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Exploration of the Use of Online Learning Applications to Improve Students' Mathematical Problem Solving

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Abstract

This study aims to find out the exploration of the use of online learning applications in learning and learning strategies. Mathematics is one of the important lessons, because in studying mathematics students are expected to not only understand the material being taught but also understand and can be applied in everyday life. Mathematical problem solving ability is one of the most important skills involved in learning mathematics. The teacher's role in learning mathematics is very important because it relates to learning strategies that can be used in the teaching and learning process. This research uses descriptive qualitative research. The technique of taking the subject in this study used the Purposive Sampling Technique. Exploration of the use of online learning applications in learning mathematics and learning strategies can be done in various ways, namely by conditioning fun and interactive learning and teachers can develop learning with Project Based Learning models that which can facilitate students to investigate, solve a mathematical problem, is student center and can produce a real work or product from the results of the project.

Abstrak

Penelitian ini bertujuan untuk mengetahui eksplorasi penggunaan aplikasi pembelajaran online dalam pembelajaran serta strategi pembelajarannya Matematika adalah salah satu pelajaran yang penting, karena dalam mempelajari matematika siswa diharapkan bukan saja mengerti materi yang diajarkan melainkan paham dan dapat diaplikasikan dalam kehidupan sehari – hari. Kemampuan pemecahan masalah matematis merupakan salah satu kemampuan yang terlibat penting dalam pembelajaran matematika. Peranan guru dalam pembelajaran matematika sangatlah penting karena berhubungan dengan strategi belajar yang dapat digunakan dalam proses belajar mengajar. Penelitian ini menggunakan jenis penelitian kualitatif deskriptif. Teknik pengambilan subjek dalam penelitian ini menggunakan *Teknik Purposive Sampling*. Eksplorasi penggunaan aplikasi pembelajaran online dalam belajar matematika serta strategi belajarnya dapat dilakukan dengan berbagai cara yaitu mengkondisikan pembelajaran yang menyenangkan dan interaktif serta guru dapat mengembangkan pembelajaran dengan model pembelajaran Project Based Learning yang dapat memfasilitasi siswa untuk berinvestigasi, memecahkan suatu permasalahan matematika, bersifat student center dan dapat menghasilkan sebuat karya atau produk yang nyata dari hasil proyek

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A. Background

Studying is a way to achieve the goal of quality education and can benefit everyone. One of the sciences that need to be studied is the science of arithmetic or mathematics. Mathematics is one of the important subjects, because in learning mathematics students are expected not only to understand the material taught but to understand and can be applied in everyday life. Understanding means that students can solve everyday problems in mathematical models, so students must be equipped with mathematical skills, including the ability to solve problems (Gusnidar et al., 2017)

The ability to solve mathematical problems is one of the abilities involved in important mathematics learning. (Islahiyah et al., 2021). According to (Dewi et al., 2019) that problem solving is one of the higher-order thinking skills, and problem-solving skills are one of the abilities that students must have in solving mathematical problems. Furthermore, according to Branca in (Syaiful et al., 2011) problem-solving ability is at the heart of mathematics because it is the main goal of learning mathematics. Thus, students' mathematical problem solving skills are very important to be maximized so that they are expected to achieve learning objectives.

Based on preliminary studies conducted using student interviews that students at SMP Budi Cendekia Islamic School have problems in learning mathematics, including students still having difficulty in solving math problems in the form of stories and changed to mathematical models and students have difficulty in understanding the subject matter in the textbook. Supported by the learning carried out by students one semester back, namely students learning online so that understanding in students' mathematical abilities is still considered lacking.

To overcome problems in online learning during the Covid 19 Pandemic, teachers need interactive teaching materials or learning applications so that the material delivered by teachers to students can be easily understood, especially in solving students' mathematical problems. The solution that can be done is that teachers can use and develop teaching materials that support in improving students' mathematical problem solving. Teachers can use online applications as a learning medium to improve students' mathematical problem solving.

B. Theoretical Studies

Fun learning, students are more directed to have high motivation in learning to create pleasant and joyous situations(Trinova, 2012). Fun learning can also be interpreted as learning that attracts students' attention with various learning methods and applications, so that learning that takes place does not make students bored. Varied, innovative and interesting learning

methods make the teaching and learning process of mathematics in the classroom fun for students. The methods used by teachers have implications for student interest and motivation. Therefore, the selection of learning methods in class must be appropriate and not boring so that students in class do not feel bored in receiving mathematical material from the teacher.

According to (Maswar, 2019) the task of teachers in schools is not only teaching but can also generate students' interest in learning what they will learn at school. The high and low learning outcomes of students, one of which depends on the teacher who teaches. The low learning outcomes of students in learning mathematics are caused by several factors. One of them is the factor of teachers who have not been able to create a pleasant learning atmosphere for students. Mathematics teachers are required to be able to create a fun and active learning atmosphere. With the creation of such a learning atmosphere, it can increase students' interest in learning mathematics.

During the Covid Pandemic that hit all over the world, teachers forced teachers to always create learning innovations by providing interesting learning methods and applications. Interesting learning applications during the Covid Pandemic include the Nearpod, Edpuzzle and Quizizz applications. The Nearpod learning application according to (Susanto, 2021) has the characteristics of being web-based, flexible in its use, allowing interactive learning to occur and its use is not limited to space and time. Meanwhile , the Edpuzzle application according to (Sugestiana & Soebagyo, 2022) is a video-based online learning application and media used by teachers to make lessons more interesting, we can take videos through Youtube channels, Crash Course and Khan Academy, then the videos are included in the Edpuzzle application so that teachers can ask questions and monitor student activities. Meanwhile, the Quizizz application according to (Wijayanti et al., 2021) that Quizizz can be used as an alternative learning media that is creative, innovative and fun so that student motivation is higher and learning outcomes will be better.

The role of teachers in learning mathematics is very important because it relates to learning strategies that can be used in the teaching and learning process. A mathematics teacher is required to be able to create a fun, active, and creative learning atmosphere. Fun learning can increase student motivation and interest in learning. One learning strategy that can be used to increase student learning success is the Think Talk Write (TTW) strategy). According to (Wahyuni & Efuansyah, 2018) this Think Talk Write strategy can improve students' mathematical problem solving and communication skills. This is because learning can lead to students constructing their understanding with the reasoning that students have, then students demonstrate and communicate the reasoning to other students.

Project-based learning or Project Based Learning is a learning model that uses projects or activities as a medium that involves students in transferring knowledge and skills through a discovery process with a series of questions arranged in tasks or projects (Awab et al., 2021). This learning model is a learning model for discussion in real problems so that it will be easier to understand and directly applied in everyday life. This learning model emphasizes students to be more active, while the teacher's role is only as a facilitator, students fully explore their own knowledge.

C. Research Methods

This study used a type of descriptive qualitative research. According to (Basir, 2015) descriptive qualitative research is to describe in depth about the research taken. The data collection method used in this study was semi-structured interviews with the students.

This research was conducted on April 14, 2022. The subjects of this study consisted of 5 students consisting of 3 girls and 2 boys in class VII at SMP Budi Cendekia Islamic School.

The technique of taking subjects in this study uses Purposive Sampling Technique. Purposive sampling technique is a sampling technique in which researchers expect their own judgment when selecting population members to take part in the study. The data collection technique used in this study was by conducting direct interviews with 5 students consisting of four questions. The respondents in the interview, namely as follows:

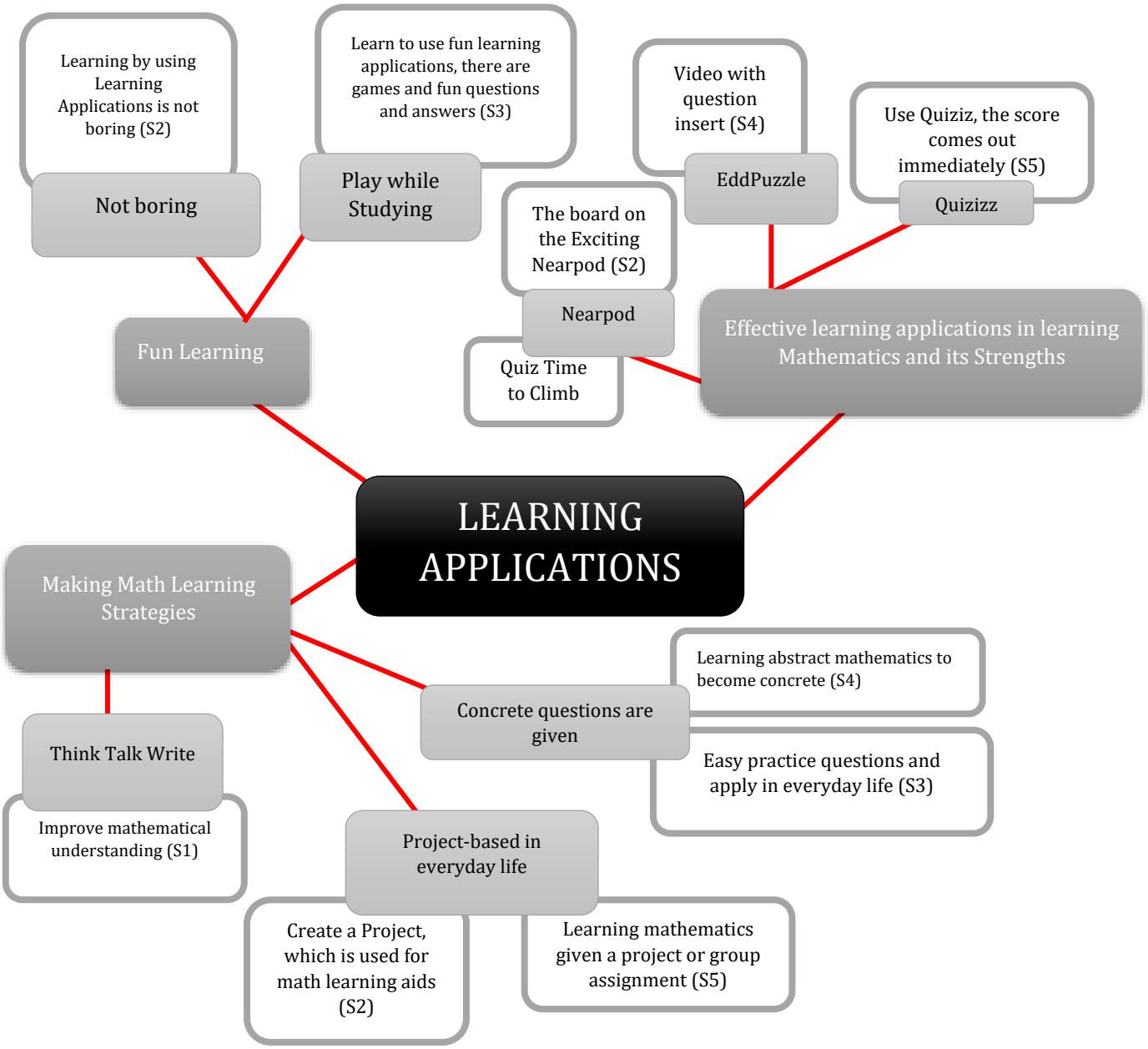
Tabel 1. List of Respondents

Nama	Kode
Kusumadirangga	S1
Altireli	S2
Airamahda	S3
Putri Cahayanie	S4
Fazha Faradilah	S5

This study aims to determine the influence of using online learning applications in learning and learning strategies. Here are the questions asked to students:

1. PP_1 : In your opinion, learning mathematics using learning applications can increase interest in learning? Why?
2. PP_2 : Of the several learning applications that you have used, which learning application is your favorite? Why?
3. PP_3 : What math learning strategies do you think are effective in improving math learning outcomes?
4. PP_4 : What learning model do you expect in learning mathematics?

D. Results and Discussion



Based on the results of observations and interviews with students, a concept map is produced which is displayed as shown above. In the concept map above can be described as follows:

1. PP_1 : In your opinion, learning mathematics using learning applications can increase interest in learning? Why?

   According to the opinion of (Mustakim, 2020) that mathematics is still considered a difficult subject because mathematics is abstract, systematic and has many symbols or symbols and uses confusing formulas. Such difficulties in mathematics

subjects require creativity to be able to develop learning, both in the media used and methods in teaching.

The use of online or multimedia-based applications is one of the innovations or solutions to make students able to understand the subject matter well and fun. Learning using online applications in the era of the Covid-19 pandemic is expected to make mathematics learning fun so that mathematics learning that takes place is not boring, students will quickly understand the material provided.

The role of online learning applications is needed to be able to become an intermediary or forum so that learning carried out even though it is carried out online remains effective. According to (Hasiru et al., 2021) the use of online applications or learning media innovatively and creatively will add more knowledge for students so that learning that takes place is fun and can increase students' technological literacy and student learning interest in mathematics.

Relevant research related to fun learning in accordance with research conducted by Hestika Novianingsih (Novianingsih, 2016) and research conducted by Pariang Sonang Siregar, et al (Siregar et al., 2017) has the result that the application of fun learning can improve mathematics learning outcomes.

2. PP_2 : Of the several learning applications that you have used, which learning application is your favorite? Why?

Learning applications are used to channel messages in the form of feelings, thoughts and attention that are useful in the learning process. According to (Hasiru et al., 2021) learning applications can help students teach abstract mathematical concepts so that they are easier for students to understand and accept. In learning, the process of student interaction with teachers and other learning resources needs to be supported by the right media or application.

The most favorite learning applications based on interview results are the Nearpod, Edpuzzle and Quizizz applications. The Nearpod application is an online learning application that presents an interactive learning space between students and teachers, where teachers can make a presentation containing pictures, questions and answers, quizzes and can be played together (Biassari & Putri, 2021). he Edpuzzle application is a video-based learning application and media that can be used by all educators and to make lessons more interesting(Achmad & Ganiati, 2021). While the Quiziz application is a game-based application that brings multiplayer activities to the

classroom and makes them interactive and fun in the classroom (Mulyati & Evendi, 2020). According to(Dityaningsih et al., 2020) the Quizizz application can make students compete and challenge with other students, because students can see the rankings on the leaderboard so that it can increase student motivation in learning mathematics, this results in improving their mathematics learning outcomes.

Relevant research related to online learning applications conducted by Destyan Dityaningsih et al (Dityaningsih et al., 2020) and Evi Latifatus Sirri as results that learning by utilizing online applications during Covid 19 makes mathematics learning fun, students learn while playing and can increase student interest and motivation even though learning remotely far.

3. PP_3 : What math learning strategies do you think are effective in improving math learning outcomes?

One of the reasons for students' low learning motivation towards mathematics subjects is the result of traditional methods in teaching mathematics that are used continuously. The teacher delivers a material only one way, there is no discussion to the students. Teachers still think that teachers are worried that applying several varied learning methods can hinder the completion of material that has been determined in the national curriculum. Based on this, student learning motivation can be increased by implementing learning strategies that are liked by students. According to (Lestari, 2015) the Think-Talk-Write learning strategy is a strategy that can increase students' understanding of mathematics in mathematical communication skills.

According to (Azrah, 2017) the role and task of teachers in making effective use of the Think – Talk – Write strategy is by submitting and preparing assignments that students may be actively involved in thinking, can encourage and listen clearly and carefully to an idea put forward by other students orally or in writing, consider and provide information about what is explored or found out by students in Discussion so as to encourage students to actively participate. The tasks prepared by the teacher are expected to be a motivation or trigger for students to be able to work actively.

Relevant research related to the Think Talk Write learning strategy as conducted by Ahmad Yazid(Yazid, 2012) and Nur Fitriyana &; Rani Asnurida(Fitriyana & Asnurida, 2018) has the result that the Think Talk Write strategy increases students' understanding of mathematical concepts.

4. PP_4 : What learning model do you expect in learning mathematics?

Mathematics teachers must be able to make innovations and be creative in choosing learning models that are combined with appropriate approaches and based on technology and information. The hallmark of a good learning model is the intellectual and emotional involvement of students, analyzing, acting and in the formation of attitudes; active and creative participation of students during the learning process; teachers can act as coordinators, facilitators, mediators and motivators in learning activities; The use of various approaches by utilizing media or learning tools.

One of the learning models that is in accordance with mathematics learning is the Project Based Learning learning model. According to Bie in (Nurfitriyanti, 2016) Project Based Learning Model is a learning model that focuses on concepts and principles from a discipline, which can provide opportunities for students to work autonomously and construct student learning and at the end can produce valuable and realistic student products or works. This learning model can facilitate students to invest, solve a mathematical problem, is a student center and can produce a real work or product from the results of the project.

Relevant research related to the Project Based Learning learning model conducted by Hesti Noviyana (Noviyana, 2017) and Dyana Indri Hapsari et al(Indri Hapsari et al., 2019) has the results that the Project Based learning model can be applied in mathematics learning.

E. Conclusion

Based on the description and explanation above, the use of online learning applications in learning mathematics is the latest breakthrough in this Covid 19 pandemic era. The use of online applications in learning can make the learning atmosphere active, fun and not boring so that it can grow and even increase students' interest in learning mathematics.

The Think Talk Write learning strategy is a learning strategy that can improve students' mathematical understanding and communication skills. The learning model that supports this strategy is the Project Based Learning learning model that can facilitate students to invest, solve a mathematical problem, is a student center and can produce a real work or product from the results of the project.

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