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The Influence of The Proficiency of Using Smartphone Technology on The Critical Thinking Skill

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Abstract. The study aims to identify the influence of smartphone technology on students' critical thinking skill for a reference to transform the rules on campus (Code of Conduct of Cadets/ PT3) that previously limited the permit to use a smartphone. This study is an ex-post facto with 48 sample students from some different classes. The research method was quasi-experimental with non-equivalent control group design (pretest and post test). Instruments used in the study included an observation sheet and students' achievement test, which had been considered valid and reliable. Research data were analyzed using SPSS 16.0 application. The findings show that the test of using smartphone proficiency consisting of ten questions based on the R count and R table values was categorized as valid. Question number 4 got the highest R count of 0.903. The pretest in Inquity-1 class got a significant value of 0.369 > α (0,05), and the inquiry-2 class got a significant level of pretest of 0,358 > α (0,05), test on the hypothesis of critical thinking skill using an independent t-test got sig (2- tailed) <0,05 = 0,00 indicating that H_0 was refused while H_1 was accepted. The multicollinearity test and VIF from independent variable data of the inquiry learning model on dependent data of critical thinking skill showed with the regression coefficient value of the inquiry variable were 0.082 and 0.191, respectively. The positive value indicated that if the inquiry level increases by one point (assuming that other independent variables are constant), the critical thinking skills will increase by 0.082 and 0.191. based on the conclusion above, there was no variable reducing the critical thinking skill.

Keywords: Using a smartphone, inquiry, learning results

INTRODUCTION

The development of technology has also occurred in education as the impact of the industrial revolution 4.0. All students and teachers have to adapt to technology in presenting the material so that the learning goals can be better achieved. Education management policy in Indonesia instructs all educational levels, especially tertiary education, to employ the advanced digital technology and educational computerization of industrial revolution era 4.0 (Purnasari and Sadewo 2020)

At the beginning of 2020, Indonesia faced the Covid 19 pandemic, which also influenced the educational sector. The learning activities should keep continuing. In the beginning, the students were not accustomed to virtual technology. However, in the era, they were required to catch up with the advancement

of technology and use it to support their daily activities as students. To measure how successfully the learning activities achieve the goals, teachers could implement some learning models like inquiry. The model presents student center learning activities by directing students to utilize technology like a smartphone which is the most common gadget possessed by students.

Information and media literacy is understanding and using various communication media to deliver ideas and collaborate and interact with many parties. Educational institutions should have skills in creative thinking, critical thinking, problem-solving, communication, and collaboration (4C) (Septikasari and Nugraha Frasandy 2018).

The main goal of education is to bring students successful in learning (Muhali et al., 2020), and generally, teachers as learning facilitators demand students to master the knowledge cognitively (Muhali. 2014); creative thinking skills highly determine students' performance in learning. Creative thinking is defined as the process of finding out alternative answers to a question or problem (Fadilah, A., 2016).

Aviation Polytechnic is one of the vocational education institutions which implemented a boarding school system. Boarding school as a transformative education has some strengths like (1) it prioritizes integrated learning processes, including cognitive, affective, and psychomotor processes; (2) it unites some educational environments, including formal, nonformal, and informal educations; (3) it combines curriculum patters and contents (Kaimuddin 2015). Teaching has four paradigms namely self directed learning (the independence in learning), involved learning (ability to adapt quickly), interested learning (having a good understanding of the learning goals but still confused about how to achieve them), and dependent learning (Nur, Bahrawi, and Sabur 2021). Evaluation is performed to measure the students' learning outcomes (Adi 2010).

Aviation Polytechnic implements a boarding system with learning methods to train students' critical thinking skills. One of the strategies is by adapting and utilizing technology in applying the learning model in the classroom and focusing on student center activities to achieve the learning targets determined in the curriculum. The Aviation Polytechnic did not holistically utilize technology, especially smartphones in the daily live of cadets or students and the learning was still teacher centered so that it was unsuccesssful to improve students' critical thinking skill. In line with that, (Huda 2016) mentioned that learning motivation and achievement can be better achieved through computer multimedia than through conventional methods, and (Sasmita and Purnamasari 2018) stated that the average score of students treated with edutainment was higher than students treated with conventional learning model.

Based on the problems discussed above, the study aimed to find out the solution to improve students' critical thinking skills. We carried out the study in two classes as samples to measure the level of smartphone technology usage in measuring students' critical thinking skills. The research findings can be taken as a reference in modifying the rules of the campus (Code of Conduct of Cadets), which initially limited the time to use the smartphone.

METHOD

This is a causal-comparative study that tests the hypothesis to identify the influence of independent variables on the dependent variables. Besides that, this study was carried out through ex post facto design to discover a fact (Sappaile 2010). E*x-post facto* is a study to research an event that has occurred and identify factors triggering the occurrence of the event (Iskandar and Rizal 2018). We carried out this study quantitatively.

This research was carried out at the Aviation Polytechnic of Makassar, involving 48 students from two different classes (full sample) as participants. The source of primary data was students in the aviation engineering program, who were then called respondents. The instruments included an observation sheet and students' achievement tests.

The research method was a quasi-experiment. We gave a similar treatment to both experimental classes (inquiry class).

Data were analyzed and validated using a normality test (Kolmogorov-Smirnov test). Homogeneity was tested using Lavene Statistic, and the Hypothesis was tested using a t-test processed with SPSS 16 program.

RESULTS AND DISCUSSION

Resluts

Analysis of Instrument Trial

Based on the validity test using SPSS 16 program on the critical thinking skills assessment, which consist of 10 essay questions, the results are as table 1.

Table 1. Validity Test of Critical Thinking Assessment

Validity	Categories	Questions
$r_{count} > r_{table}$	Valid	2, 3, 5, 7, 8
$r_{count} < r_{table}$	Not Valid	1, 4, 6, 9,10

While the validity test of a questionnaire measuring proficiency in using technology results in data as presented in table 2.

Table 2. Results of Validity Test of The Proficiency in Using Technology

Questions	R Count	R Table 5% (28)	Criteria
1	.407	0.374	Valid
2	.892	0.374	Valid
3	.542	0.374	Valid
4	.897	0.374	Valid
5	.586	0.374	Valid
6	.848	0.374	Valid
7	.903	0.374	Valid
8	.586	0.374	Valid
9	.848	0.374	Valid
10	.903	0.374	Valid

Based on table 3, the instrument measuring proficiency in using technology which consisted of 10 questions based on the R count value and R table, was considered valid, and question number 4 got the highest R count score = 0.903. Based on the reliability test performed using SPSS 16 program, we obtained the following results table 3.

Table 3. Reliability Test of Critical Thinking Skill Tets

Cronbach's Alpha	N of Items
0.641	10

The table above shows that *Cronbach's alpha* value was 0.641, meaning that the questions were reliable.

Normality Test

The normality was tested using *Kolmogorov-Smirnov* with SPSS 16, and the results can be seen in the table 4

Table 4. Normality Test of Critical Thinking *Pretest*

Variables	Classes	Stages	Sig. (2-tailed)
Critical Thinking Skills	Inquiry - 1	*Pretest - Post-test*	0,000
	Inquiry - 2	*Pretest - Post-test*	0,000

Table 4 above shows that the pretest score obtained by class Inquiry-1 had a significant level of 0,369 > α (0,05), and the pretest score of class Inquiry-2 had a significant level of 0,358 > α (0,05). Thus, the data of this study had a normal distribution and could have their homogeneity tested

.

Table 5. Normality Test of Critical Thinking Skill Post-test

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10.682	4.499		2.866	.005		
	Inquiry -1	.082	.185	-.156	-.459	.059	.343	2.229
	Inquiry-2	.191	.058	.269	1.085	.079	.446	2.298

Table 6 above shows that the post test score of class Inquiry-1 got a significance level of 0.743 > α (0,05), and class inquiry – 2 got a significance level of 0,741 > α (0,05), meaning that data from both classes distributed normally and could be continued to homogeneity tests.

The homogeneity test used Lavene Statistic with SPSS 16. The results are as in table 6

Table 6. Homogeneity Tets

Levene Statistic	Variable	Tahap	Sig.	Criteria of Sig.2 tailed table > α (0.05)	Conclusion Sig.>0,05 (normally distributed)
	Critical thinking skills	*Pretest*	0,537	0,05	Homogenous Data
		Post-test	1,214		

Table 7 shows that the significance levels of critical thinking tests on both classes were 0.537 (pretest) and 1.214 (posttest). On the other hand, the questionnaire on learning outcomes shows a significance level of 0.087 > 0.05, meaning that the data above were homogenous.

The hypothesis was tested using an *independent t-test.* It parametrically examined whether the hypothesis could be accepted or not. The results are as in the table 7

Table 7. Independent T-test

Classes	Sig.	Criteria of Sig.2 tailed table > α (0.05)	Conclusion Sig.>0,05 (normally distributed)
Inquiry – 1	0,743	0,05	Normally distributed
Inquiry – 2	0,741		

The table above shows that the hypothesis of critical thinking skill tested using an independent t-test got the value of sig (2- tailed) 0.00 <0.05, indicating that H_0 was rejected while H_1 was accepted.

1. Multicollinearity Tolerance and VIF Tests

The multicollinearity test in multiple linear regression analysis was used to identify a strong correlation between independent variables. A good regression model should not show a correlation between independent variables and multicollinearity indications.

The tolerance multicollinearity and VIF tests on independent variables (inquiry learning model) and dependent variable (critical thinking skills) resulted in the table 8.

Table 8. Coefficient Test of Inquiry on Critical Thinking Skills

Variables	Classes	Stages	Sig. (2-tailed)
Critical Thinking Skills	Inquiry - 1	*Pretest - Post-test*	0,000
	Inquiry - 2	*Pretest - Post-test*	0,000

It can be seen that the tolerance value of inquiry-1 on the critical thinking skill was 0.343; the tolerance value of inquiry-2 on critical thinking skill was 0.446; Thus, it can be concluded that there is no multicollinearity between the influence of inquiry learning quality on critical thinking skill and regression coefficient of inquiry variable (0.082 and 0.191 respectively). The positive scores indicate that if the inquiry level increases by one point (assuming that other independent variables are constant), there is no variable reducing the critical thinking skill score.

CONCLUSIONS AND SUGGESTIONS

Results of multiple regression analysis show that the regression coefficient of proficiency in using technology was 0.556 (positive value), indicating that if the proficiency in using technology increases by 1%, assuming that other independent variables are constant, the use of technology will increase by 0.556. It means that the variable of proficiency in using technology positively contributed to the use of technology in the inquiry learning model. Thus, proficiency in using technology has a positive influence on the use of technology in implementing inquiry learning with a significance score of 0.000. Because of the Sig. 0,000 < probability of 0,05, it can be concluded that H_0 was refused while H_1 was accepted. It means that there was a significant influence of proficiency in using technology on the use of technology in the implementation of inquiry learning.

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