Android-Based Mathematics Learning Media Assisted by Smart Apps Creator on Self-Regulated Learning

Isnaini Mahuda[1], Anton Nasrullah[2*] https://orcid.org/0000-0003-0696-2748, Melinda Putri Mubarika[3]
https://orcid.org/0000-0001-8861-5306, Ranny Meilisa[4], Laksmi Evasufi Widi Fajari[5]
[1,2,4,5]University of Bina Bangsa, Indonesia
[3]University Pasundan, Indonesia
e-mail: [1]anton.nasrullah@binabangsa.ac.id, [2,4,5,6]Laksmievasufi@binabangsa.ac.id

ABSTRACT

This study aimed; 1) to investigate student responses toward the use of android-based media assisted by Smart Apps Creator for mathematics learning; 2) to investigate student self-regulated learning level; 3) to find out whether there was an effect using Android-based mathematics learning media assisted by Smart Apps Creator on student self-regulated learning. The study used an experimental method One-Shot Case research design. This study took the population of second-semester students in the Department of Management. The research samples were 2B MAN students chosen by random cluster sampling. The study showed that the percentage of average student responses to Android-based learning media assisted by Smart Apps Creator was very high, 88.08% and students' self-regulated learning was in a high category at 75.87%. The hypothesis test results indicated an effect of using Android-based mathematics learning media assisted by Smart Apps Creator on student self-regulated learning. The number of using android-based mathematics learning media on student self-regulated learning was 18.2%, the rest by other variables in this study. The researchers found the result of their research and concluded: 1) the average of student responses to the use of Android-based learning media assisted by Smart Apps Creator was 88.08% which is categorized powerful ad category; 2) the average of students' self-regulated learning was 75.87% described as a strong category; 3) The results of hypothesis test showed there was an effect of using Android-based Mathematics learning media assisted by Smart Apps Creator on student self-regulated learning.

INTRODUCTION

Learning is a series of stages of change to achieve specific competencies in a person, both cognitive, affective, or psychomotor. Learning is a change in self-potential from experience and knowledge that is perceived and then involved in circumstances related to experience (Sulistiyarini & Sukardi, 2016). As a person ages, the responsibility for organizing and self-discipline in the learning process also increases. When reaching adolescence to adulthood, one should be responsible for learning and become an independent learner. Independent in the sense of being able to take the initiative,

overcome obstacles or problems, and have the confidence to do things on their own without the help of others. Independence in learning is essential for someone to achieve optimal learning goals.

Self-regulated learning is a learning activity driven by one's ability, choice, and responsibility (Hadi & Farida, 2012). Students are said to have been independent in learning if they can carry out learning tasks without dependence on others. This attitude of independence in learning can lead a student to better monitor, control, and evaluate learning patterns effectively. However, students who cannot study independently can learn negative habits such as studying only before exams, truancy, cheating and looking for leaks on exam questions (Pratiwi & Laksmiwati, 2016). This tendency causes mental disorders that will continue when entering further education. The covid-19 pandemic effect almost all over the world, one of them being Indonesia. Since this virus, classroom learning has been transformed into virtual learning from home for more than a year. Self-regulated learning is also considered an essential attitude, especially in online learning. Some constraints faced by students in online learning consisted of difficulties in understanding the discussion due to the limited lecturer's presentation, especially for Mathematics discussion, which has some abstract concepts with high difficulty levels. Students were required to actively explore information and build their knowledge at their own pace to achieve learning objectives even though they ran online.

Based on the researchers' observations of Management students who took the mathematics-Economics course, the study found problems with self-regulated learning, a sign of them having relatively low for their learning. The problems related to self-regulated learning among them would be severe and affect student attitudes in the future. It was seen from their perspectives consisted: 1) were not initiative to look for teaching discussion, they were only waiting for the lecturer to give it; 2) were less active in asking for the discussion that they did not understand; 3) never evaluated their learning achievement; 4) did not explore learning facilities; 5) often did not answer the questions considered difficult; 6) only studied before the exam come. Android is one mobile operating system with relatively fast and rapid growth among other developing operating systems. Companies in the global information sector state that Android smartphones have the highest percentage of total sales, namely 53%, compared to other developing smartphones such as Blackberry with 0.5% percentage, Apple with 45% percentage, and Windows Phone with 1.5% percentage (Rahayu, 2017). Almost all students or the millennial generation must have an Android-based smartphone. The use of android-based mathematics learning media can be an effort to increase student learning independence in online learning. Android-based learning media, or mobile learning, can allow the learning process anytime or anywhere. The use of mobile learning can support the learning process. Teaching and learning can increase flexibility in teaching and learning activities to improve learning outcomes (Robianto & Wahono, 2019).

Smart Apps Creator (SAC) is widely used to create android-based learning media. SAC is the latest digital interactive media that builds multimedia content installed on Android-based smartphones (Muhlas & Marwani, 2020). SAC is used to develop mobile learning, quiz, tourism/tourism, company profile, product profile, city branding, marketing applications, and more. (Suhartati, 2021). SAC software has several advantages: 1) it does not require programming skills that let anyone can operate it efficiently, 2) intelligent Apps Creator (SAC) on Android, 3) it can insert animations as needed and planned by developers, 4) it is interactive, 5) supports various types of formats for storage media, and 6) integrate web services so that applications become more functional (Budyastomo, 2020). Android-based learning media has many advantages in the learning process, and the results show a significant impact on increasing learning independence. The study results stated that android-based mobile learning affected learning independence (Kurniasih, 2021). In line with that, the study results show that android-based learning media in mathematics learning effectively increases students' learning independence (Hendikawati. et al., 2019). Furthermore, Android-based learning media under the guidance of Smart Apps Creator exist for other subjects in research that develop modules based on android applications assisted by Smart Apps Creator for Materials Engineering Courses in the Mechanical Engineering D3 Study Program (Robianto & Wahono, 2019).

METHODS

The study was quantitative research with an experimental method to investigate the effect of dependent and independent variables. The one-showcase Study design only used one class as a practical

class with special treatment; then, the results were observed (Sugiyono, 2008). The method of the one-showcase study is as follows:

$$X \qquad O$$

Figure 1. Design of the one-showcase.

The population in this study were all second-semester students of the Management study program. The research sample was 2B Management students selected using the cluster random sampling technique. Data collection techniques used students' response questionnaires and students' self-regulated questionnaires. The questionnaire used the Likert scale model with five alternative answers, strongly agree, agree, neutral, disagree, and strongly disagree.

The student questionnaire consisted of 17 items with three assessment indicators: 1) display; 2) material presentation and; 3) the benefits of media; while student self-regulated learning consists of 27 items with nine indicators, 1) have learning initiative; 2) diagnose learning needs; 3) set learning objectives; 4) monitor, regulate, and control performance or learning; 5) take difficulties as challenges; 6) find and utilize relevant learning resources; 7) select and implement learning strategies; 8) evaluate the process and learning outcomes; 9) have self-concept (self-concept). Learning is a series of stages of change to achieve specific competencies in a person, both cognitive, affective, or psychomotor.

Learning is a change in self-potential from experience and knowledge that is perceived and then involved in circumstances related to experience (Sulistiyarini & Sukardi, 2016). As a person ages, the responsibility for organizing and self-discipline in the learning process also increases. When reaching adolescence to adulthood, one should be responsible for learning and become an independent learner. Independent in the sense of being able to take the initiative, overcome obstacles or problems, and have the confidence to do things on their own without the help of others. Independence in learning is essential for someone to achieve optimal learning goals.
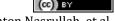
RESULTS

Android-based learning media assisted by Smart Apps Creator is an alternative learning media used in online learning during the Covid-19 pandemic. The use of android-based learning media assisted by Smart Apps Creator provided convenience for students because they could access discussion by installing applications on all types of android smartphones. This Android-based learning media assisted by Smart Apps Creator contains manuals, pretests, materials, evaluations, and product menus. In addition, for more interactive applications, video links were also connected to learning videos available on YouTube, specifically for materials or sub-materials that required a more detailed explanation.

The instrument used is a questionnaire of 17 statements using a Likert scale to see student responses to the Smart Apps Creator media. Questionnaires were given to 35 Management 2B students as research samples. The questionnaire results show that media display, material presentation, and media benefits indicators show 88 88.08%, seen as a powerful category (Table 1).

Table 1. The average percentage of student responses.

Indicator	Percentage
Media Display	89.14%
Material presentation	89.31%
Media Benefits	85.81%
Average	88.08%

Based on Table 1, the overall average percentage of student responses to using Android-based learning media assisted by Smart Apps Creator is 88.08%, which is a powerful category. To investigate student self-regulated learning, a questionnaire of 27 questions was distributed after giving special treatment; it was after the mathematics learning process using Android-based media assisted by Smart

Apps Creator. Recapitulation of the Percentage of Student-Self Regulated Learning Questionnaire Results (Table 2).

Table 2. Recapitulation of the overall average percentage of self-regulated learning.

Indicator	Percentage
Have learning initiative	78.09%
Diagnose learning needs	77.33%
Set learning goals	81.52%
Monitor, manage and control performance or learning	70.85%
See adversity as a challenge	68.95%
Find and utilize relevant learning resources	74.47%
Select and implement learning strategies	76.57%
Evaluate the process and learning outcomes	71.81%
Have self-concept (self-concept)	83.24%
Average	75.87%

Based on Table 2 above, the overall average percentage of self-regulated learning is 75.87%, a strong category. To find out whether there is an effect of using Android-based learning media assisted by Smart Apps Creator on student learning independence, a t-test with results is shown below:

Table 3. Partial t-test.

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	77.799	9.280		8.384	.000
	Students Respond	.334	.123	.426	2.708	.011

Based on Table 3, the results of the hypothesis using SPSS IBM 26 obtained a t-count was 2,708. It has significance level 5% and degree of freedom (df) = n-k = 35-1 = 34, the t-table is 2.032. Because the t-count is 2.708, which is greater than the t-table 2.032 (2.708 > 2.032), it concluded that using Android-based learning media assisted by Smart Apps Creator has a significant effect on student self-regulated learning.

The results show that Android-based learning media assisted by Smart Apps Creator on student learning independence (Table 3). The influence of Android-based learning media assisted by Smart Apps Creator on learning independence on calculating the coefficient of determination below (Table 4).

Table 4. Coefficient and determination.

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate
1	.426[a]	.182	.157	6.07438

The results of calculating the coefficient of determination were 0.182 or 18.2%, describing that the use of android-based learning media influences 18.2% of students' self-regulated learning. In contrast, the rest by other factors out of this study (Table 4).

Self-regulated learning should be owned and improved, especially by students in higher education. Especially in online learning, independent learning will significantly impact student learning outcomes. Therefore, selecting the right Mathematics learning media is essential to enhance students' self-regulated learning. Android-based Mathematics learning media assisted by Smart Apps Creator has advantages; it can be easily operated and used by all Android-based smartphone users, which teenagers and students currently dominate.

DISCUSSION

Android-based Mathematics learning media assisted by Smart Apps Creator combined elements consisting of video, audio, images, and text that make learning Mathematics more fun to increase students' experience, understanding, interest, and attention to the discussion (Chang et al., 2017; Widiyatmoko & Utaminingsih, 2021; Tian et al., 2018). Therefore, Android-based Mathematics learning media assisted by Smart Apps Creator can support students' self-regulated learning. It is in line with research that states that android-based learning media can increase student learning independence (Hendikawati. et al., 2019; Mukhtar & Putri, 2021; Astiningsih & Partana, 2019; Alhalafawy & Zaki, 2019; Kim & Jang 2015). The study results indicate that technology can positively impact the mathematics learning process. It is in line with what reveals that technology in mathematics learning is a supporting tool that can help students (Nugroho et al., 2017; Nasrullah et al., 2018).

CONCLUSION

The researchers found the result of their study and concluded: 1) the average of student responses to the use of Android-based learning media assisted by Smart Apps Creator was 88.08% which is categorized powerful ad category; 2) the average of students' self-regulated learning was 75.87% described as a strong category; 3) The results of hypothesis test showed there was an effect of using Android-based Mathematics learning media assisted by Smart Apps Creator on student self-regulated learning.

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