

Comparison of Real Object and Blended Learning

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Comparison of Real Object and Blended Learning towards Students' Metacognitive Knowledge.

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Abstract. This study aims to compare the effectiveness of real object-based learning and blended learning towards students' metacognitive knowledge in ecosystem material. This research is a quasi-experiment using a pretest-posttest comparison group design. The population of this study was all students of class X in Bantul Public High School 1 and Bantul Public High School 2. The sample of this study was class X MIA 3 students as experimental group 1 and class X MIA 6 students as experimental group 2 in Bantul Public High School 1 and class X MIA 4 students as experimental group 1 and class X students MIA 6 as experimental group 2 in Bantul Public High School 2 which is determined through cluster random sampling. Data collection techniques in this study used tests and questionnaires. The research data analysis technique uses One Way ANOVA tests to determine the effect of real objects and blended learning on students' metacognitive knowledge. The results showed that the two learning methods did not have a significant effect on students' metacognitive knowledge, but blended learning had a higher average increase in metacognitive knowledge than real object-based learning.

Keywords: *Real Object, Blended Learning, Metacognitive*

Introduction

The curriculum has drawn attention to be developed in education including Indonesia's stakeholder does. A refined purpose to accomplish the national education target is curriculum 2013 which concern students' competency and ability. In the matter of global areas, they are expected to compete fairly as much as other countries do so, so that they are involved to learn for having factual, conceptual, procedural and metacognitive knowledge.

The learning process in schools must be designed in such a way as to develop metacognitive knowledge as an effort to train students' skills in various fields, especially science. Metacognitive knowledge is the ability of students to control cognitive components in understanding assignments or problems and can complete tasks or problems properly and correctly [9]. Metacognitive knowledge is still very rarely developed, students must be accustomed to being trained using it on an ongoing basis because it can foster students' confidence in learning and improve mastery of their competencies [8]. Metacognitive knowledge must be continuously developed in the learning process. Some experts recommend implementing more activities that can improve metacognitive knowledge in the learning environment. Teachers must be able to provide stimuli to students to build students' meta-cognitive knowledge through innovative and fun learning activities [4]. For that reason, we need a model, strategy or method that is appropriate in the learning process so that students can comprehend better. The application of the model, strategy or method in learning is very important to do because by using the model, strategy or method can help the teacher in delivering learning material and the purpose of learning. However, not all models, strategies and methods are suitable for use in all learning materials. For this reason, the teacher must be able to choose the right model, strategy or method before being used for learning. Models, strategies or methods in learning are based offline and online. Internet or

online learning has begun to be developed, one of which is using blended learning. Blended learning is a combination of online learning and face-to-face or offline learning.

Blended learning is learning that combines online learning with offline learning or face-to-face [7]. Blended learning as an imitation of active, individual learning and learner-centered strategies [12]. Blended learning is claimed to overcome students' boredom in learning, this occurs because during the learning process students will not experience such routine. In addition, students will also participate more in the learning process and can get more learning resources, because they can connect directly to the internet which provides abundant learning materials. Technological advances enhance students to experience rapid development and often make teachers difficult to deal with the learning process. Teachers should be more open and more understand technological developments because students in the 21st century are active users of technology [5]. Therefore blended learning will be a way for teachers to keep up with student technology and skills [13].

Blended learning can provide students with a lot of knowledge because it can explore a variety of learning resources. Those who use interactive media based online will get the opportunity to gain new knowledge faster [2]. In addition, digital learning can also practice students-centered. Even though online learning is considered to have many benefits, learning will be more meaningful when students can interact directly with what they are learning, one of them is learning real objects, in example all objects that are still in their original state, or naturally in a living or in a dead state in the form of specimens representing specimens in their original location. The use of real objects in the learning process will make it easier for students to carry out observations and conduct investigations about what they are learning [10]. Learning by using a real object does not only bring learning objects into the classroom but also through direct observation in the student's learning environment. The purposes of this research are: (1) to find out comparison of the effectiveness of real object-based learning and blended learning towards students' metacognitive knowledge.

Research Methods

This research is a quasi-experimental study using a pretest-posttest comparison group design. The study was conducted at Bantul Public High School 1 and Bantul Public High School 2 2018/2019 academic year in the second semester. The population in this study were all students of class X MIA in Bantul Public High School 1 and Bantul Public High School 2 which totaled 378 students. The sample in this study amounted to 130 students selected using cluster random sampling technique consisting of 31 students of class X MIA 3 as experimental class 1, and 31 students of class X MIA 2 as experimental class 2 from Bantul Public High School 1. Then for the Bantul Public High School 2 as many as 34 students of class X MIA 4 as the experimental class 1, and 34 students of class X MIA 6 as experiment 2. Data collection techniques in this study used tests and questionnaires. The research instrument consisted of metacognitive tests to see students' metacognitive knowledge levels and questionnaires on metacognitive knowledge to find out the increase in students' metacognitive knowledge after the learning process. The research data analysis technique uses One Way ANOVA with the SPSS 24 for Windows application.

After all data has been collected, the validity and reliability test is carried out with the Quest program. The results of the validation obtained by infit mean MNSQ 1.04 and a standard deviation value of 0.43 so that it can be concluded that the test fit with the Rash Model so that all test items are suitable to be used in the study. The reliability result according to Alpha Chronbach is 0.80, so it can be concluded that the reliability of the instrument is a very high category. Because the instrument is valid and reliable, so it can be used as a tool to get data about metacognitive knowledge.

Finding and Discussion

The comparative study aims to compare the results of a treatment that has been done to a selected sample. In this research, a comparative study is done to determine the effectiveness of real object-based learning and blended learning in ecosystem topic on students' metacognitive knowledge. The activity of real object-based learning conducted by the experimental class 1 is to observe the

ecosystem directly in the environment around the school with various activities that have been compiled in the student activity sheet, and blended conducted by the experimental class 3 is learning activities using quipper school, they do learning activities online on it apart from formal schedule that they have, furthermore when students in the classroom they do offline learning activities, discussing the material they have learned then the teacher guides the discussion process and gives confirmation.

The data obtained from the results of the study were then analyzed using the SPSS software and the following results were obtained: Table 1 shows the results of the comparison of descriptive values between real objects and blended learning towards students' metacognitive knowledge.

Table 1. Descriptive Results of Student Metacognitive Knowledge

	<i>Real object</i>		<i>Blended learning</i>	
	Pretest	Posttest	Pretest	Posttest
N	65	65	65	65
Range	26,00	32,00	35,00	37,00
Minimal Score	48,00	55,00	39,00	49,00
Maximal Score	74,00	87,00	74,00	86,00
Mean	60,07	69,21	54,46	70,07
Std. Deviation	6,82	8,36	8,25	7,47
Variance	46,54	69,98	68,06	55,88

The data in Table 1 shows the results of the descriptive of students' metacognitive knowledge, the data shows that the class given real object learning treatment from 65 students who took pre-test, obtained a range of 26 with a minimum value of 48 and a maximum value of 74, with a standard deviation is 6.82209 and the variance value is 46.541 with an average value of 60.07. While for the class given treatment for blended learning based on 65 students who took the pre-test, the ranged value was 35 with a minimum value of 39.00 and a maximum value of 74, with a standard deviation of 8.25015 and a variance value of 68.065 with a value an average of 54.46.

After treatment, then data is collected by giving a post-test. In the class given real object-based learning treatment of 65 students who took post-test the range value was 32 with a minimum value of 55 and a maximum value of 87, with a standard deviation of 8.36565 and a variance value of 69,984 with an average value amounting to 69.21. While the class given the treatment of blended learning based learning from 65 students who took post-test found a range value of 37 with a minimum value of 49 and a maximum value of 86, with a standard deviation of 7.47560 and a variance value of 55.885 with an average value average of 70.07.

Based on the descriptive results of students' metacognitive knowledge, there are differences in the increase in students' metacognitive knowledge between classes given the treatment of real objects and blended learning. This can be seen by comparing the minimum and maximum values before being given treatment or after being given treatment. These data show blended learning is better than real objects towards increasing students' metacognitive knowledge. Furthermore, the prerequisite test was carried out, Table 2 shows the results of tests on the normality of students' metacognitive knowledge.

Table 2. Normality Test Results of Student Metacognitive Knowledge

	Kolmogorov-Smirnov(a)			
	Statistic	Df	Sig.	Keterangan
<i>Real object</i>	,103	65	,086	Normal
Blended	,080	65	,200*	Normal

The data in Table 2 show the results of the one-sample Kolmogorov-Smirnov test to determine the level of normality. Based on the tests that have been done, the results of the Real object normality test are 0.86 and the Blended learning normality is 0.200. Because the normality test value is above 0.05, it can be assumed that the data is normally distributed. then carried out homogeneity test and obtained results:

Table 3. Results of Homogeneity Tests

		Levene Statistic	df1	df2	Sig.
Metacognitive	Based on Mean	1,238	1	128	,268
	Based on Median	1,323	1	128	,252
	Based on Median and with adjusted df	1,323	1	127,947	,252
	Based on trimmed mean	1,194	1	128	,277

The data in Table 3 show the results of homogeneity tests, from these results it can be seen that the significance values are above 0.05, so it can be concluded that the similarity of population variance based on the applied learning methods can be met. Furthermore, One Way ANOVA test was conducted to find out which method had an effect on students' metacognitive knowledge and the results were obtained:

Table 4. Results of One Way Anova Test

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		24,123	1	24,123	,383	,537
	Linear Term	Contrast	24,123	1	24,123	,383	,537
Within Groups			8055,600	128	62,934		
Total			8079,723	129			

Based on the data in table 4, it is obtained a significance value of 0.537. Because the significance value obtained is more than 0.05, it can be concluded that the two teaching methods have no significant effect on students' metacognitive knowledge. Measurement of metacognitive knowledge in this study in addition to using questionnaires, also using essay tests and obtained results as follow.

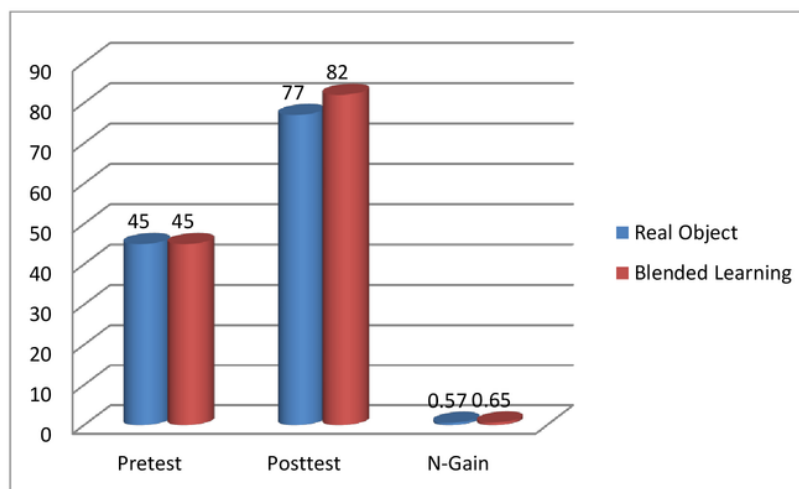
**Figure 1. Results of the students' pretest-posttest metacognitive knowledge**

Figure 1 shows the results of the metacognitive measurement of students with essay tests. Based on these data, blended learning obtained a pretest value of 45 and a posttest value of 82, while real object-based learning obtained a pretest value of 45 and a posttest value of 77. Based on these data it can be

concluded that blended learning gained the highest average increase compared to real object-based learning.

This study was conducted to compare real object-based learning, and blended learning to students' metacognitive knowledge. Classes that get real object-based learning will directly observe the ecosystem around the school environment, while the class that gets treatment based on blended learning, students will learn using Quipper School. After the learning process, it was found that according to the data in table 4, real object-based learning and blended learning did not significantly influence students' metacognitive knowledge. Real object-based learning makes students engage and interact directly with learning objects so that they can explore knowledge directly through the objects they learn. Using realia can make the learning process more meaningful and more memorable for students because they can connect it to their real-life [1]. Therefore, real object-based learning will be more attractive to students so that they can develop various abilities they have. Students who are taught using human skeletal media show better learning outcomes than students who study with media images [3].

Meanwhile, web-based learning is already familiar to students, they have already used their smartphones. Web-based learning makes students free to find resources to learn about what they learn from various sources on the internet. In addition, students can have convenience, because they can access it whenever and wherever, not necessarily at school, so they can improve their learning achievement. Students' achievement and cognitive skills which are web-based learning methods are improved and developed [6]. In the digital era, web-based learning is indeed properly implemented by teachers in schools, besides being able to make it easier for them, web-based learning will also provide youthfulness to students. The advantage of web-based learning is pages from the web contain many hyperlinks from various other webs so that students have more information [14][15].

Web-based learning in this research is by using blended learning based learning, which means there is a combination of online and offline learning. Based on the data in table 3, there is no significant influence on the dimensions of student knowledge. This is due to the lack of maximum learning when offline, students rarely open the quipper school application that is used for blended learning based learning. So when learning face-to-face students don't get the initial knowledge they should get when opening the quipper school application, because the application has provided a variety of materials that they will learn when meeting face-to-face in class. In addition, other factors that might influence students who are given blended learning are constrained by networks and internet quota and time management [11]. Because to open Quipper School requires a stable internet network and large internet quota.

Conclusion

The research that has been done shows the results of the two learning methods have no effect on students' metacognitive knowledge. however blended learning-based learning gets a higher increase in the average metacognitive students than real object-based learning. The results of this study hopefully can help teachers to prepare the right learning method when going to deliver learning in class. So that it can convey the learning objectives well, and hopefully the teacher will be more creative so that they are able to adapt the learning method to the material taught in the class.

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