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Impact of elearning on motivation and critical thinking ability of multimedia major vocational school students

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A B S T R A C T

This article aims to determine the impact of e-learning and student motivation on students' critical thinking skills. The quantitative approach is to process data and numbers obtained through statistical analysis. Sources of data used in this study are primary data or data obtained directly from respondents. This study aims to examine the effect of the independent variable, namely e-learning (X1), students learning motivation (X2) on the dependent variable, namely students' critical thinking ability (Y). Researchers took a sample of 118 respondents. Collecting data by giving questionnaires to respondents to all students majoring in multimedia at SMK Ketintang Surabaya. Based on data from the results of research and tests that have been conducted, it can be concluded that: (1) There is a significant contribution between e-learning and students' critical thinking skills. (2) There is a significant contribution between student learning and students' critical thinking skills. (3) There is a significant contribution between e-learning and student learning motivation towards students' critical thinking skills in the SMK Multimedia Expertise Program with a contribution value of 61.3%.

INTRODUCTION

Along with the rapid development of Information and Communication Technology (ICT), the need for an IT-based teaching and learning (education) concept and mechanism is inevitable. The concept which became known as e-learning has influenced the transformation of conventional education into digital form, both in content and in the system. Currently, the concept of e-learning has been widely accepted by the world community, as evidenced by the widespread implementation of e-learning, especially in educational institutions (schools, training/training and universities). Some schools organize electronic learning activities as a supplement to the subject matter that is regularly presented in class. However, several other schools organize e-learning as an alternative for students who for one reason or another are unable to attend face-to-face lectures.

The tendency to develop e-learning as an alternative to learning in various educational institutions is increasing in line with developments in the field of communication and information technology. Infrastructure in the telecommunications sector that supports e-learning is no longer a monopoly of big cities, but has gradually begun to be enjoyed by those in cities at the district level. This means that people in the district have been able to use internet facilities.

As in early 2020, all people around the world are getting information related to the Covid-19 pandemic via the internet. Information about the Covid-19 pandemic from various information/news providers has captured the attention of the world community, from this information many countries have started to issue policies to anticipate the outbreak. The development of the Covid-19 pandemic at the beginning of March 2020, which was increasing, resulting in obstruction of all community activities around the world which resulted in a weakening economy. Not only the economic sector but all sectors have been affected by this pandemic.

In Indonesia, the impact of this pandemic has a major impact on all sectors, one of which is the education sector, where before the pandemic teaching and learning activities

were carried out face-to-face. Seeing these conditions, the teaching and learning process must continue to be carried out, therefore the transfer of learning media for the continuity of the teaching and learning process where previously carried out face-to-face switches through media in the network (online). Teaching and learning activities carried out in a network (online) apply to all levels of education. So, the role of the internet in the world of education during this pandemic is very helpful and has increased in terms of its use.

In accordance with the circular from the Ministry of Education and Culture of the Republic of Indonesia Number 3 of 2020 concerning the Prevention of Corona Virus Disease (COVID-19) in the Education Unit and the Letter of the Secretary General of the Minister of Education and Culture number 35492/A.A5/HK/2020 dated March 12, 2020 regarding the Prevention of the Spread of Corona Virus Disease (Covid- 19) as well as following circulars and appeals from the respective Regional Governments of the domicile of Higher Education (Suni Astini, 2020).

Based on this decision, the teaching and learning process is required to carry out these activities from home which are carried out simultaneously in March 2020. Seeing these conditions, some education providers have changed or switched from face-to-face to online learning methods in the teaching and learning process. However, in practice, many of them, namely educators and students, are still new to the technical aspects of organizing teaching and learning during this pandemic.

In fact, online learning is not new to Indonesia, this learning model has been developed since 2013 as an alternative to learning, meaning that before the virus outbreak, Indonesia had applied this method. But not all institutions apply, especially schools located in rural areas. With this virus outbreak, all schools, colleges and other educational institutions are made and required to use online learning methods without exception, with the aim that the learning process continues even though it has to be done in their respective homes.

E-learning is distance learning that uses computer technology or usually called the internet. Henderson in Horton (2003) explains that e-learning is a web-based learning that can be accessed from the internet. E-learning itself is a form of distance learning concept. The form of e-learning itself is quite broad, a portal that contains scientific information which can be said to be an e-learning site, so e-learning or internet enabled learning combines teaching methods and technology as a means of learning. E-learning is an effective learning process that is produced by combining digital material delivery consisting of support and services in learning.

This situation certainly has an impact on the quality of learning, students and teachers who previously interacted directly in the classroom now have to interact in a limited virtual space. Teachers are required to provide good teaching, create an atmosphere that is conducive to learning and creatively and innovatively use attractive learning media so that students can understand learning material and learning objectives can be achieved.

In addition, student learning motivation also affects learning success. This is in accordance with what Emda stated that the learning process will achieve success if students have good learning motivation. Therefore, learning motivation is very important for every student, both intrinsic and extrinsic motivation. According to Dr. Aunurrahman, M. Pd (2009: 143) the use of an appropriate learning model can encourage the growth of student pleasure in lessons, foster and increase motivation in doing assignments, make it easy for students to understand lessons. Motivation itself is defined as an effort that can cause a certain person or group of people to do something because they want to achieve the goals they want or get satisfaction with their actions (Syarif, 2012). Mc.Donald (in Sardiman, 2011) defines motivation as a change in energy in a person which is marked by the appearance of "feelings" and is preceded by a response to a goal.

Critical thinking is a way of reflective thinking and defines it as an active, continuous, and thorough consideration of a belief or form of knowledge that is taken for granted in terms of supporting reasons and the following conclusions that become the tendency (Fisher, 2008).

Students' critical thinking skills fall into the Higher Order Thinking Skill category (high-order thinking skills). This is in accordance with the opinion (Conklin, 2012) which states that "critical thinking is a term generally associated with higher-order thinking skills characterized by careful analysis and consideration".

METHODS

This research uses a quantitative approach, with the type of ex post facto research. Quantitative research is a research method that is based on the philosophy of positivism, functions to examine specific populations or samples, data collection using research instruments and statistical analysis with the aim of testing predetermined hypotheses (Sugiyono, 2016: 35). Expost facto is a type of research based on past/past events.

This research took place at SMK Ketintang Surabaya. Determination of the research sample using a 95% confidence level krejcie table with a population of 250 obtained a sample of 118. The data sampling technique used simple random sampling.

At this stage, classical assumption testing and hypothesis testing are carried out (Mona, Kekenusa, & Prang, 2015). Tests were carried out with the help of SPSS 21. The aim was to analyze the magnitude of the

relationship and influence between variables X1 and X2 on Y

1. Classic Assumption Testing

This test consists of the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. The prerequisite for getting a good regression model is that the data distribution is normal or close to normal. If the data is not normally distributed, it is necessary to transform the data first. Furthermore, a good regression model is a regression model that does not occur multicollinearity, heteroscedasticity, and autocorrelation (Ndruru, Situmorang, & Tarigan, 2014).

2. Hypothesis Testing

After all the requirements for a regression model are met, the next step is to determine whether the proposed hypothesis is accepted or not, namely by conducting a simultaneous test (F test) and significance test (T test). The F test was conducted to determine whether all the independent variables had a significant effect on the dependent variable. Meanwhile, the T test was conducted to determine whether in the regression model, the independent variables partially had a significant effect on the dependent variable (Sulistyono & Sulistiyowati, 2017).

RESULTS AND DISCUSSIONS

Prerequisite Analysis Test Results

Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		118
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	2.39420229
Most Extreme Differences	Absolute	.073
	Positive	.065
	Negative	-.073
Test Statistic		.073
Asymp. Sig. (2-tailed)		.183[c]

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

In the normality test results, the Asymp value is obtained. Sig. (2-tailed) that is 0.183 or a value greater than 0.05. If the significant value is > 0.05, the data is normally distributed, so it can be concluded that H0 is accepted, which means that the data between e-learning, learning motivation and critical thinking skills are normally distributed.

Linearity Test

The results of data processing for linearity testing with the SPSS 21 tools are presented in the following figure.

a. Linearity test of the relationship between critical thinking skills and elearning

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
Kemampuan Berpikir Kritis Y * Elearning X1	Between Groups	(Combined)	711.577	21	33.885	3.183	.000
		Linearity	497.638	1	497.638	46.753	.000
		Deviation from Linearity	213.939	20	10.697	1.005	.464
	Within Groups		1021.821	96	10.644		
	Total		1733.398	117			

The results of the linearity test between the test results of critical thinking skills (Y) and elearning (X1) obtained a significance that is 0.464, greater than 0.05. So it can be concluded that accepting H0 means that there is a linearity relationship between critical thinking skills (Y) and e-learning (X1).

b. Linearity test of the relationship between critical thinking skills and learning motivation

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
KEMAMPUAN BERPIKIR KRITIS Y * MOTIVASI BELAJAR X2	Between Groups	(Combined)	1256.528	20	62.826	12.780	.000
		Linearity	1058.455	1	1058.455	215.300	.000
		Deviation from Linearity	198.074	19	10.425	2.121	.009
	Within Groups		476.870	97	4.916		
	Total		1733.398	117			

The results of the linearity test between the results of the critical thinking ability test (Y) and learning motivation (X2) obtained a significance that is 0.09 greater than 0.05. So it can be concluded that accepting H0 means that there is a linearity relationship between critical thinking skills (Y) and learning motivation (X2).

Heteroscedasticity Test

The results of data processing for heterodasticity test with SPSS 21 tools are presented in the following figure.

Coefficients^a

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.160	1.233		.130	.897
	Elearning X1	.017	.046	.043	.360	.720
	Learning Motivation X2	.032	.039	.100	.835	.406

a. Dependent Variable: Abs_RES

The results of the heteroscedasticity test between e-learning (X1), student learning motivation (X2) on critical thinking skills (Y) obtained significant values, namely 0.720 (X1), and 0.406 (X2), where the value of the two independent variables was significantly greater than 0.05. So it can be concluded that accepting H1 means that there is no heteroscedasticity in the data or heteroscedasticity data either, so it can be continued to the next test of requirements.

Multicollinearity Test

The results of data processing for the multicollinearity test with the SPSS 21 tools are presented in the following figure.

The multicollinearity test results between e-learning (X1), student learning motivation (X2) on critical thinking skills (Y) obtained Tolerance scores for two independent variables, namely 0.595 and VIF for two independent variables, namely 1.682. From the results of the Tolerance and VIF values, it shows that the two independent variables meet the multicollinearity test, where each independent variable data does not have multicollinearity symptoms. So it can be concluded that accepting H1 means that there is no multicollinearity in the data, so it can be continued to the next test of requirements.

Autocorrelation Test

The autocorrelation test was carried out using the Durbin Watson (DW) test using the SPSS 21 tools. The Durbin Watson test statistical value was obtained

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.783^a	.613	.606	2.415	2.146

a. Predictors: (Constant), Learning Motivation X2, Elearning X1

b. Dependent Variable: Critical Thinking Ability Y

The results of the autocorrelation test between e-learning (X1), student learning motivation (X2) on critical thinking skills (Y) obtained a Durbin-Watson (d) score of 2.146, then this value is compared with the DW table (α 5%) by looking at k = 2 and n = 118 then it is obtained that dU = 1.67870 and dL = 1.73225 then dU <d> dL so that it can be concluded that accepting H1 means that there is no autocorrelation in the data, so it can be continued to hypothesis testing.

Hypothesis Test Result

Multiple Linear Analysis

Coefficients^a

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.030	1.878		3.211	.002
	Elearning X1	.060	.070	.064	.856	.394
	Learning Motivation X2	.580	.059	.740	9.844	.000

a. Dependent Variable: Critical Thinking Ability Y

The results of the multiple linear regression test when included in the multiple linear regression analysis equation are as follows.

$$Y= 6,030 + 0,060X_1 + 0,580X_2$$

The results of the multiple linear regression analysis equation between interest in learning and achievement motivation for computational thinking abilities are as follows.

a. Obtained a value of α or a constant that is 6,030 means that the value of the critical thinking ability variable is 6,030 if elearning learning, student learning motivation is zero or constant.

b. The elearning variable (X1) has a regression coefficient value of 0.060, meaning that if the elearning variable (X1) increases by one unit, then the test results of the

student's critical thinking ability variable (Y) will increase to 0.060.

c. The student motivation variable (X2) has a regression coefficient value of 0.580, meaning that if the student motivation variable (X2) increases by one unit, then the test results of the student's critical thinking ability variable (Y) will increase, namely 0.580.

F Test

The results of data processing for the F test with the SPSS 21 tools are presented in the following figure.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1062.730	2	531.365	91.114	.000^b
	Residual	670.668	115	5.832		
	Total	1733.398	117			

a. Dependent Variable: Critical Thinking Ability Y

b. Predictors: (Constant), Learning Motivation X2, Elearning X1

The results of the F test through SPSS obtained an F value of 91,114 with a significant value of 0,000. If the significant value is less than 0.05 then accepting H1 means that the regression line is significant to estimate the results of critical thinking skills.

Value of Determination Coefficient (R2)

The results of data processing for the determination coefficient test using SPSS 21 tools are presented in the following figure.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783^a	.613	.606	2.415

a. Predictors: (Constant), Learning Motivation X2, Elearning X1

b. Dependent Variable: Critical Thinking Ability Y

The result of the coefficient of determination (R2) through SPSS is 0.613, so it can be concluded that computational thinking ability is influenced by interest in learning, and achievement motivation is 61.3% and the rest is influenced by other factors or outside the research variables.

T Test

The results of processing data for the T test with the SPSS 21 tools are presented in the following figure.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	6.030	1.878		3.211	.002
	ELEARNING X1	.060	.070	.064	.856	.394
	MOTIVASI BELAJAR X2	.580	.059	.740	9.844	.000

a. Dependent Variable: KEMAMPUAN BERPIKIR KRITIS Y

The results of the t test are as follows.

a. The elearning variable (X1) obtained a t value of 0.856 with a significant 0.394. If the significant value is less than 0.05, it can be concluded that accepting H1 means that there is a significant influence between the independent variables on the dependent variable.

b. The student motivation variable (X2) obtained a t value of 9.844 with a significant 0.000. If the significant value is less than 0.05, it can be concluded that accepting H1 means that there is a significant influence between the independent variables on the dependent variable.

CONCLUSIONS

Based on the test results in the previous chapter, it can be concluded that:

a. There is a significant contribution between learning and critical thinking skills of students.

b. There is a significant contribution between student learning and students' critical thinking skills.

c. Significant contribution between learning and student motivation to students' critical thinking skills in the SMK Multimedia Expertise Program with a contribution value of 61.3%.

Author's Contributions

All authors discussed the results and contributed to from the start to final manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

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