social processes to ensure realization of successful online learning experiences (Kozan & Caskurlu, 2018). Teaching presence refers to the presence of a teacher or the teacher's moderator role in the research community. The duty of managing the process provides the teacher with various ways in which s/he can affect the development of cognitive and social presence (Stewart, 2019). Teaching presence consists of 3 sub-components as "teaching management", "meaning construction", and "direct teaching". Teaching management is about the process of planning and organizing the online learning experience (Anderson et al., 2001). It emphasizes the active role of the teacher, from determining the contents to the method, assessment and even time management. Meaning-construction is the process of creating an effective group consciousness that aims to create a collaborative learning environment, to identify the participants' areas of meaning sharing, agreement and disagreement, and to reach consensus finally. Direct teaching is defined as the teacher's facilitating thinking and discourse by presenting content, questions, and orienting and summarizing discussion, and providing curative or diagnostic feedback to student responses (Garrison et al., 1999).

Cognitive presence is concerned with the extent at which individuals experience online learning are able to construct meaning through communication and discourse. The component of cognitive presence indicates the success of an online learning experience (Kozan & Caskurlu, 2018). Cognitive presence consists of 4 sub-components: "the trigger event", "discovery", "integration" and "analysis" (Swan et al., 2009; Pifarre et

al., 2014). Inquiry begins with a trigger event that can be expressed as a problem or dilemma that needs to be solved in an educational context. This event will understandably lead the participants to “discovery”, which is seeking a solution and knowledge for understanding the challenge. This phase is characterized by brainstorming, inquisition and information exchange. Integration refers to the process of starting to construct meaning from the ideas generated during the previous phase. The last phase is the resolution of the dilemma or problem through direct or indirect action. In many non-educational settings, it means applying the proposed solution or testing the hypothesis through practical application. Still, the concept is slightly more challenging in the context of education. In educational terms, the end of this phase may require moving to a new problem with the assumption that students have acquired useful information (Garrison et al., 2010).

The profile of 21st century individuals is shaped by interaction and sharing, and CoI refers to individuals who come together in the online environment. The framework, which provides a roadmap for how to build collaborative learning, especially based on text-based communication, continues to guide educator and researchers in the process of designing and implementing successful learning experiences in synchronous and asynchronous environments.

Text-Based Communication

Text-based communication has become more accessible to an increasing number of people around the world due to advanced technologies. Text-based online remote group works have become a phenomenon rapidly becoming more widespread among organizations operating in educational and global contexts (Robinson et al., 2019). Gonzales (2014) has highlighted the important role of text-based technologies and meaningful social interaction on self-esteem. Weigel (2019) has researched whether the use of voice or video discussion communities yield higher scores than text-only discussions in an online lesson environment, but she has found no statistically significant difference.

Humphry and Hampden-Thompson (2019), in their study examining the effects of one-to-one synchronous educational interventions on primary school students’ emotional experiences, have revealed that text-based communication reduces emotional and social stress. It has been stated that some of the students who previously received individual education through voice-based communication from a teacher they did not know, were initially nervous about talking to their teachers but they could overcome this by using text-based communication. The students preferred to communicate with their teachers through text-based communication until they were confident enough to engage in verbal conversation. The researchers have underlined the positive effect of text-based communication on alleviation of social distance and social stress. In an attempt to refute the claim that socio-emotional climate is compromised, other group members are experienced less real, and sub-optimal outcomes of group work are more likely in online remote group discussions engaging text-based communication, Robinson et al. (2019) have used neuroscience methods and tools. In their study carried out with undergraduate students who were supposed to carry out a group-based project, who did not know each other and did not communicate face to face, the researchers used computer-mediated text-based communication only. They collected data with two neuroscience methods, which are electroencephalogram (EEG) and electromyogram (EMG). As a result, they rejected the alleged handicaps of text-based communication,” (i) the absence of non-verbal communication cues jeopardizes the emotional experience, and (ii) other people in the group are experienced as ‘unreal’ when they are foreign”. It has emphasized that discourse is an important component of human social interaction.

Synchronous and asynchronous computer-mediated communication is used as the tool to promote discourse in the online learning environment. It is defined clearly the advantages and disadvantages of using asynchronous or synchronous tools in online learning environments (Oztok et al., 2013). According to Sotillo (2000), both modes are important tools that can be used to encourage interaction, collaboration, the formation of the learner communities among participants.

On the other hand, Kilic et al. (2016) emphasized that many studies have been conducted on CoI, mostly in asynchronous online environments, and in recent years, studies have been carried out in blended learning environments, but studies conducted directly in synchronous online environments are not common. It is clear that structured studies on how CoI is created in synchronous learning environments will contribute to the field, and it is one of the motivations for this study.

Synchronous Discussions

Approaches where traditional classrooms are enriched with online learning experiences are becoming widespread. Lessons followed face to face by teachers can be integrated with various synchronous and asynchronous tools offered by digital platforms (Wolverton, 2018). Among these approaches that offer significant added value to the learning process, online discussions have an important place (Blankson & Kyei-Blankson, 2008; Butz & Stupnisky, 2017; Kilinc, 2020). Keles (2018) points out that discussions in online learning environments enrich lessons through different infrastructures and experiences. Kilinc (2020) thinks that group discussion should be used more in online learning environments and should be the subject of more scientific studies. According to Beckett (2019), discussions or discussion boards are the heart of online learning environments, and they are an interaction space for teachers and students. Online discussions offer students with the opportunity to adapt, correct, accommodate and extend each other's learning while allowing teachers to encourage in-depth exploration of important concepts. Most online learning research focuses on asynchronous forms of interaction that allow text-based discussion to take place. However, the literature is hosting increasingly more studies examining the potential of synchronous discussions in learning environments (Baker & Hjalmarson, 2019).

There are studies examining the benefits of simultaneous discussions to the learning environment. Kung (2004) has placed emphasis on the emotional, linguistic and cognitive advantages of synchronous discussions. The abovementioned study has indicated strengths of synchronous discussions such as (i) more equal participation, (ii) taking more initiative (iii) feeling of freedom in initiating, following and managing discourse (iv) encouraging the collaborative spirit, (v) enhanced motivation for language practice, and (vi) more time for commenting and improving. According to Kim (2014), text-based synchronous communications is vital for instant feedback and development of reasoning and critical thinking. Participants can present their views instantly without losing the context, similar and different views can be raised and addressed quickly, and misunderstandings can be corrected. According to the same researcher, as another positive feature of synchronous discussions, participants can express their thoughts without any conflict with other participants. All opinions are displayed chronologically in the stream, and participants may be exposed to widely differing views on the topic. Different views and arguments can help students to develop their own thoughts.

Ferrara et al. (1991) define the transmission of texts electronically through communication networks as "interactive written discourse". When text-based synchronous discussions are looked at from this perspective, it can be said that participants are involved in a collaborative discourse in the direction of a specific goal. According to Harasim (2012), knowledge can be built through discourse. In her theory put forward as learning based on online collaboration, she emphasizes the role of peer discourse as the key to learning and defines learning as the construction of knowledge derived from three successive phases of group discourse: (i) Idea Generating, (ii) Idea Organizing, and (iii) Intellectual Convergence. Idea generating is the brainstorming phase where participants' thoughts are brought together. During idea organizing, different ideas generated by participants are compared and contrasted, debated, resolved and classified. Lastly, intellectual convergence refers to reach a level of intellectual synthesis, understanding, and compromise (including the willingness to be in dispute) (Bates, 2015). Studies are still ongoing to find out how to improve discourse, how to contribute to learning in online learning environments, and how educators and students can improve the strengths and weaknesses of this mode of learning (Qiu & McDougall, 2013; Derin et al., 2020). In this context, CoI provides a framework for constructing meaning through collaborative discourse.

The Importance of the Study

CoI continues to be a topic of interest in current research. Educators and researchers studying online learning have mostly directed their attention to higher education context (Seaman et al., 2018; Medeiros et al., 2019; Tratnik et al., 2019). Yet, studies at the K12 level are also increasing rapidly (Arnesen et al., 2019). According to Haavind (2007), social, cognitive and teaching presence components of the CoI framework can be useful for understanding collaborative constructivist approaches at the K-12 level. Although there are studies showing that the CoI framework can provide significant benefits at the K-12 level, there are few studies using the CoI framework at the K-12 level. Jackson et al. (2013) have concluded that the CoI framework improves

the educational experience for many higher education students and some secondary school students, but further research is needed before deciding whether it can be applied to primary and secondary schools seeking to exploit the potential of the online environment. Garrison (2017) has emphasized that the CoI framework has significant potential in shaping online and blended learning at the K-12 level, and there is an enormous need for research into online and blended learning at the K-12 level. From this point of view, the present study aims to analyze online text-based discussions for secondary school students. The study was built on CoI as the theoretical background.

The Aim of the Study

It is aimed to examine the effect of online text-based discussions on secondary school students within the framework of CoI, and answer was sought to the follows questions:

1. What is the nature of the shares in online synchronous text-based discussions?
2. What do students think of the online synchronous text-based discussions?

METHOD

The study was implemented as a case study owing to the fact that this method makes it possible to scrutinize a case in detail and in depth (Yildirim & Simsek, 2013). According to Creswell (2007), a subject that is explored through one or more cases within a limited system such as a setting or context can be examined with a case study. It allows the researcher to look into a limited system or multiple limited systems through detailed, in-depth data collection that includes multiple sources of information, and to report a case definition and case-based themes. It is a transparent method that allows for an elaborate definition of the phenomenon for which evidence is collected (Vanwynsberghe & Khan, 2007). A virtual classroom was created as an online learning environment for the work performed within the Information Technology and Software course. Students participated in online synchronous discussions managed by the teacher in a virtual classroom environment and shared their opinions regarding the topic.

Participants

Purposive sampling method was used in the study. It is preferred when one or more special cases that meet certain criteria or have certain characteristics are wanted to work in (Buyukozturk et al., 2020). The aim here is to study in depth by considering a sample of participants with similar characteristics in terms of age, culture and life experiences (Oral & Coban, 2020). The study participants are 26 secondary school students (13 girls and 13 boys) from the same classroom in a Turkish public secondary school. It was a class with students whose academic achievement was high. All students have their own study room. The education level of the parents was generally undergraduate. All participants had internet access at home so they could participate in online synchronous discussions scheduled outside of school hours. Students had access to technology (computer or tablet) and their use skills were sufficient. Online synchronous discussions were led by their Information Technology and Software teacher. The teacher was took part as a researcher at the same time. All necessary permissions for the study were obtained from the relevant persons and institutions in advance. The participants were given nicknames as S1, S2, S3... during the analysis stage.

Procedure

The overall procedure lasted about 10 weeks starting with the determination of the weekly discussion topics, followed by outlining of the scope and content, and lastly collection of data from the students after the online synchronous discussions. Online synchronous discussions were held for 5 weeks.

Bulbul et al., (2016) proposed a roadmap based on the CoI for educators who implement and intend to implement online learning applications. This study is based on the roadmap proposed by the researchers. Accordingly, the various steps to be followed in the context of cognitive, social and instructional presence before, during and after online courses are as follows: (i) planning, (ii) presenting the environment, (iii)

course process and (iv) evaluation. Planning, recognizing the student profile, determining/providing the hardware requirements, developing a suitable method - technique - strategy for online learning, determining the online learning environment and tools, recognizing the learning environment and tools, developing content, risks and time management, syllabus creation and piloting and reviewing includes steps. The presenting the environment includes the steps of, orientation, resource sharing, and presenting ethical situations. The course process includes the steps of starting the lesson with a conversation, reporting the course agenda and its operation, introducing the topic, starting the discussion by presenting a question/ambiguity, enabling research or discussion, following/focusing/directing the discussion, making sense of the discussion/concluding it. Evaluation includes giving and asking for feedback to the student, tasks and assignments to be done inside or outside the classroom.

The online synchronous discussions took place on Google Classroom. A virtual classroom was created and the students were added. Face-to-face training was given to the students on the use of the virtual classroom, tasks, rules by the teacher of the course in two 40-minute sessions.

Discussion topics were determined by the researchers to be brought up in online synchronous discussions. The topics were selected from the curriculum of the 6th grade Information Technology and Software course. Each of the 10 sessions was planned by the researchers. Then the relevant materials were selected or designed. The activities were built on the constructivist approach and 5E model. The plans and materials were discussed in face-to-face and online asynchronous online interaction environments attended by 20 students in the 3rd grade of Computer Education and Instructional Technology, who had already taken the undergraduate courses “Instructional Principles and Methods” and “Instructional Design”. At the end of these steps, the plans and materials were revised for their final version.

Before the synchronous discussions start, the course flow chart is shared by the teacher. Online synchronous discussions begin with a informing by the teacher. This informative text mainly aims to inform the target audience and it is followed by questions asked by the teacher. These questions are often accompanied by multimedia materials such as documents, audio, video, animation, images or photographs. Next, the participant students write their opinions or share their views about the topic in the questions. The students have a chance to both express their own opinions and read the others’ opinions. In this way, brainstorming occurs, and the students can now think on, reflect on, interact, enquire, criticize, explain, accept, reject, or see the connections between ideas. As a result, the students reach a common understanding on the topic or reach agreement on disputed ideas. The teacher maintains the role of guide, support or encouragement throughout the discussion. Harasim (2012) schematizes the pedagogy of group discussions with a diagram consisting of 3 key steps. In this context, the model examined in the study was structured as in Figure 1.

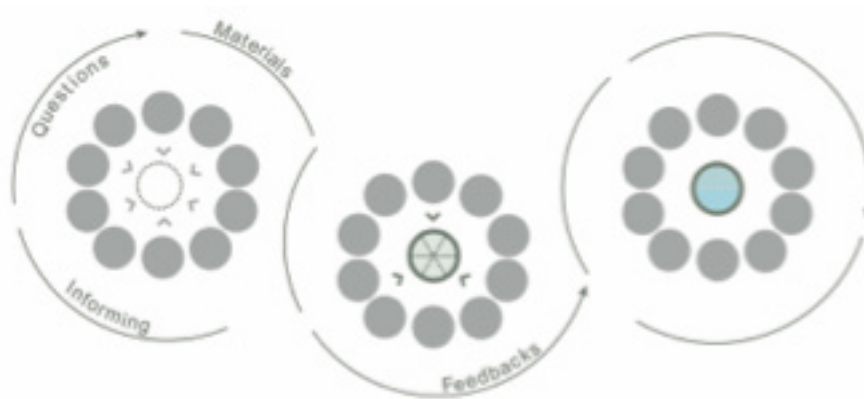


Figure 1. Diagram of online synchronous text-based discussions

The online synchronous discussions were held twice a week in 40-minute sessions at 20:00 in the evening. The students attended from their homes. Participation in discussion sessions was on a volunteer basis and was not mandatory. Students who participated in the discussions were not given extra score. The total number of sessions attended by the students is shown in Figure 2.

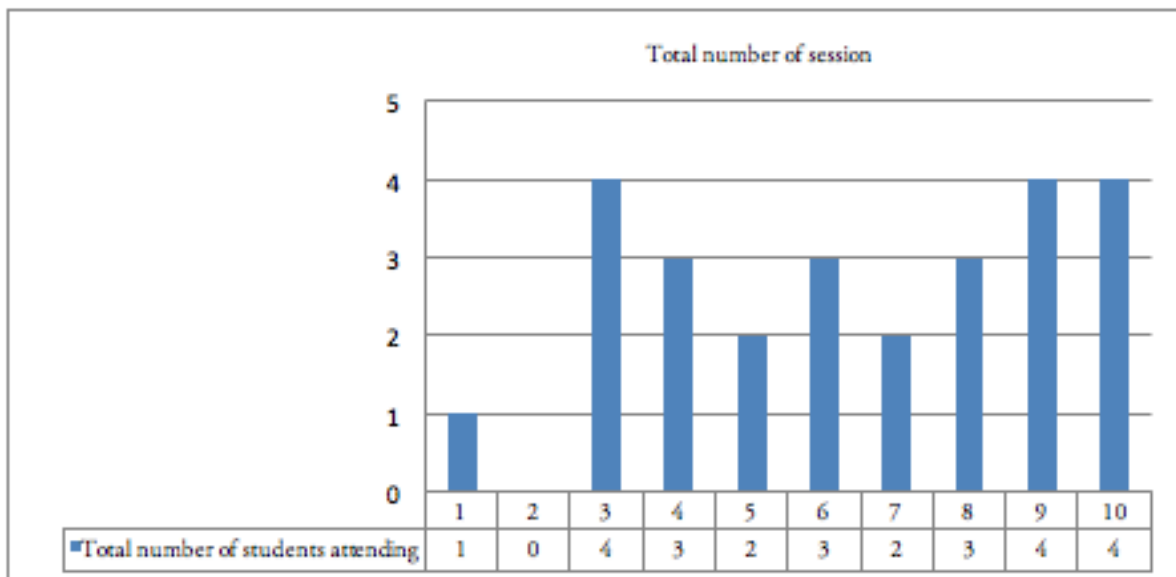


Figure 2. Total number of sessions attended by students

Data Collection and Analysis

Semi-structured interview questions were prepared as data collection tools. The questions were drafted through literature review and shaped by taking expert opinion. The interview questions were used in the focus group interviews conducted with students who were volunteer to take part at the end of the process. The main purpose of the focus group interview is to focus on the participants' attitudes, feelings, beliefs, experiences and reactions. Such attitudes, feelings and beliefs are more likely to arise in an interactive environment. Interaction facilitates the participants' re-evaluating their own understanding of their experiences, asking each other questions, and reconsidering their own attitudes. It also enables the participants' proposing more than one explanation for their behaviors and to express their attitudes more easily (Gibbs, 1997). For these reasons, focus group interview was applied as the most eligible method in this context.

Some of the questions asked during the meeting were as follows: What is the most important reason for your participating in online discussions? What were the most intriguing things for you in online discussions? Was there a forum for discussing, sharing and commenting on ideas? Were you able to learn the topics? How do you think the learning took place? How did presentation of different ideas and everyone's presenting their own opinions affect you? What was your teacher's role in the virtual lesson? Was the feedback helpful? How? How did you feel emotionally overall during virtual lessons? What was the effect of communication by writing?

The data obtained through focus group interviews were presented after being processed with content analysis. The data was read repeatedly and common phrases, words and expressions were elicited to explain all aspects of the content. Then, the categories were created, similar or relevant data were combined and classified under one separate heading (Bazeley, 2013). The results were presented in terms of themes, codes and frequencies in tables (Yildirim & Simsek, 2013). Reliability was ensured through coding and calculation of frequencies by two independent coders, who are the researchers themselves. The formula suggested by Miles and Huberman (1994) was used to calculate the inter-coder agreement, and reliability of 0.85 was found as a result. An agreement rate of 0.80 is considered sufficient to prove reliability.

In the virtual classroom, all shares on the wall were examined. Frequency as well as other quantitative measures are frequently used to evaluate the content and results of discussion boards, which are accepted to be an important component of online learning (Marra et al., 2004). Therefore, the types and frequency of the teacher and the students' shares and the number of students participating in the discussions were found. In addition, screenshots of the discussion board were included in the study data.

FINDINGS

In order to see the effect of online synchronous text-based discussions, this section is devoted to the findings regarding the shares on the discussion board. Additionally, the students' thoughts on the applied process are given as below.

Teacher and Student Shares in Online Synchronous Text-Based Discussions

The online discussions encouraged the teachers and students to make synchronous shares on the discussion topics. Table 1 shows the findings regarding these posts. The materials shared by the teacher in the discussions were gathered under the headings of “documents”, “images or photographs”, “videos”, “audio”, “animations”, “poems”, “stories” and “other” (news, interactive materials and such). It was seen that the teacher shared the materials at various stages of the discussion process in order to draw attention to the topic of discussion, to recycle the preliminary information, to give information about the subject, to help the students concentrate on the topic and to motivate proposing of different ideas.

The teaching presence emphasizes the role of the teacher in designing and guiding the process, and online synchronous discussions begin and end with brief shares made by the teacher. Approximately one hour before the synchronous discussion, the teacher briefed on the discussion time, topic/attainments, course flow and good wishes. Likewise, the process was winded up with posts indicating the end of the discussion and good wishes. By the time the next discussion session started, posts were made to announce the teachers' expectations from the students or requirements of the assignment set earlier. The materials in the posts were also supported with informing and questions. All kinds of posts of the teacher received feedback from the students. For instance, the start and end time of discussions were posted by the teacher in advance, and dozens of students replied by typing “OK”, “All right, teacher”, “We are ready.” each time. The same was true for the shares on the end of the sessions. The teacher's material shares and accompanying notifications such as “Please analyze the material.” were also replied as “OK”, “I have analyzed” or heaps of comments with the same effect. Including all these, the total number of comments made by the students in each session is presented in Table 1. Some student posts were created as a countdown activity while waiting for the start time of the session in the virtual classroom. Similarly, there were some instances during the discussion process where two or more students exchanged posts relevant or irrelevant to the topic of discussion.

The questions asked by the teacher act as The trigger event, which is one of the sub-components of cognitive presence, and are used to initiate and maintain discussions. The average number of responses generated by the students are presented in Table 1. It was seen that each question stimulated sharing of different opinions. The average number of comments by students and the average number of comments on questions are scaled to the number of students in each discussion are presented in Figure 3.

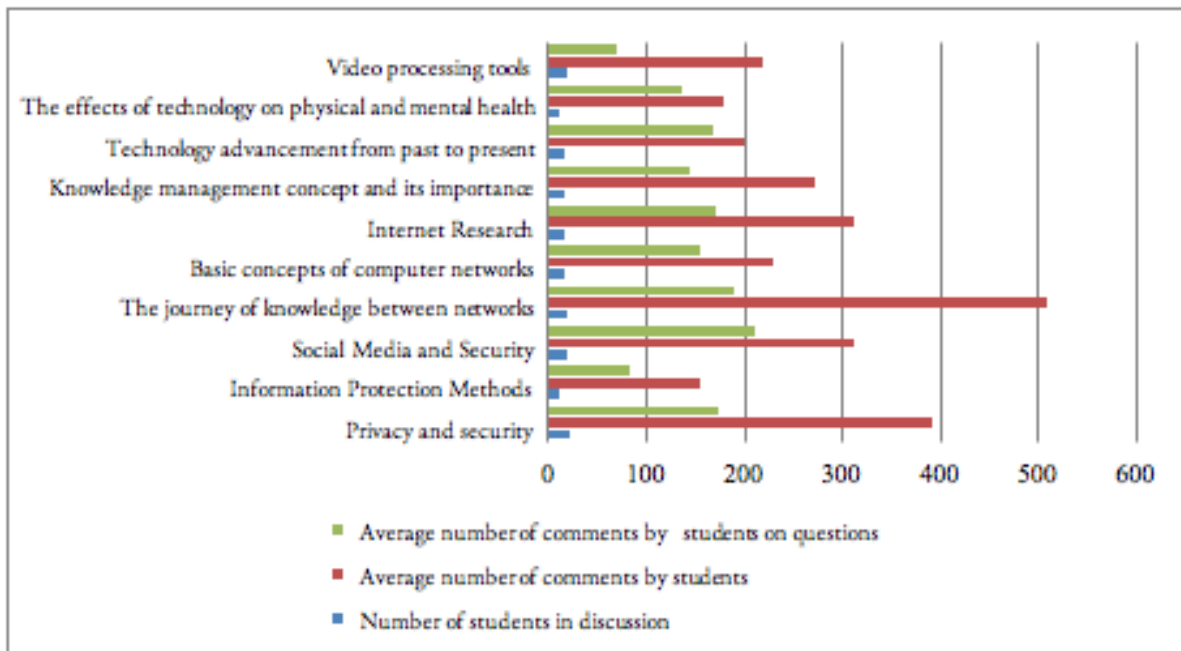


Figure 3. The average number of comments by students and the number of students in each discussion

Every student in the discussion shared their own opinion in response to the question, and this was promoted by the teacher. For example, after a lot of comments were made on a video shared by the teacher, one of the students wrote “I have just watched the video.” The teacher invited in remarks by typing “Let’s hear your thoughts.”

In terms of content, the students’ posts were generally in the form of answer to a question, explaining an opinion or asking a question. It was observed that the teacher paid regard to every single student comment and hearted the students by giving feedback. In some cases, the teacher added extra question to the main question to steer the discussion. To exemplify, the teacher posted an animation along with the question “How has technology affected our social life and our overall life?” The students were seen to report positive or negative thoughts in varying percentages, the teacher provided feedback asking for detailing of the expressed thoughts, and the students were seen to struggle to explain their views in detail.

It is important for students to feel safe and to express their opinions comfortably in terms of social presence. The analysis of the wall showed that the students read each other’s posts, made positive or negative comments accordingly, addressed questions to each other and answered each other’s questions. Another finding from the wall analysis was the frequent comments implying the students’ agreement with their friend(s) during or after the discussions.

Table 1. Findings about discussion topics and shares

Discussion Topic		Type of material posted by teacher										Analysis of discourse in discussion					
Learning Module	Learning Topic	Document	Image or photograph	Video	Animation	Audio	Poem	Story	Other	Assignment	Number of informings made by teacher	Number of questions asked by teacher	Number of feedback given by teacher	Number of students in discussion	Average number of comments by students	Average number of comments by students on questions	Number of submitted assignments
Ethics and Security	Privacy and security	1	1	-	-	-	-	-	-	1	5	7	14	22	393	172	11
	Information Protection Methods	-	4	-	-	1	1	1	1	1	4	6	10	12	156	83	7
	Social Media and Security	1	-	2	-	-	-	-	1	1	5	7	34	18	313	211	5
Communication, Research and Collaboration	The journey of knowledge between networks	-	1	-	1	-	-	-	-	1	7	5	31	20	508	190	4
	Basic concepts of computer networks	2	1	-	-	-	-	-	-	1	7	4	19	17	228	154	7
	Internet Research	2	-	1	-	-	-	1	1	1	6	7	28	16	312	170	7
Information Technologies	Knowledge management concept and its importance	3	-	1	-	-	-	-	-	-	5	2	18	16	273	144	-
	Technology advancement from past to present	-	-	-	2	-	-	-	-	1	3	5	26	16	201	168	5
	The effects of technology on physical and mental health	-	6	1	1	-	-	-	-	-	3	7	23	12	178	137	-
Product Creating	Video processing tools	2	-	1	-	-	-	-	-	-	5	2	29	19	218	70	-

As a supplementary effort, the teacher was seen to post specific questions or contents to steer the discussion in a particular way or to motivate quiet participants to “speak”, and the teacher summarized the topic of discussion in the end. It was found that some of the participants searched the topic on the Internet while the discussion was going on and pasted the search result as it was. In an occasion when such posts took up a lot of space in the flow, the teacher warned the participants by saying “Why don’t you post your own comments?” It was also revealed that some students often sent off-topic posts in the discussion sessions. Some others were seen to deal with the subject in a humorous language and act informally. While a serious discussion was ongoing on the main topic, some participants were seen to be annoyed and thus warn their classmates because of their irrelevant posts. The teacher did not prefer warning individual students for such shares but occasionally making notices such as “Let’s stop share up off-topic (stuff).”

Upon the ending of 7 of 10 discussion sessions, the students were given assignment. They were asked to submit their works online. Table 1 shows the number of assignments submitted by the students via the online platform. When the students’ posts about the first assignment were examined, they were seen to ask questions about how to do the assignment, where to upload it, and whether it would be marked with points.

Technical troubles occurred from time to time. In the discussion session titled “The Journey of Knowledge Between Networks”, the students had difficulty accessing an animation presented by the teacher to the students’ attention. The wall analysis revealed dozens of comments saying that the animation could or could not be opened and asking how it would be opened. Due to the students’ shares seeking alternative ways and technical support for access to the video content, this session witnessed the highest number of comments. It was noticed that the discussion process was interrupted by a student’s shares insistently saying that they could not open the shared materials. Meanwhile, the teacher meticulously provided technical support to the student who faced this challenge. In the follows discussion sessions, it was realized that the teacher directly addressed to the same student to comfort them by saying “If you cannot open it, let me know so that I can send you a link” as soon as the relevant material was posted. In other sessions, there were students who referred to the problem of accessing the Internet or the shared materials, but not at an extent disrupting the discussion process.

Students’ Views on Online Synchronous Text-Based Discussions

The data obtained from the students in focus group interviews about synchronous online text-based discussions were subjected to qualitative analysis. The codes assigned to student responses and the number of students who responded in relation with these codes were clustered under specific themes. The findings from the content analysis are presented in Table 2. The results fall under the follows themes: “participation”, “learning”, “feeling”, “text-based communication”. The section below presents each theme, the codes covered by each theme, the number of students representing each theme, and verbal quotations from the students.

Participation

The theme of participation was developed based on the students’ views regarding their rationale for participating in online synchronous text-based discussions. The students’ views in this regard were coded as “desire to learn” (13), “peers’ existence” (6), “interest in technology” (4), “teacher’s existence” (3) and “examination” (3). Almost all of the students in the focus group interviews stated the desire to learn as their main motive for participation. Approximately half of the students mentioned their classmates’ participation in the sessions as their main drive for participating, while some others stated that their teachers’ presence in the environment convinced them to participate. Apart from these, there were students who attended the sessions just because they were interested in technology. It was also found out that some students participated in the discussion sessions expecting to deal with the discussion topics in the examinations to be taken as a part of the formal education. The statements of the students called S7 and S13 regarding their reasons for participation are as follows:

- S7: The online discussion topics might come as questions in the exam, so I participated in the sessions. Also I participated because most of my friends did so.
- S13: We did not take Information Technologies and Software lessons in the 5th grade. So We didn’t learn much. That’s why it is beneficial for us to log in here.

Learning

The theme of learning was based on students' views about the effect of discussion sessions on their learning and how it took place. Under this theme, the students' views were coded as "peer comments" (13), "contents" (10), "teacher feedback" (9) and "assignments set" (2). Almost all of the students attached importance to the effect of peer comments. This relates to CoI's cognitive presence, which emphasizes able to construct meaning through communication and discourse. Besides, some students emphasized that the contents shared by the teacher were instructive and the teacher feedback was influential. Moreover, there were students who found the assignments given at the end of the sessions to be instructive. The students named S1 and S9 described their own learning processes as follows:

- S1: The teacher assigns a topic and we discuss it with our mates. Everyone has a different opinion on the topic. The teacher evaluates all what we have said. It turns out to be right or wrong, and we learn in this way.
- S9: When I checked the contents the teacher shared, I was able to understand the topic more or less. It was also reinforced when my friends sent comments. When the teacher asked questions, we answered them. We were able to learn the topic as a result.

Feeling

The theme feeling was developed from the student views on the students' reported emotions during the discussion sessions which is related to social presence. Under this theme, the views were coded as "curiosity" (9), "comfortable" (8), "excitement" (7), "boredom" (7), "happy" (3) and "anxiety" (2). It is worth noting that the students expressed not only positive feelings such as curiosity, comfort, excitement and happiness but also negative feelings such as boredom and anxiety. As an example of positive feelings, the statements of S11 and S14 are cited below:

- S11: I was getting excited at the start, wondering what we would learn that day. We could learn the content of the day and we felt happy with that lesson.
- S14: It was fine at first. I was active, I was curious. I generated ideas by myself and typed them. I was happy when my opinion was liked. Towards the end of each lesson, my excitement decreased a bit because everything already was set in my mind, while the lesson was slowly coming to end.

On the other hand, unfavourable feelings such as boredom and anxiety were reported by students as exemplified below:

- S1: When someone wrote something, I, too, wrote but only if I agreed with her/him. I wrote very little of my personal views. I only wrote when I was sure.
- S13: Sometimes a student posted a negative comment, and then disrupts the lesson. As a reaction I left the course.

Text-Based Communication

The students' views on using text-based communication as a communication mode in discussions were analyzed and this theme was reached. The relevant views were combined under codes "generating new ideas" (7), "enhancing participation" (6), "ease of classroom management" (6), "inability to express oneself adequately" (5), "better self-expression" (4), "permanence" (3) and "improvement of writing skills" (2). It was noticed that the students heavily regarded the use of written communication in online synchronous text-based discussions as favourable. According to some students, the fact that all participants were allowed to write their views on the given matter was particularly useful for encouraging generation of new ideas. It even proved to be the most frequently repeated code under the theme of text-based communication. It was revealed that some students had the opportunity to express themselves more easily thanks to text-based communication, whereas some others reported the opposite. As an example, the student named S13 explained the effect of text-based communication on themselves as follows:

- S13: We can make more than one comment. There is no need for the teacher to invite us to speak. You are allowed to write whatever you want, there is nothing to prevent us from expressing our views.

But as for the disadvantages, our pace of our typing is low and we cannot fully explain ourselves. I sometimes get tired of typing. Lessons last something like forty minutes and our hands get tired, but we are getting used anyway.

Table 2. Content analysis results

Theme	Code	Frequency	Participants' remarks
Participation	desire to learn	13	"I participated to learn the topics of the lesson." (S11)
	peers' existence	6	"My friends are there. Why am I not there?" (S8)
	interest in technology	4	"I participated because it is about technology." (S9)
	teacher's existence	3	"The teacher did this for us to be able to learn and we understand that the teacher values us, so we attend the lesson." (S2)
	examination	3	"Questions from topics may arise in the exam." (S8)
Learning	peer comments	13	"I was typing but what my friends wrote also helped my what to write to improve." (S5)
	contents	10	"I reviewed the contents the teacher shared not only during the lesson but several times afterwards." (S11)
	teacher feedback	9	"During the discussion, the teacher talked about the key points when necessary, and they caught my attention." (S1)
	assignments set	2	"The teacher gave homework. I enjoyed doing it very much." (S6)
	curiosity	9	"It was feeling nice when the teacher started the discussion and shared various contents. While someone was typing, the system sent notification about it it and I wondered what s/he would write." (S1)
Feeling	comfortable	8	"When we typed there, our teacher read them all. But s/he can't give everyone a voice in the classroom, so it's more comfortable here." (S11) "When I raised my hand in the classroom and expressed my opinion, the reactions of others disturbed me more. But I was feeling better on this platform." (S7)
	excitement	7	"It was exciting. It was exciting when it was called virtual lessons for the first time." (S8) "I was always excited as my friends were there." (S13)
	boredom	7	"While discussing a topic someone just wrote something ridiculous. It spoiled everything and I was bored." (S10) "I was bored while waiting because of technical problems." (S2)
	happy	3	"You enjoy it when writing your thoughts on a topic. When people like your opinion, you feel happy." (S2)
	anxiety	2	"I sometimes waited for others to type with the fear of giving an incorrect answer." (S10)
Text-based communication	generating new ideas	7	"Everyone was suggesting a new idea. I was thinking by looking at those ideas." (S13)
	enhancing participation	6	"When the whole class raises hand in the real classroom, the teacher receives a person's comment, but here s/he can get everyone's comment." (S11)
	ease of classroom management	6	"Everyone makes noise in the classroom. The teacher speaks, but nobody catches it. Contrarily, here, when the teacher shares posts, everyone focuses on her/him and there is no noise then." (S1)
	inability to express oneself adequately	5	"We can't make much emotion felt when we write, but it can be understood differently because of the way we speak and our tone of voice." (S2)
	better self-expression	4	"If I raise my hand in the classroom, everyone looks at me and I get a little nervous. If I say something wrong, they respond to me by adjusting their tone of voice. Unlike in that setting, I can express myself better by typing here." (S5)
	permanence	3	"When you can't listen to a lecture in the real classroom, there is no make-up. But you can review the online classes recorded there. So it is more beneficial because it stays there." (S9)
	improvement of writing skills	2	"It helped us to master the keyboard by typing." (S12)

DISCUSSIONS AND CONCLUSION

The results obtained here were analyzed in connection with CoI, which constitutes the theoretical rationale of the study. A special case was reached through participation of secondary school students in online synchronous text-based discussions, and it was analyzed in relation to teaching presence, social presence and cognitive presence.

Teaching Presence

The students participating in the activities in this study posted a significant number of comments during the discussions. The materials in the form of contents shared by the teacher, the questions posed, the students' replies and teacher feedback within the scope of the discussion topics brought in student-student, student-content and student-teacher interaction. The students stated that the peer comments made within the scope of the discussion topics and the shared contents helped them to develop their views on the topic of discussion. This finding is consistent with the thesis of Miyazoe and Anderson (2010) that student-student and student-content interaction matters for learning. It was added that the contents shared by the teacher (text, video, animation, audio, story) were interesting. Similar studies confirm the positive effect of using contents such as text, video, photographs, cartoons and web links within the scope of online discussions (Baran & Correia, 2009; Keles, 2018). The teacher is responsible for creating conditions in which learners feel connected, supported and safe to build meaning (Rehn et al., 2016). The present study confirms the previous findings that the teacher initiated discussions, shared contents, promoted the participation of all students, read all of the student comments and provided feedback.

The results of the wall analysis showed that the discussion topics and contents were planned before the discussion, all students were expected to concentrate on and be involved in the discussion as a single group, the start and end time of the discussion and the time or share order of the contents were planned beforehand, and guidance for the effective use of the environment was performed actively by the teacher. It is known that students' motivation and perceptions of learning benefit from online discussion groups effectively guided by teachers (Kilinc, 2020).

According to Anderson et al. (2001), the category of facilitating the discourse is crucial for maintaining students' interest, motivation, and participation in active learning. The current findings show that the teacher could encourage all participating students to share their opinions on the topic, asked additional questions to deepen the shared ideas or reach consensus, enabled acceptance or reinforcement of ideas through feedback and make evaluations. The teacher's guide or facilitator role is important (Garrison & Cleveland-Innes, 2005); however, the current study revealed that peer comments and contents also affected students' interest. The analysis of the wall demonstrated that there was a flexible classroom climate where students could share their ideas without any obstacles. What is more, the focus group interviewed revealed that some participants were able to express their ideas more comfortably in the text-based discussion sessions compared to the real classroom environment. On the other hand, it was understood that there were students who waited to see the posts of their classmates before writing their own opinions with the fear of giving wrong answers. As a result of the discussion sessions, consensus was generally reached on the topic of discussion. Again, according to the focus group interviews, the students ranked teacher feedback as one of the most important factors boosting their learning of the subject. Providing feedback in the online learning environment is critical for students to be motivated and interested in tasks, to eliminate misunderstandings, to prevent them from getting lost and to meet their needs (Kilis & Yildirim, 2019).

The teacher posted questions and contents on the topic with the purpose of elaborating the discussion, tried to bring specific issues into focus in this way, made particular shares to summarize the topic of discussion, provided affirmative feedback, and put efforts to solve technical problems at once. The teacher did not attempt to inject information from various sources during the discussion process, apart from the predetermined instruction materials or activities. However, the students made such attempts. As a conclusion, it can be said that the conditions (Rehn et al., 2016) for meaningful participation of students in the discussion sessions were met to a great extent in this study.

Social Presence

The findings of this study seem to extend considerable support to the view that social presence can be established in online synchronous text-based discussions with secondary school students. It was revealed that dialogue was encouraged around the discussion topics in a meaningful way, participation was ensured, and qualified conversation could be generated. Garrison et al. (2010) define social presence as participants' ability to identify with society, to communicate consciously in an environment of trust and to develop interpersonal relationships by reflecting their individual personalities. In the case of this study, it was observed that the students could express their opinions freely and felt responsible to express their opinions for each topic. Most of the participating students stated that they were able to express themselves comfortably in the discussion sessions. Still, there were students who were anxious about expressing themselves. But the level of anxiety was low enough for them to recall their responsibility to share their views. It can be suggested that online synchronous text-based discussions are an effective way of promoting active participation, generating ideas, and meaningful dialogue for secondary school students.

Lowenthal and Dunlap (2020) have stated that people who communicate outside of online sessions can spend time online more readily than those who do not, and having a past relationship with class members helps create a social presence in online courses. For students who have successful past experience with their peers, it is possible to get to know their peers better, and it is similarly easier to establish and maintain social presence among specific peers in the future (Lowenthal & Dunlap, 2018). The findings of this study are in congruence with the statements of the researchers since the students transferred their classroom interactions during their formal education into the online discussion environment.

Jiang (2017) argues that lesson designs that unveil critical questions and participants' perspectives will boost students' participation in online discussions. In this respect, some of the students in this study stated that text-based discussions fostered participation, facilitated their self-expression, proposed them the opportunity to experience multiple perspectives on the subject and to generate new ideas or to rearrange their existing ideas. These findings are in conformity with the findings of Jackson et al. (2013). Contrarily, there were students who could not fully express themselves emotionally in online text-based discussions as text-based communication deterred doing so.

According to Kilis & Yildirim (2019), it is vital for social presence that the course teacher is kind, uses a simple and easy-to-understand language, and produces timely responses to student needs. In this study, there were found students who accounted for their participation in discussion sessions with the presence of the teacher. In addition to this, some students pointed out the importance of the teacher's reading all comments, duly giving feedback and drawing attention to the main points. Furthermore, the wall analysis became a witness of the friendly classroom climate created by the teacher. Particularly, the teacher's attentive attitude to the students who shared off-topic posts and efforts to help the students facing technical problems seem to have contributed to the formation of social presence in the discussion sessions.

Cognitive Presence

In synchronous online text-based discussions, teacher questions and accompanying content generally started the cycle of critical inquiry. It was interesting for students and provided background information on the question. All students were expected to share their opinions and express their personal thoughts about the question or problem. Synchronous discussions made it possible for students to share their ideas, reflect on shared ideas, exchange ideas, and brainstorm. As a result, meaning could be constructed from the ideas put forward in this context. Share proving students' approval of each other's ideas were frequently encountered in the wall analysis. In order to apply the solution in the real world and test the experience, an assignment was set about the subject at the end of many sessions. The number of assignments submitted by students was smaller than the number of students attending the sessions. Bates (2015) has claimed that online discussions should be an essential component of teaching, not an additional tool such as a textbook, lecture recording or text. If discussions are not used for grading students' performance, the students consider the discussions as optional or extra work, and the researcher pointed out that marking for attendance in discussions should be an essential principle to rely on in instructional design. In this study, the structured discussion sessions were

appointed as optional activities; thus, the students were not given marks for participating. It can be said that the effect of discussion sessions would change once they are placed as the basic component of instruction.

Chen et al. (2019) have revealed that facilitative roles such as questioning, explaining, encouraging connections, summarizing, providing information, and using positive social cues in discussions affect the development of cognitive presence. In the current study, the teacher usually realized these roles, and the students did the same in some cases. The teacher strictly followed all student posts and provided feedback, guidance, explanation, informing and summarizing as needed. The students were seen to sometimes improvise similar responsibilities. In this regard, they contributed to generation of new knowledge by sharing their own opinion about the question or topic of discussion, endorsed other participants' opinions, gave positive feedback, conducted Internet search to provide more detailed information about the topic, and shared the results through "copy-paste". On the contrary, there were students who made off-topic or irrelevant postings causing many other participants to be negatively affected. The literature mentions irrelevant shares and the difficulty of controlling them. According to Keles (2018), in social networks where many people try to send content concurrently, an excessive amount of information accumulates in the learning environment, it becomes difficult for participants to follow all posts regularly and quickly, the possibility of developing a high-quality discussion is reduced and cognitive presence is affected negatively.

In this study, the online synchronous text-based discussions were helpful for students' focusing on specific aspects of the subject, holding discussions around these and sharing information accordingly. Online learning can be beneficial for introverted students (Reilly et al., 2012). Some students enjoyed online text-based discussions due to the inclusion of non-verbal communication, while some others underlined the difficulty of learning through non-verbal communication. In a similar vein, some of the participants in this study were content with the relaxing environment where they could express their opinions, while some others stated that purely text-based communication prevented them from expressing themselves adequately. The literature asserts that text-based communication offers a communication and dialogue environment for many online students, and stands as a useful instrument for social presence and communication among students as long as it is effectively integrated into an online classroom and used for well-defined goals (DuVall et al., 2007).

Discussion sessions designed to uphold progression through the stages of cognitive presence enable higher-level learning to take place (Darabi et al., 2011). In this study, the wall analysis shows that discussion sessions progressed through the stages of cognitive presence and the teacher put efforts to this end. In the focus group interviews, the students stated that they learned the topics discussed in the sessions. They listed peer comments, shared content and teacher feedback as the most influential factors in their learning, respectively. However, Maddrell et al. (2017) have pointed out that empirical data regarding the relationship between social, instructional and cognitive presence and learning outcomes in the learning environment are scarce, and there is a significant shortage of significant correlation between the learning perceived by the student and the success criteria assessed by the instructor.

Suggestions

It was concluded that CoI can be used as a conceptual framework for an online learning experience or discussion activity designed for secondary school students. Analyzes of the discussion sessions revealed the social, cognitive, and teaching presence and its sub-components. Teacher-student, student-student and student-content interactions took place. Significant effects were validated in the context of student opinions. Online discussions can offer important potentials for secondary school students. Departing from this, educational activities for K12 teachers blending theory and practice can provide significant benefits. Moreover, it is emphasized that more research is needed to confirm the applicability of the CoI framework for all subject areas in K-12 (Sanders, & Lokey-Vega, 2020).

In this study, discussion sessions were not designed as a basic component of instruction. Rather, participation was based on voluntariness, participation was graded by no means, the students were not told that the assignments given in the discussion sessions would be used for assessing their success and converted into grades. In the future, a similar setting can be formed and monitored to see the results after fixing discussion sessions for secondary school students as the main component of instruction and determining a set of criteria for assessing the participation. Students pointed out the positive and negative effects of synchronous

discussion sessions with text-based communication. The effect of using other communication modes besides text-based communication can also be looked at.

This study was designed within the framework of the components of teaching, social and cognitive presence, and collected obtained were analyzed within this scope. Many researchers say that CoI can be further developed. There are researchers who articulate new presences such as learning, feeling and autonomy. Future studies can be planned in a way to cover new areas of presence.

The learning presence is discussed by researchers and it is suggested that it may be one of the component of CoI (Shea et al., 2014). Zhang and Lin (2020) confirmed that the learning presence plays an important role in explaining the online learning experience of K-12 learners, different from but complementary to the original CoI presence. In this study, it is revealed in the context of student views that new learning takes place in text-based discussions. However, Maddrell et al. (2017), empirical data on the relationship between social, teaching and cognitive presence and learning in the learning environment are insufficient. In this context, it is recommended to conduct empirical studies.

It is hoped that the design and results of this study will be useful to educators and researchers interested in online learning in K-12. More research is needed on the K-12 online learning in the CoI framework.

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