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Student Involvement in Online Tutorial Activities for Environmental Chemistry Course

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Abstract

Distance education students learn through networks. This study aims to analyze student involvement in online tutorial activities. This research is a survey research to all students participating in the online tutorial of the Environmental Chemistry course. Data was obtained from 26 students who filled out and returned questionnaires from 42 students who participated in online tutorial activities for environmental chemistry courses. The instrument used is a questionnaire containing questions developed from 6 indicators of student involvement in learning. The data obtained are analyzed descriptively. The results obtained show that: 1) Students tend to be motivated to follow online tutorials (agree = 76.53%, strongly agree = 14.44%), 2) Students are able to collaborate with friends in tutorials (agree = 71.42%, strongly agree = 28.57%), 3) Students are able to solve cognitive problems (agree = 90.46%, strongly agree = 9.53%), 4) Students are able to interact with lecturers (agree = 88.56%, strongly agree = 11.44%), 5) Students feel supported by the community (agree = 92.85%, strongly agree = 5.36%), and 6) Students are able to manage their learning (agree = 76.17%, strongly agree = 21.92%). Other research results in the form of student expectations statements, namely: 1) Online tutorial materials should be made more innovative, 2) increase practice questions, 3) prefer if lecturers respond directly to the results of discussions in a faster time so that students can improve discussions and become more active. Other responses conveyed by students are: 1) students like to gain knowledge and open new interesting insights related to environmental problems, 2) students want to deepen the material, 3) students are motivated to find solutions to problems faced in the field, 4) tutors pay enough attention because they remind students of the deadlines for completing discussions and assignments.

Keywords: *Distance Education; Environmental Chemistry Course; Online Tutorial; Student Engagement; Survey Research; University Students*

Introduction

Non-face-to-face learning has a variety of terms, such as online learning, elearning, or distance learning. All of them have similarities in terms of the separation of learners and teachers physically. The term online learning is defined as a learning model that lays place partially or fully through the delivery of information through the internet. In other words, knowledge is provided to users without time constraints and geographical location (Aparicio, Bacao and Oliveira, 2016). E-learning is the delivery of training or education using various electronic media, especially the internet (Ellis, Jarkey, Mahony, Peat and Sheely, 2007). Distance learning is formulated as a teaching and technological model aimed at providing teaching to learners who are physically unable to be present in conventional learning conditions, for example in classrooms (Bušelić, 2012). From the three terms, it can be seen that the core similarity is in the absence of direct interaction through physical face-to-face and the use of media in the learning process. For the sake of term consistency, in this study the term distance learning will be used, hereinafter abbreviated as PJJ.

The existence of communication between teachers and students or communication between students is very necessary for both distance and face-to-face education participants. With the development of information and communication technology, especially the development of computer technology with the internet, this media is widely used for distance learning because it is able to penetrate time and place boundaries and can be accessed anytime and anywhere. The existence of interaction makes learning active and interesting.

Communication takes place in two directions that are bridged with the media actually not only occurs through the internet, but can also be with other media such as computers, television, radio, telephone, and video.

One form of learning assistance services organized by the Open University (UT) is tutorials both given face-to-face and online. Online tutorials (tuton) is an internet-based tutorial service or *web-based tutorial* (WBT) that is followed by students through the network. Through tuton activities, it is possible to carry out a distance learning process that can build communication and interaction between teachers and students as well as between students.

Almost all courses offered by UT are provided with internet-based tutorials and one of them is Environmental Chemistry. Environmental chemistry is a science that studies chemical processes that occur in the environment, chemical processes that occur in the environment can also be caused by various synthesis products and these products in nature can result in various chemical reactions in the environment. Through understanding this chemical process, it can be known the impact it causes, both in the air, land and water.

Currently, a lot of online learning has been given at almost all levels of education, including higher education, even basic education, especially during the 2019 Covid pandemic.

Method

The approach used in this study is Survey research using a qualitative-quantitative survey approach was conducted to all students who took Environmental Chemistry courses.

The instrument in this study is a questionnaire containing 48 questions developed from 6 indicators of student involvement in learning including: a) psychological motivation, b) collaboration with others, c) cognitive problem solving, d) interaction with tutors, *e*) community support, d) self-management.

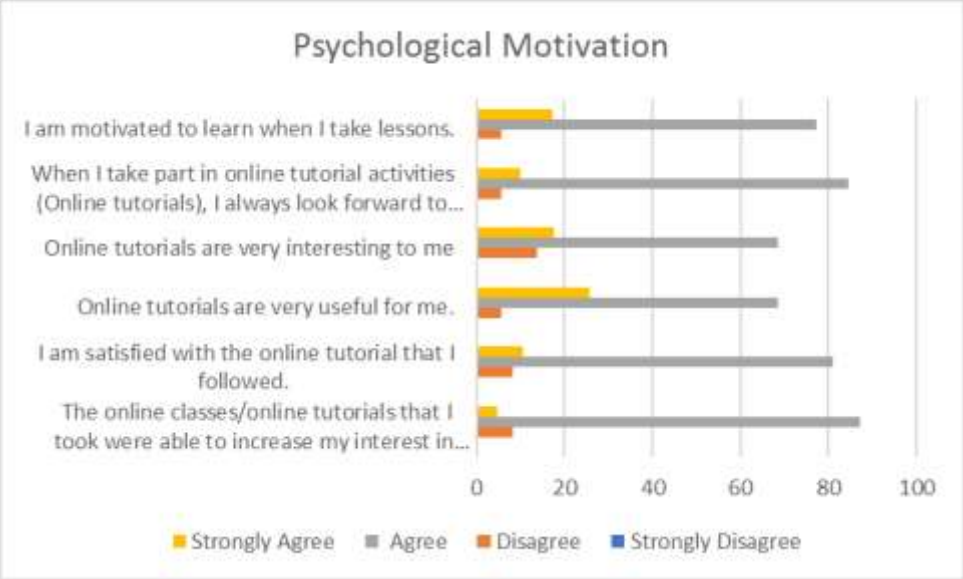
Data were obtained from 26 students who returned and filled in each questionnaire question item and then the data obtained were analyzed descriptively.

Results and Discussion

Distance learning provides ample time and place flexibility and allows learners to make their own arrangements, according to their individual learning needs. In this system, the role of the teacher is as a mediator or facilitator. That is, teachers must provide provisions or the right way for learners to be able to construct their own learning (Goulao, 2012 in Goulao, 2014). Student involvement in learning can be seen from several indicators such as psychological motivation, the existence of student facilities to be able to interact with tutors and collaborate with colleagues, community support from students, and students' ability to manage themselves to be able to solve cognitive problems.

Table 1.Psychological Motivation

NO	STATEMENT	SD	D	A	SA
	PSYCHOLOGICAL MOTIVATION				
1	The online classes/online tutorials that I attended were able to increase my interest in learning	0	8.13	87.1	4.76
2	I am satisfied with the online tutorials I followed	0	8.133	81.2	10.7
3	Online tutorials are very beneficial for me	0	5.566	68.66	25.76
4	Online tutorials are very interesting to me	0	13.66	68.66	17.66
5	When participating in online tutorial activities (tuton) I always look forward to the next week's tuton activities	0	5.566	84.53	9.9
6	I am motivated to learn when I follow tuton	0	5.566	77.2	17.23



Students participating in distance education sometimes do not have preparation in managing their way of learning, especially the management of independent learning. This situation can be a psychological pressure experienced by learners and affect their academic performance. (Pascoe, Hetrick and Parker, 2020). Many factors affect a person's success in participating in distance learning, including the emergence of psychological pressure, which is a condition of not being sure of one's abilities. This uncertainty about one's abilities is commonly called self-efficacy, and this condition can cause a person to become stressed. According to Peters, WcEwen and Friston (2017), stress occurs when a person feels

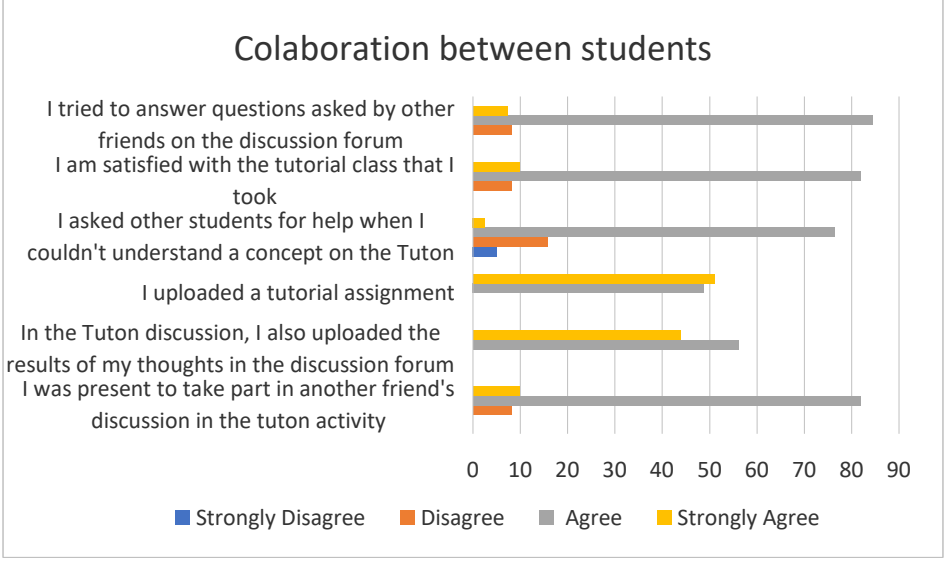
unsure or unclear about something important, which affects physical and mental health. This psychological pressure will affect satisfaction in learning, because high satisfaction in learning will trigger the ability to think and learn optimally (Lo, 2010).

The data in Table 1 explains that online tutorials followed by students show an interest in student learning, because they are considered interesting and useful for them and students are satisfied and motivated in learning. Through these data, it is suspected that students do not experience psychological pressure in participating in this online torial, but on the contrary, students feel satisfied, this is shown by the desire of students to look forward to tuton activities on the next schedule.

There is a negative relationship between hardiness and academic stress, Riggio and Porter (2013) revealed that when individuals lack hardiness it will cause high stress. reveals that in hardiness there is a formidable attitude of commitment, control (Khosaba ; 2005), as well as challenges that can give you the courage and motivation to find ways when faced with stressful situations and reduce the pressure around. Such courage and motivation can help individuals to practice coping skills rather than avoiding problems. These skills provide impetus in action by turning stressful circumstances into opportunities.

Table 2.Collaboration among Students

NO	STATEMENT	SD	D	A	SA
	fellow collaboration				
1	I attended other friends' discussions in tuton activities	0	8.13	81.96	9.9
2	In the tuton discussion, I also uploaded the results of my thoughts in the discussion forum	0	0	56.2	43.8
3	I uploaded a tutorial assignment	0	0	48.9	51.1
4	I asked other students for help when I couldn't understand the concept on the tuton discussion forum	5.133	15.8	76.5	2.56
5	I am satisfied with the discussion of the tuton class that I participated in	0	8.13	81.96	9.9
6	I'm trying to answer a question another friend asked me on a discussion forum	0	8.13	84.53	7.33



A collaborative approach is seen as the process of building and maintaining a common conception and solution of a problem. Learning collaboratively becomes interesting because students are

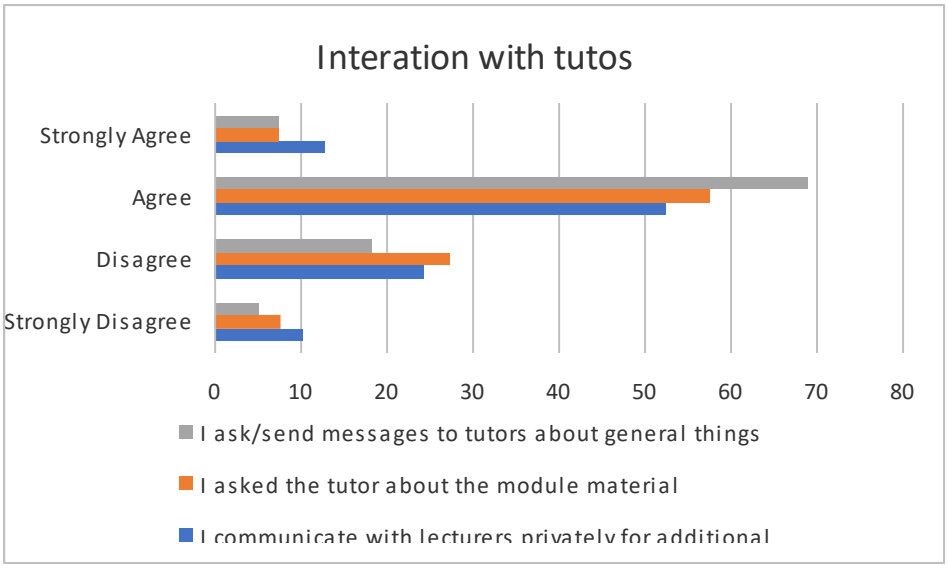
required to think integratively and critically. Experts argue that thinking is not just manipulating mental objects, but also interaction with others and with the environment. Collaboration also allows students to stimulate and connect their experiences with existing material concepts so that higher-order thinking skills will grow. John Myers (1991) emphasizes the process of cooperation, while the word cooperation focuses on the product of cooperation.

Therefore, student involvement in online tutorials is not only shown by student attendance in tuton activities but student participation in discussions and doing assignments and uploading them at each step of the activity. Sometimes students experience problems in doing assignments due to lack of understanding in understanding the concepts of learning concepts in Tuton. This situation can be brought closer to the existence of a discussion forum as a forum for students to interact with each other or communicate with each other and collaborate in their learning. The discussion provides opportunities for students to become active participants in the learning process, maximize the process of cooperation that takes place naturally among students and create a pleasant learning environment and foster mutually supportive and respectful relationships among students.

Data in Table 2 showing that students help each other when unable to grasp concepts and try to answer questions asked by other friends in online tutorial discussion forums. Benefits that can be taken through this activity include cooperation to achieve common goals, help each other and understand the problems faced and find solutions. Thus, it is expected that there will be a process of cooperation that takes place naturally among students, and creates a learning environment that is student-centered, contextual, integrated, and cooperative. This is as expressed by a respondent who said "Maybe it can further improve communication between students in a discussion forum to respond to each other's opinions so that at least good communication is established, the material provided can provide good understanding and provide opportunities for students to think and find more information related to the material through discussions, quizzes and exercises given".

Table 3.Interaction with Tutors

NO	STATEMENT	SD	D	A	SA
	INTERACTION WITH TUTORS				
1	I communicate with lecturers privately for additional help	10.23	24.36	52.5	12.9
2	I asked the tutor about the module material	7.7	27.36	57.6	7.33
3	I asked/messaged the tutor about general things	5.1	18.4	69.16	7.33

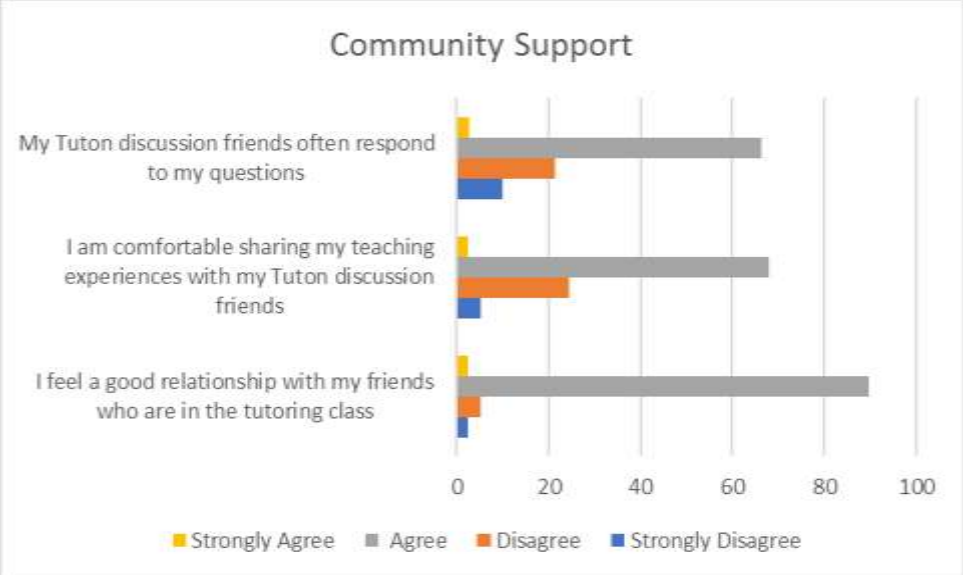


Tutor's interaction with students is an important indicator in.online learning. Interaction between teacher and students can increase student engagement (Fredricks, Filsecker, & Lawson, 2016; Nguyen, Cannata, & Miller, 2018; Quin, 2017). Engagement is defined in multifaceted including behavioral, cognitive and emotional activity in the interaction of teachers and classmates (Muir et al., 2019). Behavioral engagement refers to participation in academic, social and extracurricular activities. Cognitive engagement is a combination of attention and willpower in exerting efforts to understand the subject matter and mastering the skills (Fredricks, Blumenfeld, &Paris, 2004).

As a tutor / teacher, careful readiness is needed before conveying learning to students. The unpreparedness of lecturers in carrying out distance learning can make students lose the ability to organize themselves, so it is difficult to manage time, difficult to focus, difficult to learn independently, and become unproductive. This is in line with the findings of Kuo, Walker, Belland and Schroder (2013) who stated that in distance learning, interaction is very important. Teacher-learner interaction, peer learner and learner interaction with learning content is an important predictor of learning satisfaction.

Table 4.Community Support

NO	STATEMENT	SD	D	A	SA
	COMMUNITY SUPPORT				
1	I feel a good connection with a friend who is in tuton class	2.56	5.13	89.73	2.56
2	I am comfortable sharing my teaching experience with tuton discussion buddies	5.13	24.36	67.93	2.56
3	My tuton discussion buddy often responds to my questions	9.86	21.36	66.2	2.566

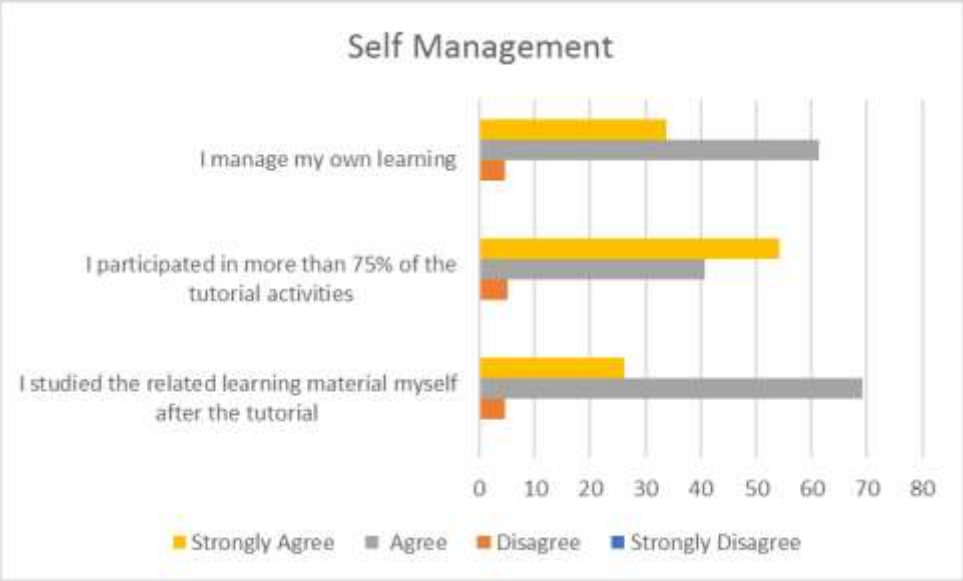


Peer support meant here is peer support, especially those in the same tutorial class. Peer support is shown by a sense of mutual support in making decisions, and providing information to each other. The data in Table 4 shows that in general, students feel comfortable with the support of their community to share their learning experience stories, including in responding to questions. .

This support can develop self-skills and interest in learning and exchange problems and solutions. Students feel comfortable telling their learning experiences to tuton discussion friends. Therefore, peer support helps a lot in creating a school climate, as well as building students' social skills (Erhamwilda 2016).

Table 5.Self-Management

NO	STATEMENT	SD	D	A	SA
	SELF-MANAGEMENT				
1	I taught myself related learning materials after tuton	0	4.76	69.1	26.13
2	I follow more than 75% of tuton activity	0	5.1	40.8	54.1
3	I manage my own learning	0	4.76	61.33	33.9
4	When I follow tuton, I plan a study schedule	0	5.56	63.9	30.53

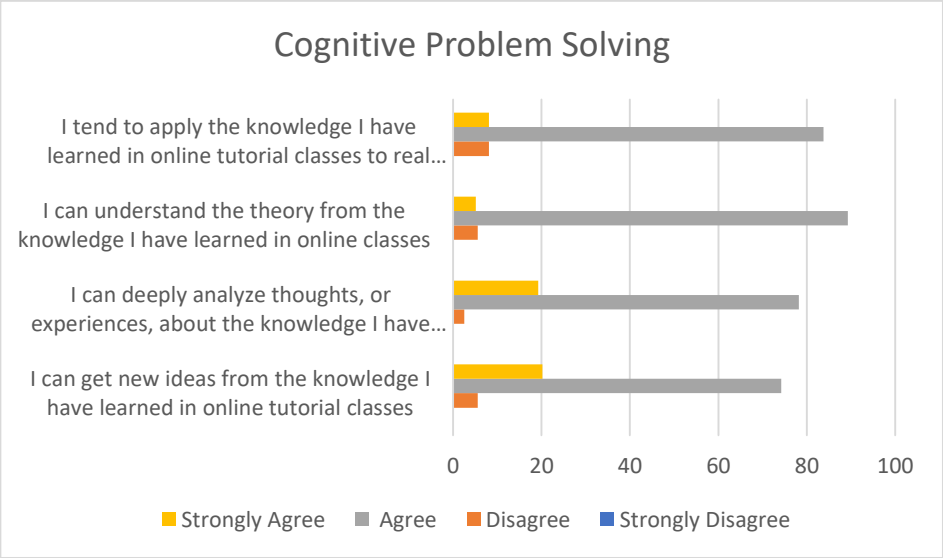


Distance education students are required to have independence in learning. Self-directed learning can be shown as a way of learning for someone with their own initiative starting from planning, implementing, and evaluating, so that students have complete control in the decision-making process related to their own learning (Knowles, 1975; Merria, 2004; Huda, 2013).

When viewed from its spirit, distance learning provides wide time and place flexibility and allows learners to make their own arrangements, according to their individual learning needs. In this system, the role of the teacher is as a mediator or facilitator. That is, teachers must provide provisions or the right way for learners to be able to construct learning on their own (Goulao, 2012 in Goulao, 2014).

Table 6.Cognitive problem solving

NO	STATEMENT	SD	D	A	SA
	COGNITIVE PROBLEM SOLVING				
1	I can get new ideas from the knowledge I've learned in online tutorial classes	0	5.56	74.23	20.23
2	I can deeply analyze thoughts, or experiences, about the knowledge I have learned in my online classes	0	2.56	78.2	19.23
3	I can understand the theoretical theory from the knowledge I have learned in online classes	0	5.56	89.3	5.13
4	I tend to apply the knowledge I've learned in online tutorial classes to real problems or new situations	0	8.13	83.76	8.13



Cognitive is the ability to develop rational abilities (reason). Cognitive theory itself emphasizes more on how the process or effort to optimize the ability of rational aspects possessed by a person. Cognitive can mean intelligence, thinking, and observing, namely behavior that causes people to acquire the necessary knowledge and use knowledge to solve problems by designing, remembering, and finding alternative forms of problem solving (Eti Nurhayati, 2011: 16).

Based on the data in Table 3, it can be explained that in following online tutorials, students are able to analyze deeply thoughts or experiences, obtain new ideas and even tend to apply the knowledge they have learned from the environmental chemistry they have learned. It is expected that students will be able to develop their cognitive abilities, including being able to think critically. In developing children's cognitive abilities, an effective, fun, interesting and meaningful learning process is needed for the learner.

Conclusion

Student engagement is based on several aspects: 1) student-student interactions, 2) student-tutor interactions, and 3) student-material content interaction (Bolliger & Martin, 2018). Students' interaction with other students is an important aspect in the online learning environment. This type of interaction gives students the opportunity to learn from each other through exchange of learning resources, discussions, and sharing experiences and ideas (Shackelford &Maxwell, 2012). Students' interaction with tutors is also an essential part in distance learning environments (Kang &Im, 2013). The role of online tutorial in the online learning environment are: online tutorial can foster a sense of togetherness in various ways; online tutorial supports student participation and learning through online behavioral models by building the contribution of students whom involved in online discussions; tuton increases the activeness of students by various means of communication and providing timely feedback (Martin, Wang, & Sadaf, 2018). Interaction between students and the material content is an important component because students interact directly with teaching materials and lecture activity plans (Tuovinen, 2000; Vrasidas, 2000).

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