The Effect of Online Interaction Types and Acceptance of Technology Factors on Student Satisfaction with Online Learning During the COVID-19 Pandemic

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ABSTRACT
In reducing the spread of the COVID-19 virus, all face-to-face learning processes are replaced with online-based learning. Student satisfaction is needed in an online learning. Online interaction and technology acceptance are required in online learning. Learner-content interaction, learner-instructor interaction, and learner-learner interaction are types of online interaction. Technology acceptance is described by the two factors of technology acceptance model (TAM). The two factors are perceived usefulness and perceived ease of use. Therefore, this study aims to examine the effect of online interaction types and technology acceptance factors on student satisfaction with online learning. The study was conducted on 205 students at a university in Jakarta. The research method used is a quantitative method by distributing online questionnaires. Based on simple linear regression analysis, this study indicate that all three types of online interaction has a positive effect on student satisfaction with online learning. This study also shows that two factors of technology acceptance effect student satisfaction with online learning. This study found that duration of online learning gives different result in student satisfaction. Overall, the results of this study indicate that material, communication with instructor and other students in online learning effects the student satisfaction. In addition, the longer online learning takes, the students feel more satisfied in learning because more material is obtained. Furthermore, students' perceptions on one of communication platform can help and ease students in online learning so that student satisfaction increases.

Keywords: *Student satisfaction, online interaction, technology acceptance, online learning, communication platform*

1. INTRODUCTION

Since the COVID-19 pandemic began to spread in Indonesia, the government has set a regulation to start online learning and maximize the use of technology [1]. This has forced students to study online. Online learning is a type of learning that uses of the Internet and technology such as electronic devices and communication platforms [2]-[3]. In general, online learning is implemented as MOOCs, which have their own system [4]. In online learning, the decline in motivation and commitment might occur. This is due to the discontinuation of on-campus learning [5]. Therefore, student satisfaction is crucial in online learning [6]. Student satisfaction can be referred to as the learning experience that students feel content with [7].

Meanwhile, in order to provide satisfaction in online learning, students ought to have an understanding and readiness in using the technology and the Internet. Subsequently, there needs to be a positive relationship in the communication between the instructor and peers. The instructor has to be prepared to receive questions and feedback from the students. During the COVID-19 pandemic, research was conducted at a university in Indonesia by the Faculty of Biology Education of FKIP Universitas Jambi. The result of the research showed that overall, the students were satisfied with online learning as it was more flexible. However, there was a difficulty in understanding the course materials since students tended to learn more from doing assignments rather than listening to explanations by the instructor [8].

In online learning, the chance of students to interact with the instructor and their peers is limited [9]. The student satisfaction will increase if there is a convenience in accessing materials and communicating [10]. Therefore, online interaction is also crucial in online learning. Online interaction has three types, namely, learner content-interaction, learner-instructor interaction, and learner-leaner interaction [11]. These three types of online interaction may be able to describe and measure the effect of online interaction [12].

Previous studies found that there was an effect of the three types of online interactions on student satisfaction with online learning. One of the studies found that there was an effect of learner-content interaction and learner-instructor interaction on student satisfaction with online learning [5]. Another study result claimed that there was an effect of student-student interaction and student-teacher interaction on student satisfaction with online learning [13]. In addition, other studies on MOOCs found that learner-content interaction was the only interaction type that had an effect on student satisfaction with online learning [14].

To increase student satisfaction, social presence is required in online learning [15]. Social presence is the sensation of being connected to another individual despite of the distance [16]. Technology can make students feel the social presence since online learning uses information system such as a platform to communicate and provide materials. In conclusion, technology acceptance has an important role in online learning.

According to Davis et al. [17], technology acceptance is described as technology acceptance model (TAM). This model provides an explanation on why a certain system cannot be accepted by users. Technology acceptance model (TAM) has two factors that has a major relevance in technology acceptance behavior. Those two factors are believed to affect the behavior and usage of the technology system. Moreover, both factors can affect an individual's trust and behavior when using that technology. Perceived usefulness and perceived ease of use becomes crucial in adopting new information technology.

Technology acceptance model (TAM) may be used in any context and in any field. Initially, technology acceptance model (TAM) was observed on office workers who used computers in the United States [17]. Then, technology acceptance model (TAM) was observed in the education sector that implemented online learning [18]. Other research found that technology acceptance model (TAM) was correlated to the usage of online games by adolescents in Indonesia [19].

Based on previous studies done on MOOCs, perceived usefulness was the only one affecting student satisfaction with online learning [9]-[20]. In addition, other research found that there was an effect of perceived ease of use on student satisfaction [21]. However, there is a researcher who did not find the effect of perceived ease of use on student satisfaction [5].

Due to the different results from the previous studies, and the fact that the variables above are not commonly found in other research in Indonesia and in a COVID-19 pandemic situation, this study aims to observe the effect of online interaction types and acceptance of technology factors on student satisfaction with online learning.

1.1. Related Work

1.1.1. Student satisfaction with online learning

Student satisfaction is the most important predictor in a learning process regarding the quality that measures perception and achievement [22]. Student satisfaction may improve the motivation to study, and to get involved and follow the learning process [23]. There are characteristics of students who have satisfaction with online learning. Students who are satisfied will feel content and be responsive during the learning process. They may earn greater achievement. In addition, students with low satisfaction will face many difficulties during the learning process. This may cause ineffective learning process [24]. In online learning, factors that can affect student satisfaction are instructor attitude and communication with other students. The instructor has to be prepared to receive questions and feedback from the students. The students can study in groups to increase student satisfaction in online learning. Moreover, the convenience to get books, access the library, and have technical support are needed to increase student satisfaction in online learning. Finally, there needs to be a comprehensible website [24]-[25].

1.1.2. Online interaction

Online interaction is technology-based communication or event that involves an interrelationship between two or more objects or individuals connected with a technology [26]. Online interaction is based on the independent learning and teaching theory as an education system where instructors and learners are separated in a different space and time. Students tend to learn independently. A communication method becomes important in online interaction. Distance learning must have more than one media to communicate and provide course materials, such as books, social media, television, radio, computer, telephone, and applications used for learning [27].

There are three types of online interaction. The first type, learner-content interaction, is an interaction between learners and the course materials. By interacting with the materials, students gain knowledge and it becomes a process of receiving information to their cognitive thoughts. Some learning processes are only content-interactive, thus, making the communication only one-way with an expert. This interaction is commonly implemented in independent learning [25]. In this case, the learning process includes providing videos presenting the materials, learning from various sources, reading the materials, using study guides, watching videos, and finishing a project or assignment [28]-[29].

The second type is learner-instructor interaction, which is an interaction between learners and the instructor who provides the course materials. The instructor can receive questions, give advice, support, and motivation to each learner. For that reason, a feedback is needed between learners and the instructor. This interaction can be performed using a communication platform [25]. Learner-instructor interaction can be done synchronously through a phone or video call. On the other hand, distance learning can be done asynchronously through e-mail, messaging applications, or discussion forums [30]. The third type, learner-learner interaction, is an interaction between a learner with another learner, individually or in a group, with

or without an instructor. Usually, learner-learner interaction is found in a group discussion. Learner-learner interaction can be done through emails or chatting features provided by communication platforms [11].

1.1.3. Technology Acceptance

Technology acceptance is described as technology acceptance model (TAM). Technology acceptance model (TAM) is an information system theory designed for an observation on how users accept, understand, and apply an information technology [17]. Technology acceptance model has two important factors. There are perceived usefulness and perceived ease of use. Perceived usefulness is defined as an individual's belief that a certain system is useful to increase their performance on their tasks productively and effectively. Meanwhile, perceived ease of use is an individual's belief that the technology they are using can minimize their effort in doing something [17].

1.2. Our Contribution

This research can add an empirical study regarding the predictors of student satisfaction with online learning seen through online interaction types and acceptance of technology factors. Besides that, this paper may become a reference to universities that use online learning. In addition, this research can provide guidance to instructors so that they can adjust their learning method to increase student satisfaction with online learning.

1.3. Paper Structure

First, the researcher describes all variables to be studied. Then, research method used in this study is in Section 2. Section 3 the results of the study using simple linear regression analysis. Section 4 concludes the paper from the overall research results and presents direction for future research.

2. METHODS

2.1. Participants and Procedure

The survey was filled in by 205 students studying in a university in Jakarta, Indonesia. The questionnaire data were acquired by using Google Form. The participants are those who were learning online due to COVID-19 and used one of the observed communication platforms. This research used a quantitative method and a simple linear regression analysis. To conduct inferential testing, this study used One Way ANOVA analysis. The data were processed with Statistical Product and Service Solution (SPSS) software 22.0.

2.2. Research Instruments

The instrument used for measuring student satisfaction with online learning is student satisfaction scale developed by Alqurashi [5]. Each item was measured using Likert's scale ranging from 1-5 points. The instrument used for measuring online interaction types is an instrument developed by Kuo et al. [31], which is learner-content interaction scale, learner-instructor interaction scale, dan learner-learner interaction scale. Each item was measured using Likert's scale ranging from 1-5 points. Perceived usefulness and perceived ease of use scales, developed by Sun et al. [32], were used to measure both factors of technology acceptance. The researchers readapted both instruments to be compatible with the selected communication platform. Each item was measured using Likert's scale 1-7. The smallest scale means strongly disagree, and the largest scale means strongly agree.

3. FINDINGS AND DISCUSSIONS

In this study, there were 57 males (27.8%) and 148 female participants (72.2%). The participants were in 18-24 years of age. Most participants were 21 years old (47.8%). Meanwhile, the least were 24 years old (1.0%). This study was conducted in eight faculties. The faculty with the largest number of participants was psychology 94 people (45.9%), the other faculties were economy and business (65 people, 31.7%), engineering (13 people, 6.3%), communication science (11 people, 5.4%), law (8 people, 3.9), art and design (8 people, 3.9), information technology (4 people, 2.0%) and medicine (2 people, 1.0%). The longest lecture duration in a week was 20 hours (39.5%). Other students took lectures with the duration of 6 hours (31.7%), and 13 hours (28.8%).

Each instrument has number of items, ranges, mean scores, standard deviations, and Chronbach's coefficient alphas, as shown on table 1. Each instrument had the Chronbach's coefficient alpha larger than 0.7, which indicated that it had a good reliability. All assumption tests including normality, linearity, heteroscedasticity, and autocorrelation tests had been conducted so that a simple linear regression analysis could be performed. Pearson's Correlation Test was also performed to test the correlation between variables on student satisfaction. The result of this study found that all variables were correlated to student satisfaction.

Table 1 Items, means, standard deviation, and reliability for each scale

Scales	Items	Range	M	SD	α
Student Satisfaction	2	1-5	3.14	1.05	.86
Learner-Content Interaction	4	1-5	3.02	.80	.80
Learner-Instructor Interaction	6	1-5	3.35	.62	.70
Learner-Learner Interaction	8	1-5	3.54	.74	.86
Perceived Usefulness	4	1-7	4.63	1.23	.87
Perceived Ease of Use	4	1-7	5.31	1.20	.89

Based on the research result shown on table 2, it was found that learner-content interaction had a positive effect on student satisfaction ($p < .05$). If the materials are accessible by students during online learning, the level of student satisfaction will be high. This is in accordance to the previous studies [5]-[33]. This research is also in agreement with the research result of those studies even though they were conducted on MOOCs [14]. Alqurashi [5] stated that it is more likely to have student satisfaction if there is an ease of access to course materials despite the mediation of technology.

This research result find an effect of learner-instructor interaction on student satisfaction ($p < .05$). This research had a similarity in result with the research done by Alqurashi [5]. The reason that there was an effect of learner-instructor interaction on student satisfaction with online learning is that students need interaction with the instructors when doing online learning. This refers to the research by Alqurashi [5] which claimed instructor can assist students in understanding the material, support, and provide guidance while doing online learning.

This research also find an effect of learner-learner interaction student satisfaction ($p < .0.5$). This is in accordance to the research done by Eom and Ashill [13]. The results of this study may be caused by the quality of interaction during online learning. According to Alqurashi [5], the quality of interaction between students greatly affects student satisfaction with online learning. Students must have interaction such as group work discussion, receive feedback from other students, and share ideas and opinions about learning materials with other students [25].

Based on the research results, there was a positive effect of perceived usefulness on student satisfaction ($p < .0.5$). This research supported the previous studies conducted on MOOCs, that claimed perceived usefulness had a strong effect on student satisfaction [14]-[20]. The effect of perceived usefulness on student satisfaction with online learning might be caused by the fact that students believe communication platforms can help them increase their learning achievement. This refers to the research done by Al-Azawei dan Lundqvist [20], which stated that students' belief that using technology will improve student satisfaction with online learning. According to Sun et al. (2008) [32], the higher the perceived usefulness in online learning, the higher the student satisfaction rate. Hence, this research could be described as the higher the perceived usefulness in a communication platform during online learning, the higher student satisfaction with online learning.

In this research, the effect of perceived ease of use on student satisfaction was found. The research result is in accordance to the one conducted by Joo et al. [21]. Despite the different form of online learning, the results were the same as that of this research. The influence of perceived ease of use on student satisfaction with online learning can be caused by student belief in the ease of using technology that can help students in online learning. This refers to one of the statement that MOOCS can make it easier for students in their learning to increase student satisfaction [21].

This research had an additional result. There was a difference in student satisfaction with online learning based on the duration of learning ($p < .05$). There was a significant difference in the group with 20-hour duration and the group with 6-hour. The research result showed that the longer the duration of online learning, the more satisfied the students feel. This difference might occur because the longer the duration, the more materials the students get in online learning, hence, increasing the student satisfaction. This result refers to the research by Burnett et al. [34], which noted that students received less course materials in a shorter duration than those who had a longer duration in online learning.

This research had several limitations. The research samples were taken only from one university, which might not predict all students in Indonesia who were learning online. In measuring technology acceptance, this research was limited to one communication platform. The reason for this was that the chosen communication platform was recently used by students to learn online during the COVID-19 pandemic. Nonetheless, there were students who did not use the chosen communication platform. Thus, they could not be the participants of this research. Another limitation of this research was that the questionnaire was shared through Google Form and it used the snowball technique sampling. As a result, the researchers were unable to supervise the participants. The data of participants in this research were not even regarding the faculty and gender.

Table 2 Simple regression analysis

Independent Variable	R^2	F	β	*t*	*p*
Learner-Content Interaction	.395	132.72	.63	11.52	.00
Learner-Instructor Interaction	.285	80.87	.53	8.99	.00
Learner-Learner Interaction	.226	59.39	.48	7.71	.00
Perceived Usefulness	.397	133.78	.63	11.57	.00
Perceived Ease of Use	.224	58.51	.47	7.65	.00

4. CONCLUSIONS

Based on the research result, there were three types of online interaction that affected student satisfaction, namely, the learner-content interaction, learner-instructor interaction and learner-learner interaction. It also applied to the technology acceptance factor. Perceived usefulness and perceived ease of use were the factors affecting student satisfaction. This research found a difference in student satisfaction based on the duration of online learning. The suggestion for future research is to increase the number of samples and to conduct the research in various universities. Future researchers may also conduct the research in universities that have applied online learning curriculum. Moreover, they may also observe other communication platforms. Lastly, future researchers may also apply other methods, such as qualitative or mixed methods.

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