Employing Nearpod as a Resource to Encourage Active Students in BYOD Mathematics Learning Model

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ABSTRACT

In the period of the last few decades, more complex technology have been integrated into our daily lives. Therefore, teachers are advocating that students BYOD (bring your own device). This aims are investigated the activities of students during the lesson, which enables teachers to evaluate their students' progress in learning. In addition to this, students' learning experiences and raise their levels of satisfaction with their education with Nearpod and the dynamic interaction that occurs between them. Descriptive statistics were used for the analysis. Descriptive data for the questions and items were compiled in Excel, and included frequency, percentage, mean, and standard deviation. The goal of this research is to explore how female students feel about using Nearpod in conjunction with a video-conferencing learning system on a Bring Your Own Device (BYOD) learning platform. This study was conducted at Universitas Muhammadiyah Purwokerto (n = 78 students) and Purwokerto Secondary School in Central Java (n = 83 students and 9 teachers), during the even semester of the 2020/2021 school year. The objectives of this study required the development and administration of a questionnaire to all of the women enrolled in the "Mathematics Education" course. Researchers concluded from their study that students are open to using their own devices in class and are willing to benefit from the affordances provided by the BYOD platform and the Nearpod to engage in active learning during lectures. Therefore, there has to be more work done by universities to figure out which of the growing elements of education should be prioritized in order to create the best possible conditions for instruction and learning.

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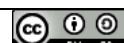
A. INTRODUCTION

Over the period of the past few years, sophisticated technologies have gradually made their way into our everyday lives (Hakami, 2020). Consequently, in an effort to enhance both the learning experiences and the outcomes of students, educators have begun building learning environments that take advantage of the gadgets and technologies owned by students. As a result, teachers are encouraging students to bring their own electronic devices (also known as "BYOD") so that these might be used in classroom instruction. According to the findings of a number of studies, students' iPads, laptops, tablets, and cellphones have been utilized in the daily learning that takes place in the mathematics classroom and other learning contexts (Govindarajan, 2021). In the field of higher education in particular, there is a significant rise in the prevalence of the BYOD model. According to some research (Fimala, Alwi, Miaz, & Darmansyah, 2022; Solomon Ironsi, 2021), letting students use their own electronic devices in

the classroom, such as smartphones and iPads, can be an effective teaching method that boosts the amount of interaction that takes place during class time. However, the utilization of such technologies necessitates the implementation of suitable pedagogies (Feri & Zulherman, 2021; Stojanovska, 2022). According to Civelek and Karatepe (2021), students need to have more possibilities to collaborate and react as active agents in the learning contexts.

Utilizing the affordances of learning materials and the environment in which students are learning is an extremely significant part of the pedagogical actions that teachers must do in order to encourage student participation in educational pursuits (Civelek & Karatepe, 2021). As a consequence of this, teachers need to be aware of how to facilitate collaborative activities between them and their students with the assistance of the functionalities provided by these educational technologies (Hakami, 2020). If a learning tool is solely seen as a presentational tool, then it is possible that this potential interaction will not take place (Naumoska et al., 2022). As a result, the job of a faculty member in the classroom needs to be shifted from imparting information to encouraging students to participate in productive activities over the course of the lecture (Pupah & Sholihah, 2022).

According to a report, faculty members in higher education institutions need to view technology as a tool that can promote both their own teaching and the learning of their students in order for active learning to be implemented (Fauzi & Subekti, 2021; Pupah & Sholihah, 2022). This is necessary for active learning to be implemented. One definition of active learning is any learning approach that allows students to do an active learning task and encourages them to think about the activities they are involving themselves in. Active learning can be defined as any learning approach that allows students to do an active learning task (Mohamed & Corresponding, 2022). To put it another way, the student gets experience in working, communicating, and receiving during the course of the class, which can be utilized to distinguish active learning from passive learning (Naumoska et al., 2022). In order to do this, a new educational model that emphasizes active participation from students within the classroom is required. In particular, as shown by a number of studies, the vast majority of students are content to use their own electronic devices for the aforementioned activities both inside and outside of the classroom (Siregar, 2022). In addition, according to what the students have said, the BYOD model encourages them to connect more with one another in the classroom (Qi, Shen, & Xue, 2022; Qiao, 2022).

According to Qi et al. (2022), the findings of a number of studies that focused on the efficiency of mobile learning suggest that mobile learning may have the potential to improve students' learning achievements, as well as their levels of motivation and their overall attitudes toward learning. Qiao (2022) investigates the impact that implementing a Bring Your Own Device (BYOD) model has on the academic performance of students in blended learning classes at Hongkong University. According to the findings of the study, the Bring Your Own Device (BYOD) intervention has a considerable positive impact on the academic accomplishments of students as seen by their improved test scores. Code (2019) conduct an analysis of the utilization of mobile technology in Portuguese higher education institutions located in the north area between the years 2019 and 2021. They discovered that mobile technologies were employed primarily as a tool rather than as a method to teaching and learning most of the time. They recommend that teachers implement mobile learning in such a way that increases the

amount of collaborative learning that takes place amongst students both inside and outside of the classroom. Mckay and Ravenna (2016) investigates how teachers and students use the iPad's technical affordances to create pedagogical affordances designed to construct and promote Mathematics teaching and learning. The information was gathered through the use of a survey, which was completed by 194 students and 14 teachers, as well as the observation of six different classrooms and interviews with five different teachers. According to the findings of the study, both teachers and students utilize iPads to assist activities that involve collaborative learning because of the portability of the device and the user-friendliness of its functionalities.

However, the BYOD model provides a solution for some problems that prevent the learning environment from being improved. On the other hand, it also brings some difficulties that prevent the proper adoption of the model in the learning environment. It has been stated that bring your own device (BYOD) policies could impede the educational progress of students because students frequently utilize their devices for activities that are unrelated to the subject matter being studied. For instance, they are able to read, transmit, and replay text messages, as well as explore websites that are not pertinent (Kaur, Koval, & Chaney, 2017). Another difficulty is that it's possible not all of the students will have access to high-quality devices to bring to class with them (Michael, 2014). However, the mobility, simplicity of use, low initial investment cost, and the potential impact on boosting students' learning are all advantageous features that motivate educators to adopt BYOD. These traits are what lead educators to apply BYOD. Nevertheless, one of the most difficult issues that teachers face when dealing with large classes is figuring out how to maintain order and get students involved in learning activities while the class is in session.

To summarize, in order to increase the amount of interaction between students, it is recommended to teachers that there is a need to develop learning activities that rely on the personal devices that students bring to class, and that teachers should encourage students to participate in these activities whenever it is necessary (Kaur et al., 2017). To achieve this goal, some teachers have combined the Bring Your Own Device (BYOD) initiative with software programs that make it simple for students to participate in classroom discussions, such as Nearpod, which is a web-based learning application that facilitates and controls interactions during the course of a learning experience. According to Michael (2014), one of the primary benefits of utilizing Nearpod is that it supports active learning in the classroom. This is due to the fact that Nearpod gives a variety of various ways to engage students while they are present in the classroom. As a result, Nearpod is considered to be one of the applications that has the potential to raise the level of interaction and cooperation in the classroom (Qi et al., 2022).

Therefore, this aims of study are investigated the activities of students during the lesson, which enables teachers to evaluate their students' progress in learning. In addition to this, students' learning experiences and raise their levels of satisfaction with their education with Nearpod and the dynamic interaction that occurs between them. As a result of the fact that it enables teachers and lecturers to synchronize, show, and control materials such as slides and videos while the class is in session. In addition, Nearpod records the activities of students during the lesson, which enables teachers to evaluate their students' progress in learning. In addition to this, it has the potential to improve students' learning experiences and raise their

levels of satisfaction with their education as a result of the increased opportunities it provides for students to participate in learning activities and the dynamic interaction that occurs between them (Qiao, 2022).

B. METHODS

The study of the data consisted of applying descriptive statistical methods (Creswell, 2014). Excel was used to compile the descriptive statistics, which included frequency, percentages, means, and standard deviations in relation to the questions and items. The responses to the open-ended questions were collected in a word document, and the comments from each participant were grouped together and given a single title using the following format: "ST" followed by the questionnaire number. For instance, ST01 indicates the comments obtained from the first questionnaire. After that, the researcher began the inductive process by examining the data in an effort to find parallels and differences while also taking notes on the most important ideas. There is now a list of codes, although other codes have been altered or taken out entirely.

Cronbach's alpha coefficient was computed for the five Likert Scale items in section 2, which elicited students' perspective about Nearpod usage when integrated with video-conference learning system, and section 3, which measured students' perspective toward Nearpod, BYOD platform, and video-conference learning system. This was done in order to analyze the reliability of the survey. Section 2 was followed by section 3. Section 3 measured students' perspective toward Nearpod, BYOD platform, and video-conference learning system. In all parts of the analysis, the coefficients were greater than 0.75, which indicates that the reliability is good. The entire Cronbach's alpha for both sections' 22 items has a value of 0.98, making it a very reliable measure. In section 2, there were thirteen things, and the value of the Cronbach's alpha was 0.9. In section 3, there were three positive items, and the value of the Cronbach's alpha for those items was 0.88, while the value for the six negative items was 0.85.

C. RESULT AND DISCUSSION

When students were allowed to use their own electronic devices in class, the qualitative data that was collected from open-ended questions revealed that the vast majority of students were pleased with the use of Nearpod and its integration with a video-conference learning system.

The table shows that the mean score for the total sample of responses from female students regarding the use of Nearpod in the class was 3.97, which indicates that students perceived the Nearpod as a learning tool which could support their learning in the class when integrated with video-conference learning system. When linked with a video-conference learning system, the students' perspectives on the use of Nearpod were favorable, particularly among the female students. As seen by the median score of three and the mean score of 2.77, they did not have any unfavorable attitudes regarding the utilization of Nearpod, BYOD platforms, or video-conference learning systems. Additionally, with an average mean score of 3.89, the majority of the students who identified as female "agreed" with the positive statements. In other words, the students agreed with all of the positive items and did not agree with any of the negative items, which suggests that the female students were pleased with the implementation of

Nearpod in the classroom. According to the ST09 report, "*I expect that this program will be used in all classes that are supported with video-conference learning system.*" ST20 continued by saying, "*I hope further applications, similar to this one, will be used in order to promote learning in the class",* as shown in Table 1.

Table 1. Summative Integrated Assessment of Learner Performance

Items – Students Personal Views	N-items	Mean	Median	Mode
Perspectives of Students on the Classroom Use of Nearpod	13	3.89	4	4
Evaluation of Nearpod, a Bring Your Own Device (BYOD) platform and a videoconferencing learning system from the perspective of students	3 positive items	3.97	4	3
	6 negative items	2.77	3	3

1. The Feedback on Classroom Nearpod Use from Students

The majority of the items that students agreed upon about the utilization of Nearpod when it was combined with the video-conference learning system on the BYOD platform are displayed in the table that can be found below. As can be shown in Table 2, the vast majority of students (90%) think that using Nearpod makes the classroom experience more interactive. In addition to that, 91 percent of the students said that they were given the opportunity to collaborate with other students while the class was in session. Similarly, 84 percent of the students said they like it when other students in the class asked them questions about their replies. According to the explanation provided by ST44, "*the most beneficial aspect of utilizing Nearpod in class that I loved was sharing my view and discussing it with other students*", as shown in Table 2.

Table 2. A comparison of the number students have said they would be interested in using Nearpod in class

No.	Items	Agree (%)	Natural (%)	Disagree (%)
1	There were more opportunities for students to collaborate.	90	4	7
2	There was a noticeable jump in students actively participating in class.	91	4	5
3	Because of Nearpod's group work features, I learned more thoroughly.	85	3	8
4	I learned a lot more once I started asking plenty of questions.	87	10	6
5	In class, it felt good to have a chance to explain my thought process.	83	10	5
6	My comprehension of the lectures improved because to the variety of study aids.	83	4	12
7	The method of managing lessons and resources allowed me to become more invested in my education.	84	6	8
8	There is a clearer elaboration of concepts in the lectures.	84	8	10

According to the results of Table 2, the students believe that incorporating Nearpod into the classroom either as a tool or a learning environment can help them better comprehend the content of the lectures. To put it another way, the affordances of the Nearpod assisted to raise the amount of interaction between students as well as between students and their teacher,

which in turn supported the students' comprehension of the topics that were being taught. The collaborative activities tools provided by Nearpod were regarded by 87% of the students as having a positive impact on their level of comprehension of the material covered in class. In a similar vein, 84% of the students said that the variety of learning tools had improved their comprehension of the lectures that they had attended. "*Using this App helps to grasp the lesson better by directing the conversations and questions*," stated ST34. The majority of the students, 85 percent, were of the opinion that asking a variety of questions during the duration of the class period helped them comprehend the material more completely. It is possible that this is the reason why 83% of the students reported that the lectures were taught better after the Nearpod was linked with the video-conference learning system. According to the findings of Dong et al. (2018), teachers can leverage the use of Nearpod to encourage student engagement in active learning by delivering a variety of learning tasks and learning resources to their students.

2. The Analysis of Students' Attitudes Toward the Use of Nearpod in Conjunction with a Video Conferencing System

Table 3 demonstrates that the majority of the female students in the class did not have any unfavorable attitudes against the use of technologies at any point in time. On the other hand, between one-fifth and practically one-third of the students possessed negative sentiments regarding the utilization of technologies in general, as well as Nearpod and the video-conference learning system when the lectures were being delivered. There are a number of potential reasons for this, one of which is that the incorporation of Nearpod did not resolve all of the problems that hampered the process of learning through the utilization of the video-learning system. As an illustration, ST11 mentioned in their report that "*the Nearpod is beneficial, but the internet speed and the quality of sound need to be corrected*." The students in ST07 emphasized that the noise in the classroom was the most significant barrier that distracted them from their studies. Although the use of the Nearpod did raise the level of interactivity in the classroom, this level of interactivity remained lower when compared to the level of physical engagement that occurred between the students and their teachers. It's possible that this is also why 32% of the students who are female found that using modern technology during the lecture was annoying. According to ST04, "*learning through the video-conference learning is not something that I enjoy at all*", as shown in Table 3.

Table 3. Student perspectives on the usefulness of using Nearpod in tandem with a videoconferencing platform for instruction.

No.	Items	Agree (%)	Natural (%)	Disagree (%)
1	When compared to its integration with Nearpod, the video-conferencing learning system stands on its own as a superior educational tool.	20	19	60
2	The Nearpod takes my attention away from the material I should be studying.	25	28	47
3	Nothing is gained from utilizing Nearpod in the classroom.	22	33	45
4	Without the Nearpod, I am able to absorb more information.	27	30	43
5	I find it distracting when professors use smartphones and other devices during their lectures.	30	28	42

3. The Opinions of Students Regarding the Use of Personal Electronic Devices

During the course of the lesson, almost one third of the students reported having unfavorable feelings toward the use of technologies. However, as can be shown in Table 4, there were some students who did not enjoy using their personal technology for educational purposes while in the classroom. In addition, greater than three quarters of the students surveyed said that they had a positive experience when utilizing the Nearpod in the classroom. According to the findings of Mckay and Ravenna (2016), students enjoyed using their own devices to run instructional activities within the allotted time in the classroom. According to the responses of 75% of the students, the vast majority of students had no problem sharing their personal electronic devices with her classmates, as shown in Table 4.

Table 4. The perspectives on BYOD amongst students, degraded by percentage

No.	Items	Agree (%)	Natural (%)	Disagree (%)
1	I found that utilizing my own electronic gadget to study in class was a wonderful experience.	82	10	8
2	The combination of Nearpod and the videoconference learning system is a fun and effective way for me to study.	80	10	10
3	During class, I enjoyed connecting with a neighbor by sharing my own device with them.	73	17	10

It has been discovered that the affordances of both the Bring Your Own Device (BYOD) model and the Nearpod have contributed to the promotion of active learning in the classroom. Because of this, it is up to the students to determine which apps may be utilized to supplement the instruction in all of their classes, particularly the ones that are delivered via a video-conference learning system. According to the study from ST13, "*The video-conference learning system is an antiquated system; the Nearpod and other new Apps should be employed to enhance teaching and learning in all areas*". This result is consistent with the findings reported by other researchers who confirmed that Nearpod made their classes much easier compared to other app presentations (McClean & Crowe, 2017; Michael, 2014). This result is also consistent with the findings reported by other researchers who confirmed that Nearpod made their classes easier than other app presentations (Brno, 2018).

In addition, due to the collaborative aspect of the Nearpod application, students were given the opportunity to interact with the material being presented, as well as with their fellow classmates and the lecturer. This finding is supported by the findings of Halloran (2018), who discovered that utilizing Nearpod appears to offer an alternative teaching approach in comparison to traditional lectures, which allows students to be engaged for a better and more enhanced learning experience. Additionally, this conclusion is consistent with the findings of Hirtz (2018). They reported that using the Nearpod app in a single class boosted student engagement as well as whole-group assessment.

Meanwhile, Code (2019) at Russellville High School explored the influence of utilizing Nearpod as an active learning tool in the high school science classroom. Her research was published in the journal Educational Technology & Society. This experiment compared the benefits of active learning using Nearpod to the disadvantages of passive learning with PowerPoint. The investigation made use of an experimental methodology, and it incorporated

both qualitative and quantitative data. When compared to active learning through the use of the presentation program PowerPoint, the findings suggested that Nearpod does not have a significant impact on the grades that students receive. Therefore, active learning appears to be the primary factor that determines how much students learn, rather than a computer program that offers possibilities for active participation (Abdullah, Yahaya, & Mat Isa, 2020).

However, both students and teachers enjoyed the active learning opportunities given by Nearpod because, in comparison to utilizing PowerPoint, Nearpod gave students a stronger sense of confidence in the content they were learning. Mckay and Ravenna (2016) also did a study to analyze the affect of using Nearpod and its impact on progress monitoring in order to ascertain the academic performance of students, measure the degree to which they have improved, and evaluate the effectiveness of education. In this study, a quasi-experimental methodology was utilized. According to the findings of the research, implementing Nearpod into a single class session led to increased levels of student involvement as well as more accurate evaluations of the performance of the entire class.

In addition, Buttrey (2021), carried out a study to investigate the influence that the use of an interactive classroom application has on the academic performance of students. The experimental technique was used for the investigation. According to the findings of the investigation, the utilization of the Nearpod platform in the programming class led to dramatically enhanced educational outcomes for the students. The findings also suggested that the usefulness of employing an interactive learning platform differs according on the nature of the class being taken and is influenced by the attendance pattern of the students. In addition, there was a minority of people who participated in the poll who believed that they could have learnt more if they hadn't used the Nearpod program. Perez (2017) conducted research to determine how the use of the interactive presentation technology Nearpod influences the academic performance of high school students studying science. The success of the students was evaluated utilizing both preliminary and final examinations, as well as daily quizzes, in-class exercises, and laboratory work. Surveys and journals were used to gather information about the students' and teachers' attitudes. When compared to active learning through the use of the presentation program PowerPoint, the findings suggested that Nearpod does not have a significant impact on the grades that students receive (Srisakonwat, 2022).

On the other hand, students and teachers both favor the active learning opportunities that Nearpod makes available. In addition, Pupah and Sholihah (2022) carried out an action research project with the goal of determining the influence that the integration of technology has on the level of student participation in secondary school classrooms. When compared to traditional, parallel lessons, their findings indicated that there was a rise of between 5 and 10 percentage points in the total level of student involvement, as well as an improvement in students' enjoyment of and excitement for lessons that involved technology.

Subsequently, this finding also lends support to the findings of Civelek and Karatepe (2021), which showed that both full-time and part-time students benefited from the introduction of interactive learning using the Nearpod platform. Specifically, full-time students significantly reduced their failure rate, and part-time students reached higher grades as a result of the introduction of interactive learning. On the other hand, the outcomes of this study run counter to the findings of Lowry and Brock (2016), which revealed that active learning with the

presentation application PowerPoint does not have a significant impact on student grades when compared to the use of Nearpod. On the other hand, students and teachers both favor the active learning opportunities that Nearpod makes available.

D. CONCLUSION AND SUGGESTIONS

According to the majority of the students surveyed, the capabilities of the Nearpod to present and ask questions (real-time evaluation) were the factors that motivated them to participate in learning activities the most while they were in the classroom. The current results demonstrate this to be the case. In addition, the manner in which the Nearpod controls content was helpful to both the students and myself as a lecturer in terms of making it easier to carry out the learning exercises while the teacher was speaking. All of the students in the class were able to participate in the learning exercises thanks to the way Nearpod controls them, and they were able to better control the learning materials that were presented to them. This is possible thanks to Nearpod's ability to support teachers in this endeavor. This result is in line with the findings that were reported by other researchers, who indicated that using Nearpod made their classes considerably easier in comparison to using other app presentations. This study confirms the findings that students enjoyed utilizing their own devices to run learning activities during class. The findings of this study also demonstrate that students were content with using their own devices for learning purposes. This study also lends credence to the conclusion that the BYOD platform was an effective learning environment that could be used to encourage instructional activities during the time that lecturers were actually presenting their material. According to the findings of this research, the students favored this form of interactive system since it encouraged increased contact and the sharing of knowledge. In addition, students were willing to share their electronic devices with their classmates and use them for educational purposes.

In a nutshell, the findings of the present study led the researchers to the conclusion that the affordances of the BYOD platform and the Nearpod promote active learning during the lectures, and that students are willing to participate in this kind of learning approach with their own devices being used for such learning activities during classes. The findings of this study have a number of practical repercussions for educators who are interested in implementing active learning in various learning situations. I propose that it might be easier to build a learning environment that results in an improvement of the teaching and learning process if one understands the affordances of the tools and learning environment that are now available. Nevertheless, the job of lecturer needs to shift from one of imparting knowledge to that of assisting students' learning, with due consideration given to the significance of employing the proper educational instruments that are suited to the particular learning environment. Higher education institutions need to make additional efforts in order to gain a better understanding of which newly emerging components of education should be prioritized in order to provide a better environment for teaching and learning. To be more specific, there is a significant amount of research that has to be done in order to establish the best way to encourage active learning in higher education through the integration of a learning tool with a BYOD platform.

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