

Training students metacognitive skill using mobile learning

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Abstract. Mobile learning is a learning media for using in helping teachers in the 21st century class to train students' metacognitive skills. There have not been many researchers on the use of mobile learning in senior high schools of Manokwari. Metacognitive skills become the focus of research that was to be achieved in this research. A total of 126 XI_{MIA} class students of SMA Negeri 01 Manokwari which was divided into five groups were taught used mobile learning in teaching biology. Data collected used learning outcomes test. Corebima rubric (2009) was used to measure metacognitive students. Data analysis showed that $p = 0.214 > 0.05$, which means that there were no differences in metacognitive skills of students for the five treatment groups. The mean total overall of metacognitive skills was 70.12. It belongs to the good category. It can be concluded that the use of mobile learning in teaching can be training the metacognitive of students well in teaching biology

1. Introduction

Today, Many people in the world have used mobile smartphones for their life activities. In Indonesia, especially West Papua, people have used mobile smartphones to communicate with other people, friends, family, social media, to do business, and many others. The younger generation dominates the use of a mobile smartphone in West Papua. This dominance occurs because mobile smartphones were born and developed in their time. The younger generation uses mobile smartphones more towards social media than they are using for activities that are beneficial to their lives. For example, learning. The younger generation uses mobile devices on various occasions [1]. A total of 9.5% of mobile smartphones are used for learning [2]. Observations on 302 students in one Senior High School in Manokwari, they all have used mobile phones, and as many as 91% of them are using mobile smartphones based on Android. This data shows that mobile smartphones have been growing rapidly among student [12] schools in Manokwari, but have not been used well in the process of learning. To invite students to be able to use their mobile smartphone in [16] their learning activities can be done by the teacher. The teacher can design learning that integrates the use of mobile smartphones as mobile learning.

In the future study is needed to use mobile learning in the classroom [3], more specifically in science classes [4], and the results of a review of Crompton & Burke (2018) revealed that the mobile devices have many [1] positive benefits in learning and the time to assess to be able to use them [10] in learning context [5]. Based on the results of previous studies, it was stated that the need for the use of mobile learning in future learning. The use of mobile smartphones as mobile learning will make students successful in learning. They will get good learning results. If the student learning outcomes are good, the learning objectives are the focused learning is well achieved.



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Learning implementation in addition to focusing on learning outcomes, the right attitude and good student skills also become a focus of attention [6], and overall that learning aims to enable students to succeed in education. Mobile learning is present in learning to assist teachers in helping their students to learn success. On the other hand, student learning success is influenced by many variables, one of which is metacognitive. Metacognitive becomes a nutrient for the human brain when he is studying [7], becomes one of the predictors that influence student learning success by 90% [8]. In addition to improving learning, what needs to be trained by teachers is students' metacognitive skills [9]. Students must be able to develop their metacognitive skills to realize that the use of mobile learning has an impact on learning than they do not use it [10,11], and metacognitive skills are a prerequisite for 21st century learning [12].

It can be said that the teacher to make his students achieve success in learning, then the teacher must create learning that suits the needs of today's modern students, where modern students now use mobile devices for their daily activities. Mobile devices have not been used well in the learning process. But on the other hand, to be able to achieve success in learning, students need metacognitive skills. Therefore, what needs to be done first by the teacher is to integrate mobile devices in learning in the form of mobile learning, and it is used to train students' metacognitive skills. Teachers can design learning that integrates mobile tools [13]. Limited to previous studies from Sung & Mayer (2012) that only examined students' beliefs about the mobile device, they suggested that they could use mobile learning to measure the learning process and student performance [14]. In this study, training students' metacognitive skills through learning using mobile learning will be presented and discussed.

2. Experimental Method

This type of research was an experimental using one-shot case study. A total of 126 students as research subjects were divided into five treatment groups in the XI^{MIA} class of SMA Negeri 01 Manokwari. Designing mobile learning online used the free version of www.appypie.com. Before being designed online, researchers make storyboards from mobile learning that will be created. Figures 1, 2 and 3 show examples of mobile learning designs used to teach students the concept of biology.



Figure 1. Section of a menu in mobile learning

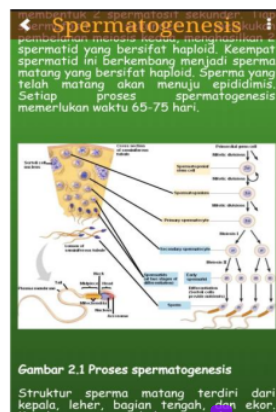


Figure 2. Section of content in mobile learning

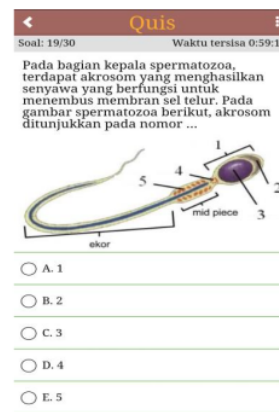


Figure 3. Section of a quiz in mobile learning

The profile section is showing the profile of mobile learning maker. The material section contains the concepts of biological material taught to students. The video section contains videos of biological material information that was previously downloaded from youtube. The quiz section contains exercises in multiple-choice form, after which students fill out they will immediately see the score

they get. The consultation section contains the cell phone number, e-mail and social media they can contact if there was material that they do not understand in mobile learning. The last part was the source that contains the reference cited. Mobile learning and metacognitive integrated learning outcome tests were validated theoretically and empirically. The theoretical validity of mobile learning by three experts was 94.25 % (very valid), and the validity of the test was 94.81 % (very valid). The empirical validity of the test that was valid. Number 1 was $r = 0.715$ ($0.000 < 0.01$), number 2 was $r = 0.715$ ($0.000 < 0.01$), number 3 was $r = 0.715$ ($0.000 < 0.01$), number 4 was $r = 0.715$ ($0.000 < 0.01$), number 5 was $r = 0.715$ ($0.000 < 0.01$). The whole question was valid and very significant. Reliability was 0.692 (reliable). To measure the metacognitive skills of students used metacognitive rubric from Corebim (2009) [15].

Data analysis was in the form of data on mean students' metacognitive skills in each treatment group, and the overall mean of students' metacognitive skills. The Kruskal-Wallis test was used to determine whether there were differences in metacognitive skills to five treatment groups. Before the inferential analysis, the normality of the data is carried out. The results of the data normality test were presented in Table 1.

Table 1. Kolmogorov-Smimov test of metacognitive skill

		Group I	Group II	Group III	Group IV	Group V
N		29	29	20	24	24
Normal Parameters ^{a,b}	Mean	67.8966	69.3448	76.4000	67.8333	70.7917
	Std. Deviation	14.99368	10.38638	22.91265	4.49799	15.32540
Most Extreme Differences	Absolute	.272	.419	.259	.408	.206
	Positive	.272	.419	.184	.408	.206
	Negative	-.200	-.200	-.259	-.217	-.161
Kolmogorov-Smimov Z		1.464	2.258	1.160	2.000	1.010
Asymp. Sig. (2-tailed)		.028	.000	.136	.001	.260

a. Test distribution is Normal.

b. Calculated from data.

Based on the data in Table 1, it was found that group III and V data were normally distributed, but data in groups I, II and IV were not normally distributed. To analyze the differences in students' metacognitive skills using non-parametric analysis, the Kruskal-Wallis test.

3. Result and Discussion

The results of the study present: first, a description of the metacognitive achievement of students in each group. Second, display the results of the test of differences in students' metacognitive skills in each group.

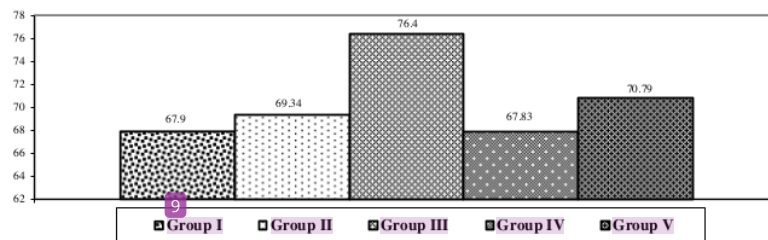


Figure 4. Mean of metacognitive skill of all group

Figure 4 shows that the mean acquisition of students' metacognitive skills in each treatment group was different. Groups I, II and IV obtain the mean of students' metacognitive skills is sufficient, and groups III and V get the mean of students' metacognitive skills is good. If it is calculated based on the mean metacognitive skills of all students (126 students), the mean student's metacognitive skills are 70.12 (good category). Based on the mean score obtained, it can be said that the use of mobile learning in biology learning can train metacognitive skills well. Furthermore, Table 2 shows the significant differences in metacognitive skills in the whole group.

Table 2. Analysis results of Kruskal-Wallis of Metacognitive skill

	Group	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Metacognitive skill	1	29	65.26	5.805	4	0.214
	2	29	57.93			
	3	20	79.68			
	4	24	60.88			
	5	24	57.25			
	Total	126				

Table 2 presents the results of the analysis of differences in metacognitive skills in all groups. The sig value obtained is $0.214 > 0.05$, that means there is no difference between students' metacognitive skills in all groups taught using mobile learning assistance.

The absence of significant differences in all groups shows that mobile learning can train students' metacognitive skills at the same level of achievement equally well. Mobile learning used by teachers in teaching the concept of biological material is facilitated by smartphones based on Android, and it is connected to an internet connection, making students' metacognitive skills good. Mobile learning technology becomes an effective tool in improving communication in learning, especially teaching a material concept, and making students interested in learning [16–18]. The process of communication that occurs with teachers through the help of mobile learning enables students to think well. When students think, they need metacognitive skills to be able to controlling their cognitive processes. Students use their metacognitive when they read material in the mobile tool [19]. Mobile learning used in the process of learning and teaching biology, material is presented in a mobile application, and students can be open using their mobile devices. Students learn to think about finding and understanding information about biological concepts, they are involved in cognitive processes, and this is where they are using metacognitive skills. Mobile learning assisted learning is done in several meetings. In each learning process, students use metacognitive in their thinking process. Here it is seen that there is a continuous practice of students' metacognitive skills. When measuring the metacognitive skills of students after they are taught using the help of mobile learning, their metacognitive skills are good. Metacognitive controls the progress of learning from students when they learn by using mobile learning assistance [20].

Different research results obtained by Lai & Hwang, (2014), they found that there was no increase in students' metacognitive when they learned by using mobile assistance in the short term or the long term [21]. In the results of research found by author, students' metacognitive skills are not very high, but the use of mobile learning can train students' metacognitive skills well. Mobile learning used by the teacher is to support constructivism learning. Students use their metacognitive skills, as they discover and construct their knowledge of the concept of biology by using the help of mobile learning as a source of information on biological knowledge.

4. Conclusion

The results of the discussion of the implementation of mobile learning in teaching the concept of biology. It is showing that mobile learning can be training students' metacognitive skills well. Each treatment group showed different metacognitive skills of students, but not significantly different. Mobile learning used by teachers in learning can make metacognitive skills of well-trained students. Future research can use mobile learning combined with other innovative learning to improve students'

metacognitive skills. Also, the limitations of this study are not to study the contribution of metacognitive skills to students' success in learning, so that the other researcher can be further to investigate for future research.

Acknowledgments

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