



The Flexibility of the Blended Learning Model to Improve Students' Critical Thinking

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Abstract. This paper examines how learning models affect change in students' critical thinking skills. Blended learning is a learning method that combines the face-to-face learning process in the classroom with learning using e-learning. Blended Learning Model makes students feel flexibility in their learning process, especially in this pandemic period. Currently, students are getting used to using digital technology in the learning process. This is also in accordance with students who are in the digital literate generation. So it is assumed that with this learning method, the level of students' critical thinking skills will increase. Critical thinking is an ability that can be learned and trained in order to be able to solve problems effectively. Critical thinking skills are used to analyze problems, solve problems, make decisions and understand solutions to problems at hand. These skills are needed by students in facing today's life. Based on the results of the analyzed using the independent t-test method conducted on students, it was found that the flexibility of the Blended Learning Model significantly improved students' critical thinking skills compared to full online learning.

Keywords: e-learning · Blended Learning Model · critical thinking · pandemic covid-19

1 Introduction

The Covid-19 pandemic that has occurred since 2020 has made many changes in our lives. One of the affected sectors is education. During the pandemic, the entire educational process was carried out online or commonly known as e-learning. E-learning is a learning method that uses the help of electronic devices in the learning process. Even though they don't always use the internet, especially during a pandemic like recently, e-learning is closely related to distance learning that utilizes the internet network.

Online learning activities or e-learning can be carried out through applications such as using zoom [4], Google Classroom, Whatsapp, and Google Meet [6], Kelas Cerdas, Zenius, Quipper and Microsoft [16]. The existence of these online learning applications, of course, has both positive and negative impacts. Some of the benefits or positive impacts of online learning include making it easy to transfer information in various limited situations and conditions [16]. Other advantages are that it is more practical and more flexible,

the approach is more familiar because it uses digital technology, the learning experience is more exciting, it is very personal because there are personal consultation features available, time and cost efficiency, learning materials are easily stored and recorded, environmentally friendly, because it is not using paper (Sun Education, 2021., referred to in [13]).

Despite the many advantages of e-learning, there are also some perceived constraints with this online learning. These include the problem of internet networks which are often unstable, as well as the uneven distribution of internet services in the territory of Indonesia, the high level of internet usage which affects the health of students, and the different levels. In addition, by only studying online, most students only skim information when looking for supporting learning materials, so they become less able to analyze and integrate the information obtained. Habits like this will certainly affect a person's creativity and efforts at a higher level, in carrying out critical thinking skills.

Critical thinking is an intellectual discipline process to conceptualize, apply, analyze, synthesize and evaluate information gathered from observation, experience, feedback, reasoning, or communication, as a way to believe and act [12]. Meanwhile Davies [3] describes critical thinking as the ability to convey reasoned arguments and make decisions. So it can be concluded that critical thinking is a high-level thinking skill that is useful for analyzing and solving problems with arguments, and making decisions.

Critical thinking skills are essentially needed in higher education students and for learning purposes [7, 10]. Critical thinking is not just a thinking process, but also a skill that is needed in future work, even its position is higher than innovation and technological knowledge [2].

Learning models using online media can indeed help improve students' critical thinking skills. However, there are several obstacles in the learning process, such as socio-cultural problems, previous student study habits, and the unfamiliarity of students and lecturers in using digital technology in the learning process. This problem is very likely to be encountered, especially in Indonesia, which has not yet maximized the use of technology in learning. The learning process before this pandemic was generally carried out more conventionally, such as face to face.

The advantages of face-to-face learning, students and lecturers can interact directly without being hindered by network constraints. Student motivation in the learning process that is carried out face-to-face is also known to be higher. Based on the results of research conducted by Pratama [11], before online learning, the average student motivation was 80.8%, but after online learning, the average student motivation was 64.01%, meaning that there was a decrease in student motivation by 16.07% after the learning process is carried out online. This learning motivation is an important element in the learning process, because it is one of the factors that influence students' critical thinking skills (Rubenfeld & Scheffer, in [9]).

To overcome these problems, it is hoped that the learning process that combines the use of online and face-to-face media can be carried out. The blended learning model is the term most commonly used to refer to a combination of face-to-face teaching with computer or online technology [15]. The aim of using a Blended Learning Model is to find a harmonious balance between online access to knowledge and face-to-face interactions. This learning method is considered to be in accordance with Indonesian

culture. Therefore, this study wants to see the impact of the Blended Learning Model on improving critical thinking skills, by comparing the critical thinking ability scores of students who follow the full online learning model and blended learning.

2 Research Methods

Respondents in this study were 106 students, consisting of 48 students participating in full online learning and 58 students participating in a learning model using a Blended Learning Model. Comparison of the number of students in proportion to the two learning models, as illustrated in the following diagram (Fig. 1).

Assessment of students' critical thinking skills in this study, using a questionnaire made in the Google form. The questionnaire used to measure critical thinking skills is the Critical Thinking Questionnaire (CThQ) developed by Kobylarek, Błaszczyszki, Ślósarz, and Madej in 2022. The procedure for instrument adaptation stages was first carried out on this measuring instrument. Before the measuring instrument was used, according to the guidelines developed by Beaton, Bombardier, Guillemin, and Ferraz [1], namely translation, synthesis, back translation, expert committee review and pretesting.

At the translation stage, the questionnaire will be translated into the target language by 2 translators, the first person is a person who understands the concept of the measuring instrument to be translated, and the second person is a person who does not have an understanding of the concept of measuring instrument, or commonly called a naïve translator. The next stage is synthesis, where the two translators and observers sit together to synthesize the results of the two translations, so that in the end only one translation is formulated. In the back translation stage, the results of the synthesis will be translated back into the original language by two persons with the source language (English) as their mother tongue. At this stage, the translator may not know the original version of the questionnaire. The fourth stage is the expert committee, which is a review process carried out by experts to find out whether the translated questionnaire is in accordance with Indonesian socio-culture. In the last stage is pretesting, the adapted measuring instrument is tested on 30–40 people who have similar criteria to the target research respondents (Fig. 2).

The analysis technique used in this research is comparative analysis. The independent T-test was used in this study as a type of comparative analysis of the group [8]. The parametric test was used to compare scores of critical thinking skills in students who experienced full online learning and blended learning. However, before the use of the T-test is carried out, according to the requirements for the use of parametric group



Fig. 1. Comparison Learning Models

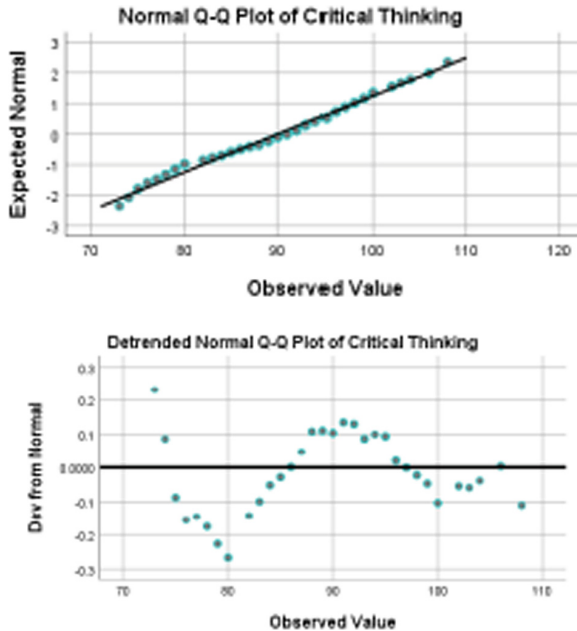


Fig. 2. Normality Test Results

analysis, it is necessary to carry out a normality test first to ensure that the research data to be analyzed is normally distributed. Based on the graph above, it can be seen that the distribution of the data is around a straight line, so it can be said that the score data for students' critical thinking skills in this study is normally distributed and there are no outlier data or extreme data. This test proves the fulfillment of the requirements for using the independent t-test in the next stage (Fig. 2).

3 Result and Discussion

Assessment for the score of critical thinking skills was tested on 106 students as respondents. Critical thinking ability scores obtained in this study have fulfilled the requirements of the Normality test using Kolmogorof-Smirnov carried out by utilizing SPSS software with the following analysis results:

The research data consists of students' critical thinking ability scores which are normally distributed, so it can be said that this research data has fulfilled the prerequisite test for using the analysis technique from the Parametric Test Group [17]. The analysis technique in this study uses the independent t-test statistical method, to compare critical thinking skills between students who take part in full online learning and blended learning. The results of the analysis obtained are that the mean score for the critical thinking skills of students who take part in full online learning is 87.48, while students who take part in blended learning get an average score of 92.10 as listed in the following table (Fig. 3).

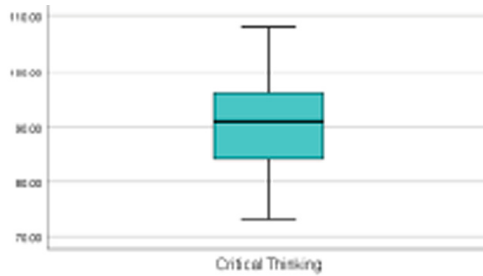


Fig. 3. Kolmogorof-Smirnov Test Results

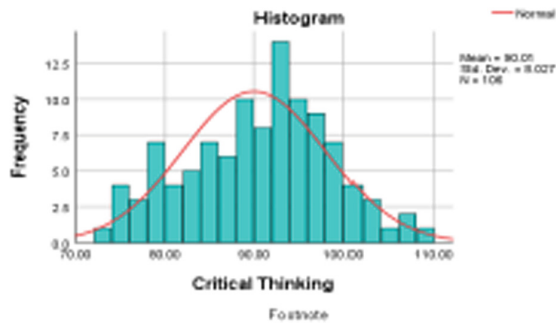


Fig. 4. Critical Thinking Histogram

Table 1. Mean Score of Critical Thinking

	Learning Model	N	Mean	Std. Deviation
Critical	Full Online	48	87.4792	9.01533
Thinking	Blended Learning	58	92.1034	6.46635

It can be seen that there is a difference in the increase in the critical thinking skills of students who take part in learning using the Blended learning model which is higher than the full online learning model. To prove whether this difference is indeed significantly significant, the results of calculations using the following t-test show the proof (Fig. 4).

The results of the independent t-test hypothesis prove that in the table, there is a significant difference (Sig. 2-tailed: 0.002). The mean score of the critical thinking skills of students participating in blended learning (92.10) proved to be higher and significantly different at alpha 0.05 compared to the average score of students participating in full on line learning (87.48) (Table 1).

The results of this study are in line with previous research which found that blended learning can improve students' critical thinking skills and transform students' knowledge [5]. Students in Indonesia are used to the face-to-face learning process, where the teacher

Table 2. Independent T-Test Result

Independent Samples Test		Critical Thinking		
		Equal variances assumed	Equal variances not assumed	
Levene's Test	F	10.288		
	Sig.	.002		
t-test for Equality	t	-3.069	-2.976	
	df	104	83.118	
	Sig. (2-tailed)	.003	.004	
	Mean Difference	-4.62428	-4.62428	
	Std. Error Difference	1.50701	1.55376	
	95% Confidence Interval of The Difference	Lower	-7.61273	-7.71459
		Upper	-1.63583	-.53397

explains learning to students in class. So that full online learning in general is still not appropriate for students in Indonesia (Table 2).

For further research it is suggested to examine critical thinking from the point of view of socio-cultural factors. Stapleton [14] found that Asian students may not reflect the concept of critical thinking because Western-oriented critical thinking may differ from Eastern educational cultures.

4 Conclusion

Based on the research results obtained, it is known that the blended learning model significantly influences students' critical thinking skills. The role of this blended learning model is quite large in improving students' critical thinking skills compared to full online learning.

The flexibility of blended learning, when online students have the convenience of transferring information in various limited situations and conditions, practical, more flexible using digital technology. On another occasion when participating in face-to-face learning, students and lecturers can interact directly without being hindered by network.

Critical thinking as a higher order thinking skill is a skill that is needed in student learning, even in the world of work in the future, to analyze and solve problems, and make decisions. The ability to think critically is needed in the learning of higher education students, so that the selection of the right learning model is very important to be applied to learning such as the blended learning model.

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