CRITICAL FACTORS IN E-LEARNING INFLUENCING STUDENT MOTIVATION AND COLLABORATION IN INDONESIAN HIGHER EDUCATION INSTITUTION

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ABSTRACT

The purpose of this research was to determine the effect of e-learning and its elements to student motivation and collaboration. This research was conducted in one of Indonesian higher education institutions. A questionnaire was distributed to collect data from students. Data were obtained from 145 active undergraduate students. The statistical method of multiple regression analysis was used for data analysis, using software Statistical Product and Service Solution (SPSS) version 22. Overall, the results of this research indicate that e-learning has a positive impact on student motivation and collaboration. However, it is found that not all elements of e-learning have positive impacts on student motivation and collaboration.

Keywords: *e-learning, student motivation, student collaboration*

INTRODUCTION

Information and communication technology in higher education has been one of the important aspects noticed by the Indonesian government. Thus, it has become one of the minimum standards of learning, meaning it must be owned by universities in Indonesia as specified in Regulation of the Minister of Education and Culture of the Republic of Indonesia number 49 of 2014 (Republik Indonesia, 2014).

According to Oye et al. (2012), e-learning is the use of information and communication technology (ICT) to improve and facilitate teaching and learning. Meanwhile, Sulcic and Lesjak (2009) have believed that e-learning is a learning process where students get their material through electronic media (Internet, intranet, extranet, satellite, audio/video, and/or CD). There are three basic characteristics in e-learning, namely (1) must be in the network, (2) must be accessible through a standard web browser on a computer, and (3) needs to expand the traditional training paradigm (Pelet, 2014). E-learning can generally be applied to two learning systems, namely online learning and blended learning. Formally, e-learning is defined as direct and indirect communication mediated by an electronic device for the purpose of establishing and understanding knowledge (Garrison, 2011). Therefore, it can be concluded that e-learning optimizes the use of ICT and/or electronic devices to improve and facilitate the teaching and learning process to achieve the goal of learning, which is obtaining an understanding of knowledge. The main purposes of e-learning are to improve the accessibility of education, save costs and time, as well as improve student achievement (Oye et al., 2012). Moreover, many researchers have discussed the positive effects of the use of e-learning as it increases the commitment of the students in the learning process (Rashty in Khan & Jumani, 2012).

Changes in the learning process as a result of the implementation of e-learning cannot be circumvented. E-learning changes not only the paradigm of the students but also the faculty, coaches, administrative, technical and other support, as well as the institution as a whole. In his research, Khan (2005) has created a framework to support the paradigm shift and create a learning environment that is more meaningful. There are eight dimensions/elements in e-learning framework; institutional, management, technological, pedagogical, ethical, interface design, resource support, and evaluation.

According to Delvecchio and Lougney in Khan and Jumani (2012), one of the weaknesses of e-learning is that it requires more time to follow the course and complete the tasks than the traditional classroom. This means that students must be highly motivated and responsible because they have to do the work themselves. That being said, the students who have low motivation or a bad learning habit can be left behind. In the context of educational psychology, motivation involves the processes that drive, steer, and maintain a behavior (Santrock, 2008). In general, motivation increases the student's time to do his/her job which is an important factor that affects both learning and their achievements in a particular area (Ormrod, 2011),

Pintrich and Schunk in Chen and Jang (2010) have shown in their study that Self-Determination Theory (SDT) is one of the most comprehensive and empirically supported theories of motivation available today. The theory distinguishes various types of motivation based on different reasons and purposes that generate an action (Ryan & Deci, 2000). The most fundamental difference is between intrinsic motivation that refers to doing things because it is inherently interesting or fun, and extrinsic motivation that refers to doing things because it is able to provide separate results. Research conducted by Khan & Jumani (2012) have revealed that e-learning is more helpful in improving student's motivation than traditional learning models, and recommend the use of e-learning for teaching and learning process to be more appealing. This result is also supported by Harandi (2015), whose study confirms that e-learning is an element that influences student's motivation.

Another important factor in the online learning environment is the effective collaboration to support students' learning process. Collaborative learning is regarded as one of the most effective ways to improve student's learning as they help each other gain a better understanding to grasp the theme by discussing their tasks. Collaborative learning according to Laal and Ghodsi (2012) is an educational approach to teaching and learning that involves a group of students to work together to solve the problem, complete task, or create the product. According to Hilts & Walker in Zhu (2011), previous research has shown that students in collaborative learning environments have a more constructive learning process. In the collaborative learning process, students can share information, train critical reflection, negotiate meaning, as well as test and build understanding. Another study shows that the use of e-learning effectively supports the collaboration of students in their learning process (Al-Ani, 2013).

Indonesia has become one of the countries recording a total growth of e-learning market average of 25% in 2016. However, student's motivation and collaboration have not experienced similar improvement. Hence, there should be research to find out the factors that can increase students' motivation and collaboration in order to design policies for its improvement. In line with that, the research question is, "what are the e-learning factors that can improve student's motivation and collaboration?" Thus, this research will be conducted to determine the effect of e-learning and its element on student's motivation and collaboration in one of the higher education institutions in Indonesia. The result of the research is expected to be useful in helping the institution and other higher education institutions, in general, to improve their student's motivation and collaboration by adjusting their strategies.

METHODS

This research uses primary data collected by using questionnaire and distributed to undergraduate students of a higher education institution in Indonesia. The institution has implemented blended learning and used Learning Management System (LMS). Several features of LMS allow the students to access learning material, conduct video conference and have a discussion with lecturers and their peers. A questionnaire is applied to collect data from 145 active undergraduate students. The questionnaire comprises of 35 statements related to latent variables within the theoretical framework of the study, as shown in Figure 1. They are three statements for institutional, three statements for management, four statements for technological, four statements for pedagogical, three statements for ethical, four statements for interface design, three statements for resource support, three statements for evaluation, five statements for motivation, and three statements for collaboration.

The operational variables of this study are adapted from e-learning framework sub-dimensions from Khan (2005), and they have been revalidated for this study. The measurement used in this study is the five-point Likert scale from strongly disagree (1) to strongly agree (5). A pilot survey has first been conducted to 30 respondents to test the validity and reliability of the questionnaire.

The method used for data analysis is multiple regressions. There are several stages of data analysis, namely; residual normality test, F-test, and t-test. Normality test is used to determine if the collected data has normally been distributed. F-test is conducted to determine if one of the independent variables positively relates to the dependent variable. Lastly, the t-test is conducted to partially determine if one of the independent variables positively relates to the dependent variable. The following are mathematical equations/models that will be tested based on the theoretical framework proposed in Figure 1.

(1) $MT = \beta_{10} + \beta_{11}I + \beta_{12}M + \beta_{13}T + \beta_{14}P + \beta_{15}ET + \beta_{16}ID + \beta_{17}RS + \beta_{18}EV + \varepsilon$
(2) $CL = \beta_{20} + \beta_{21}I + \beta_{22}M + \beta_{23}T + \beta_{24}P + \beta_{22}ET + \beta_{23}ID + \beta_{24}RS + \beta_{28}EV + \varepsilon$

Where,

MT	= Motivation	ET	= Ethical
CL	= Collaboration	ID	= Interface Design
I	= Institutional	RS	= Resource Support
M	= Management	EV	= Evaluation
T	= Technological	ε	= Error
P	= Pedagogical		

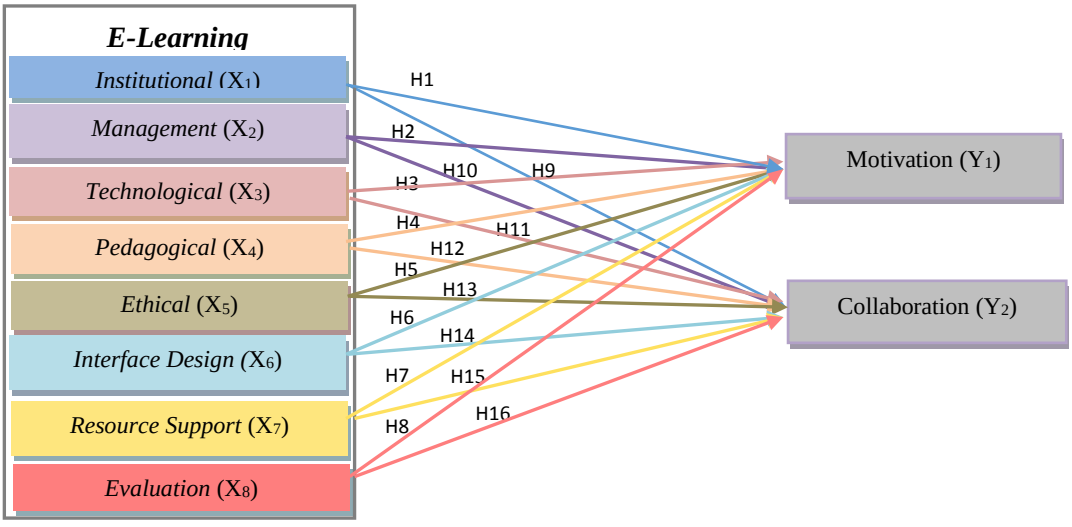

Figure 1 Model of the Relationship among Variables in the Research

RESULTS AND DISCUSSIONS

Table 1 presents the results of normality test that has been conducted on the collected data:

Table 1 Normality Test Result for Model (1) – Variable Dependent Motivation

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		145
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	0,28305079
Most Extreme Differences	Absolute	0,069
	Positive	0,067
	Negative	-0,069
Test Statistic		0,069
Asymp. Sig. (2-tailed)		0,090[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the result that can be seen in Table 1, significant value = 0,090; which is bigger than 0,05. Thus, it can be concluded that the data of the first multiple regression models tested are normally distributed.

Table 2 Normality Test Result for Model (2) – Variable Dependent Collaboration

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		145
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	0,34588112
Most Extreme Differences	Absolute	0,051
	Positive	0,034
	Negative	-0,051
Test Statistic		0,050
Asymp. Sig. (2-tailed)		0,200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Based on the result in Table 2, the significant value = 0,200; which is bigger than 0,05. Therefore, it can be concluded that the data of the second multiple regression models tested are also normally distributed.

The F-test is conducted to test the following hypotheses:

H_1 : One or several e-learning dimensions/elements are positively affecting the motivation of students.

H_2 : One or several e-learning dimensions/elements are positively affecting the collaboration of students.

Tale 3 shows the results of F-test that has been conducted:

Table 3 F-test Result for E-Learning and Motivation

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	6,970	8	0,871	10,270	0,000b
	Residual	11,537	136	0,085		
	Total	18,506	144			

a. Dependent Variable: MT
b. Predictors: (Constant), I, M, T, P, ET, ID, RS, EV

Based on the result that is shown in Table 3, significant value = 0,000; which is lower than 0,05; resulting in the conclusion that one or several e-learning dimensions/elements are positively affecting the motivation of students.

Table 4 F-test Result for E-Learning and Collaboration

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	6,527	8	0,816	6,441	0,000[b]
	Residual	17,227	136	0,127		
	Total	23,755	144			

a. Dependent Variable: CL
b. Predictors: (Constant), I, M, T, P, ET, ID, RS, EV

Based on the result seen in Table 4, significant value = 0,000; which is lower than 0,05. Hence, it can be concluded that one or several e-learning dimensions/elements are positively affecting the collaboration of students. Further analysis has been conducted to determine which of the e-learning elements that positively has an influence on student's motivation and collaboration.

The t-test among elements of e-learning and motivation has been conducted to test the following hypotheses:

H_3 : Institutional element has an influence on student motivation
H_4 : Management element has an influence on student motivation
H_5 : Technological element has an influence on student motivation
H_6 : Pedagogical element has an influence on student motivation
H_7 : Ethical element has an influence on student motivation
H_8 : Interface design element has an influence on student motivation
H_9 : Resources support element has an influence on student motivation
H_{10} : Evaluation element has an influence on student motivation

Based on the t-test result in Table 5, only H5, H6, H7, and H8 can be accepted because significant values of the test show that value is lower than 0,05. This also acts as statistical evidence that the independent variables, which include technological, pedagogical, ethical, and interface design, are significant predictors of the dependent variable, student's motivation. This result is in line with previous research conducted by Bekele (2010) that have stated that technology is a source of student's motivation in the learning environment that is supported by the internet. It also supports researches by Abootorabi (2011), Wang and Reeves (2007), and Bamosa and Ali (2000) which stated that learning

strategy and clear content have the positive effect on student's motivation. Jerman-Blazic and Klobucar (2005) have believed that violation of privacy may reduce students' confidence in the learning process, and Wang and Reeves (2007) have shown in their study that clear and functional interface promotes students' motivation in the learning process.

Table 5 t-test Result for Elements of E-Learning and Motivation

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	0,332	0,455		0,730	0,467
	Institutional	-0,147	0,080	-0,173	-1,833	0,069
	Management	0,002	0,086	0,002	0,019	0,985
	Technological	0,192	0,083	0,176	2,309	0,022
	Pedagogical	0,261	0,092	0,228	2,850	0,005
	Ethical	0,271	0,071	0,339	3,799	0,000
	Interface Design	0,262	0,103	0,201	2,536	0,012
	Resource Support	0,005	0,066	0,006	0,080	0,937
	Evaluation	0,071	0,068	0,083	1,044	0,298

a. Dependent Variable: Motivation

Adaptive learning technology is one of many initiatives which can be used to improve students' motivation. It is an approach to instruction which utilizes technology to create a personalized learning experience for students and provide different methods to enhance their learning (Forsyth et al., 2016). However, personalized learning is not only enabled by the technology, but it also has to be accompanied by an adaptive pedagogy approach. According to Bendou, Megder, & Cherkaoui (2017), there are several pedagogy principles in the adaptive online learning environment that need to be taken into account in consideration of the need to consider the diverse profiles of students, continuous presences, assistance, and feedback as well as adaptation.

On the other hand, the hypotheses are not accepted because the significant values of the test for H3, H4, H9, and H10 is higher than 0,05. This also means that the researchers do not have statistical evidence to conclude that the independent variables, which include institutional, management, resource support, and evaluation, are significant predictors of the dependent variable, students' motivation. This result is contrary to the study that has been done by Bamosa and Ali (2000), which have stated that administration, sub-dimension of the institutional element, has the positive effect on students' motivation. This can be caused by the difference of administration as in this research it refers to availability and ease of administration features related to e-learning, not the overall administration response to the student. Thus, the research can produce different conclusions if conducted with the administration as a whole. The result is also contrary to the researches that are done by Williams and Williams (2011) as well as Vansteenkiste et al. (2004). They have suggested that the learning environment, which is the sub-dimension of management element, is one of the main sources of motivation and learning environment that supports the autonomy increase of students' motivation. That being said, learning environment as suggested by Williams & Williams (2011) may include physical, mental, emotional, and even spiritual elements in some way. Whereas in this study, the learning environment is focused on the online platform and how information is distributed there.

Therefore, the research can also produce different results if it is done by looking at a more comprehensive learning environment. Small, Snyder, & Parker (2009) have suggested in their study that the media in the library have a positive influence on the motivation to learn. It is different with the result of this research, which can be caused by resource support in this study being intended to focus

more on the availability of facilities to access reference and books information along with the availability of support services related to e-learning. The result of research conducted by Bozon (2013) is consistent with the result from this study, which states that the relationship between assessment and students' motivation cannot be clearly defined because the nature of this relationship is mediated and controlled by the personality of the students.

The t-test among elements of e-learning and collaboration has been conducted to test the following hypotheses:

H_{11} : Institutional element has an influence on student collaboration
H_{12} : Management element has an influence on student collaboration
H_{13} : Technological element has an influence on student collaboration
H_{14} : Pedagogical element has an influence on student collaboration
H_{15} : Ethical element has an influence on student collaboration
H_{16} : Interface design element has an influence on student collaboration
H_{17} : Resources support element has an influence on student collaboration
H_{18} : Evaluation element has an influence on student collaboration

Table 6 t-test Result for Elements of E-Learning and Collaboration

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	0,666	0,555		1,199	0,233
	Institutional	0,037	0,098	0,038	0,379	0,705
	Management	0,096	0,105	0,096	0,920	0,359
	Technological	0,306	0,102	0,247	3,006	0,003
	Pedagogical	0,068	0,112	0,053	0,609	0,544
	Ethical	0,180	0,087	0,198	2,064	0,041
	Interface Design	0,006	0,126	0,004	0,045	0,964
	Resource Support	0,011	0,080	0,011	0,133	0,895
	Evaluation	0,138	0,083	0,143	1,673	0,097

a. Dependent Variable: Collaboration

Based on the t-test result that can be seen in Table 6, only H13 dan H15 can be accepted, because significant values of the test are lower than 0,05. This also means that there is statistical evidence that the independent variables, including technological and ethical, are significant predictors of the dependent variable which is student collaboration. This result is consistent with previous studies done by Awedh et al. (2014); AlAmmary (2012); and Davidson (2012), which have stated that technology promotes and encourages student collaboration. Mobile technology offers features of portability, social connectivity, individuality, and context sensitivity. It has made the learning is moveable, real-time, collaborative, and seamless, which in turn increases students' collaboration in the learning process (Sung, Yang, & Lee, 2017). Other effects that can be obtained is an increase in the student learning process and also improved communication and interpersonal skills of the students. Raitman et al. (2005) have suggested that students will feel more confident in interacting and collaborating when there is the protection of the privacy and build student's trust in the e-learning environment.

Alternatively, H11, H12, H14, H16, H17, and H18 cannot be accepted, because significant values of the test are higher than 0,05. This also means that researchers do not have statistical evidence to conclude that the independent variables; institutional, management, pedagogical, interface design, resources support, and evaluation are significant predictors of the dependent variable of student collaboration. The result of the study that is done by Muilenburg and Berge (2005) support this result.

It shows that administrative issue, sub-dimension of the institutional element, is one of the barriers for students to learn online. Although institutional element is an integral part of e-learning, the results of research conducted to find that the collaboration of the students will not increase in line with the increase in the administration of learning activities. The research result of Brindley, Walti, and Blaschke (2009) also supports the finding of this result that suggests there is no significant relation between evaluations with the participation in the collaboration.

In contrast, some previous research are suggesting different result with the findings of that research. Razali et al. (2015)'s research shows that the learning environment is one of the three main factors that affect collaboration. This can be caused by the learning environment in this research only focuses on the online learning environment and not learning environment as a whole. The result of this research is also not consistent with the result of research conducted by So and Brush (2008) which suggest that the content of the course, sub-dimension of the pedagogical element, has an influence on student collaboration. Since different universities can use various types of contents, this difference can occur due to the different nature of content that is applied to the research. In the research that is done by Kock (2009), the students emphasize the importance of interface design in collaboration. But the perception of the aesthetic can be different between students so that this perception can be the cause of the different result. The findings in this study are also not consistent with research conducted by Pan, Ferrer-Vinent, and Bruehl (2014) which state that there is a positive relationship between the resources viewed by students on student learning, one of which includes collaborations. It can be caused by resource support in this research is intended to focus more on the availability of facilities to access reference and books information and the availability of support services related to e-learning.

CONCLUSIONS

E-learning is a learning method that grows rapidly and is used in higher education globally, including in Indonesia. Previous research shows that e-learning is positively affecting student motivation and collaboration. This research has also confirmed that e-learning has the positive effect on student motivation and student collaboration. Further analysis is conducted to study which element of e-learning has the positive effect on student motivation and collaboration. In this research, researchers can conclude that element technological, pedagogical, ethical, and interface design are significant predictors of student motivation. Adaptive learning technology and adaptive pedagogy approach is one initiative among many that can be utilized to enhance student motivation.

From the result of this research, researchers also can conclude that technology and ethic are significant predictors of student collaboration. It is suggested to adopt mobile technology in learning because it enables learning to be moveable, real-time, collaborative, and seamless. This means to increase students' motivation and students' collaboration; an institution can facilitate several factors which are technology for students to do the collaboration, suitable pedagogical approach for e-learning environment, policies related with ethical issues, and also user-friendly interface design. Further research may consider design appropriate adaptive learning technology, adaptive pedagogy approach, and mobile technology for higher education.

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