

Using a Smartphone Application (Notes) to Improve Math Learning Outcomes in Online Learning During the Covid-19 Pandemic

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ABSTRACT

The COVID-19 epidemic has wreaked havoc on many systems, including education and the learning process. During this epidemic, the learning process, which was originally face-to-face, demands teachers/lecturers to adapt in order to provide engaging learning. The essential element that must be prioritized is the expectations of student learning outcomes. The aims of this study are to: (1) explain how cellphone notes can be used to improve math learning outcomes, and (2) describe how cellphone notes can be used to improve math learning outcomes. Action research was utilized as a research approach in this study. The subjects in this research were seventh-semester students from Universitas Muhammadiyah Ponorogo's Mathematics Education Study Program in the odd semester of the 2020/2021 academic year. Observation, interviews, field notes, and documentation were utilized to gather information. The findings suggest that incorporating cell phones into the learning process might help students get better arithmetic scores. Between before and after the activity, the outcomes of studying mathematics showed a substantial boost.

Keywords: *Smartphone Application, Covid-19 Pandemic, Online Learning.*

1. INTRODUCTION

Learning media is one element that plays an important role in the learning process. Learning media will be able to help teachers and students in an effort to gain knowledge and insight. As stated by [1] that in the learning process the most important thing to pay attention to is the selection and use of appropriate learning methods, models and media. The use of media in the learning process can foster student motivation and interest.

[2] explained that specific media is defined as graphics, photos, or electronic devices to capture, process, and rearrange visual or verbal information. It is explained in detail that the media must meet the criteria so that the learning process can run well and be relevant to the previously set objectives. Several criteria in the selection of media are as follows: 1) by the learning objectives to be achieved, 2) the media must be suitable to support the facts, concepts, and principles of the lesson, 3) the media must be practical, flexible and durable 4) the media must be able to be used by the teacher properly and skillfully, 5) the technical quality in the media used must meet the requirements, 6) the media

used must be by the students' thinking level, 7) the media used must be able to support and help students' understanding of learning.

In the learning process, technological developments are unavoidable. Teachers must adapt technology in learning so that learning is felt more interesting. As explained by that the use of technology in the learning process can make learning more interesting and diverse. Furthermore [3] explains that technology can make students participate in education. Technology in education is used to assist teachers in managing their learning [4]. It is clarified by [5] that professional teachers are teachers who can master learning strategies well, especially learning strategies that use media and models, because this strategy will improve the quality of learning.

Online learning is distance learning that uses technology in its implementation [6]; [7]; [8]. Online learning has advantages such as being able to summarize time because it does not require travel. However, online learning also has disadvantages. In online learning makes students weak to think critically such as planning and accuracy in synthesizing ideas. Online learning also has

drawbacks when it is not matched by the readiness of the perpetrators. When students and teachers are not ready to do online learning, it will become an obstacle in learning. Teachers who are less skilled at using online learning media need more knowledge, help, and experience to be able to do online learning more optimally. Because in online learning, interaction is not only needed between students and teachers, but also between students, teachers, and the learning media used. This is done to keep the quality of online learning the same as the quality of offline learning.

The development of the quality and quantity of online learning increases along with the development of technology. Especially during this pandemic, online learning is growing and experiencing an increase in the variety of technologies used. Some applications can be used in online learning including using HP notes. Note HP is a media that is already available in gadgets used by students and teachers. Note Hp is one of the media that is easy to use. HP notes learning media is also easy to carry and move anywhere. For this reason, HP notes are considered media that meet the criteria.

This study aims to: (1) describe the implementation of learning using cellphone notes in improving mathematics learning outcomes, (2) describe mathematics learning outcomes using cellphone notes. The results show that the use of cell phones in the learning process can improve mathematics learning outcomes

2. METHODS

This study uses a type of classroom action research (CAR) conducted by lecturers, to improve the quality of learning during the covid 19 pandemic. According to [9] classroom action research is research conducted by education as a strategic way to improve or improve educational services in classroom learning. Meanwhile, according to [10] classroom action research is research that examines various actions such as carrying out tasks, deepening understanding during actions taken, and improving learning carried out by educators in the classroom. It can be concluded that classroom action research is research conducted by educators to reflect on various actions in classroom learning to improve services from various aspects.

This research was carried out in the ordinary differential equations course. The subjects of this study were 29 semester VII students in the Mathematics Education Study Program, Universitas Muhammadiyah Ponorogo in the odd semester of the 2020/2021 academic year. Classroom action research will be carried out using 2 cycles wherein each cycle 4 stages will be carried out during the learning process, namely planning action (planning), implementing the action (acting), observing (observing), and reflecting (reflecting). While the data analysis technique using descriptive qualitative is used to

describe the implementation of learning by using cellphone notes in improving mathematics learning outcomes.

The evaluation of student learning outcomes occurs at the end of each cycle, 1) observation, which seeks to watch the process of implementing learning and all actions of students and lecturers in the classroom during the learning process, was employed to gather data in this study, 2) Interviews, which were utilized to round out the observation data, 3) Field notes, which are used to keep track of things that happen throughout the learning process, such as actions carried out by lecturers and students in the classroom that aren't documented on the observation sheet. 4) Documentation, in the form of pictures of activities during the learning process as actual proof, to supplement and enhance the facts gained from observations and interviews.

The data in this study was subjected to technical analysis, which included 1) data analysis of learning implementation based on observations made throughout the learning process and then presented descriptively, and 2) data analysis of student learning outcomes. The two outcomes will be compared afterwards by displaying the calculation as a percentage using the method adopted from [11]:

$$P_{ji} = \frac{\sum \text{overall score}}{\sum \text{max score}} \times 100\%$$

with

P_{ji} : Percentage of online learning achievement using cellphone notes/student learning

outcomes

j : Lecture meeting index, $j = 1, 2, 3, \dots$

I : Cycle index, $i = 1, 2, 3, \dots$

3. RESULTS AND DISCUSSION

3.1. Cycle 1

During this Covid-19 pandemic, various efforts to provide services and maintain the quality and quantity of ordinary differential equation learning are utilizing HP notes. The use of HP notes during learning dares to try to improve mathematics learning outcomes with ordinary differential equations courses. It is known that learning this course boldly does not only convey verbally but the concepts contained in the course must be achieved. One of the alternatives for learning to be brave is to use HP notes.

This is the first time using HP notes during online learning because the previous learning was carried out

offline. Online learning during the Covid-19 pandemic using HP notes in cycle 1 was carried out 2 times with a duration of 2.5 hours of learning which means 2 x 50 minutes. Cycle 1 was held on December 14, 2020, and December 21, 2020, which coincided on Monday. The following is Figure 1 which shows data on the achievement of online learning during the Covid-19 pandemic by utilizing and using HP notes.

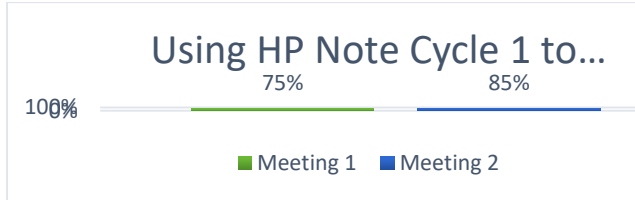


Figure 1. The first cycle of online learning using HP notes is complete.

Figure 1 above shows that online learning using HP notes during the Covid-19 pandemic has an increase of 10% from the 75% achievement. It can be seen that online learning in cycle 1 can be categorized as good. Although the use of HP notes in online learning can be well supported, several things must also be considered. One of the lecturers in this case in cycle 1 is not too familiar with using cellphone notes in online learning, because this is the first time using them. In addition, internet connection is a major requirement in online learning. According to [12] the use of learning tools such as the Jamboard, in this case, the cellphone note provides an advantage in mathematics or other analytical materials in online learning.

In cycle 1, the internet connection during online learning was not well supported, due to the lack of a strong internet connection at that time. From cycle 1, information on student learning outcomes was obtained at the two online lecture meetings, which are presented in Figure 2 below.

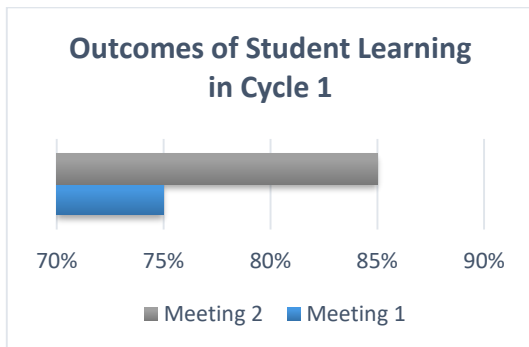


Figure 2. Outcomes of Student Learning in Cycle 1

Figure 2 above shows that student learning outcomes in cycle 1 during online learning during the Covid-19 pandemic. It is known that student learning outcomes need to be improved. There are several things that students should pay attention to. One of them is student involvement in online learning. This can be seen from the

enthusiasm and activity of students who are felt to be lacking and need to be increased in online learning involvement during the Covid-19 pandemic.

Indeed, this is the second time that online learning has been taken by students who were previously in the even semester of the 2019/2020 academic year. Students are not used to participating in online learning, which usually students only take offline lessons. So students must be able to get used to distance learning such as learning from this. In addition, students independently must be able to learn the concepts of the material learned during online lectures. So the awareness of self-study must be considered. This is in his opinion [13] which states that students' awareness of independent learning needs attention. Lack of awareness of student learning independently makes it difficult to process and receive the material provided.

3.2. Cycle 2

As in the previous cycle 1, in cycle 2 online learning or online lectures during the Covid-19 pandemic using HP notes were held 2 times with a duration of 2 x 50 minutes. The first and second meetings were held on Monday, January 04, and January 11, 2021, respectively. In contrast to the results achieved in cycle 1, in cycle 2, the achievement of learning or online learning using HP notes in the ordinary differential equation course gave similar results. significant. The following is Figure 3 which shows the achievement of online learning or lectures using cellphone notes.

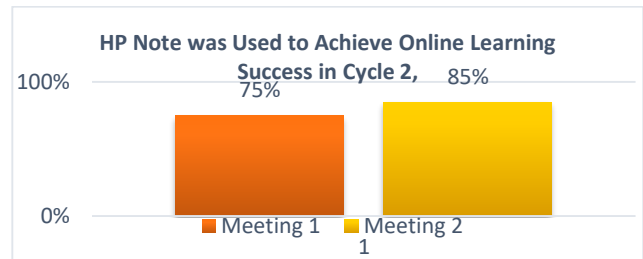


Figure 3. HP Note was Used to Achieve Online Learning Success in Cycle 2,

In Figure 3 it is clear that there was a significant increase in both meetings in online lectures. This is shown that lecturers are very proficient in using cellphone notes that are used for online learning or lectures during the Covid-19 pandemic in ordinary differential equations courses. In addition, the material delivered through cellphone notes is very easily accepted by students. Like, the lecturer writes on the blackboard. Thus, online learning or lectures supported by the use of cellphone notes will make it easier to convey material or things that need to be explained directly in writing online.

Not only that, if the materials discussed contain concepts and must be explained in direct writing or cannot be explained orally, then one good supporter is to

use cellphone notes as a support for online learning. With this cellphone note, students will be more interested and don't want to be left behind when online learning or lectures take place. So the impact is that students will better master the material and be able to understand the things discussed in online lectures. The proof is that student learning outcomes are better than previous learning outcomes. The following are the results of student learning in cycle 2 in online learning or lectures during the Covid-19 pandemic using cellphone notes as support, which are presented in Figure 4.

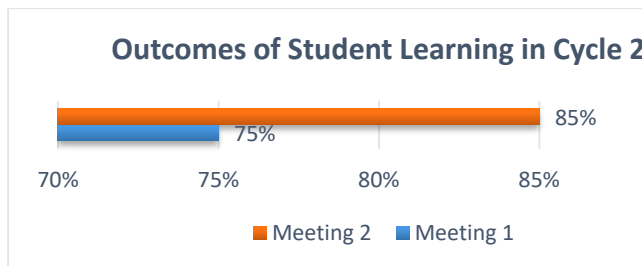


Figure 4. Outcomes of Student Learning in Cycle 2

Figure 4 shows that student learning outcomes in cycle 2 increased than in cycle 1. It can be said that students are very enthusiastic in learning or lectures when using cellphone notes in delivering material discussions. Finally, the message or information conveyed by the lecturer using cellphone notes makes it easier for students to understand the material, especially material about mathematical concepts such as in the ordinary differential equation course. This is in line with [14] which states that note hp is an application that aims to facilitate the learning process or lectures and teaching carried out.

In addition, students are used to undergoing online learning or lectures during this Covid-19 pandemic. Students are required to study independently, not depending on friends or lecturers. This is due to the distance and conditions that are not allowed to meet in person. So that students inevitably have to be able to solve this challenge independently. This independence will make students more critical to think before acting, in which students must ensure that what they receive and conclude must be valid. This is in his opinion [15] which states that there is a positive relationship between student learning independence and students' critical thinking skills in supporting student learning outcomes.

4. CONCLUSION

The use of cellphone notes can facilitate the delivery of material and provide convenience for students in studying material during online learning, as shown in the above description of the data analysis. Even though learning is done online, the quality of learning does not suffer as a result of this. This is evidenced by improved student learning results. The proportion of 85 percent in

cycle 2 indicates this rise, when it was previously 64 percent in cycle 1.

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