7th International Conference on Learning Innovation and Quality Education (ICLIQE 2023)

SHEs: Conference Series 6 (2) (2023) 117-123

Android-Based Digital Mathematics Learning Media For Elementary School Students: Preliminary Study

Elya Fitriani, Roemintoyo, Sarwanto

Universitas Sebelas Maret
elyaani508@student.uns.ac.id

Article History
accepted 31/7/2023 approved 31/8/2023 published 30/9/2023

Abstract
Mathematics is a subject that is less attractive to students because it is con-sidered difficult to solve the problems, plus when learning they are often lazy which can cause many problems such as lack of understanding of con-cepts, not developing creative thinking patterns, and decreased academic achievement. Therefore, this study intends to identify the needs of Android-based digital learning media that are able to facilitate students learning math-ematics in a more fun and participatory way. The research method is quanti-tative research, with the data collection instrument, namely a questionnaire. The sample involved in this research consisted of 17 fifth grade elementary school students (5). Responses from the questionnaire were then analyzed descriptively with percentages. The results of this research indicate that stu-dents are used to using Android smartphones, they also often use them, only not for learning but for watching YouTube and playing games. Most of them also want a learning application with the material content being mathematics, so they can learn the material when at home, and in the end students have more time to study than watching Youtube when playing their smartphones, so it is necessary to develop an Android-based learning media for mathematics.
Keywords: *Android, learning media, elementary schools, mathematics*

Social, Humanities, and Education Studies (SHEs): Conference Series p-ISSN 2620-9284
https://jurnal.uns.ac.id/shes e-ISSN 2620-9292

INTRODUCTION

Current technological developments have a very good impact on the education sector. Many things can be studied, created and developed by utilizing technolo-gy (Wang et al., 2019). Currently, the use of technology in the learning process has a positive influence because with the existence of technology educators can create a variety of creative and interesting teaching media for students (Yildirim & Sensoy, 2018). Technological developments are one of the products that offer new things for education and provide a choice of learning media that can be ap-plied to students (Teeroovengadum et al., 2017).

Seeing the current development of education in Indonesia, many educators have implemented the use of technology in teaching and learning activities (Ningsih et al., 2022). However, in some areas there are quite a lot of educators who still use textbooks as teaching media in teaching and learning activities. This makes learning seem like a lecture where the teacher explains in front and stu-dents listen. This is considered monotonous and less interesting because learning activities are not active and seem less creative (Viberg et al., 2020).

Without realizing it, technological developments have had an impact on chil-dren when compared to the old days where technological developments were not as big and advanced as they are today (Balkan Kiyici, 2018). For example, in everyday life, children play more with cellphones (HP) than reading textbooks, so students play more with cellphones than studying (Rahman & Aeni, 2021) . Parents also complain about this, because children play more with cellphones so that students' learning motivation decreases and affects the level of children's understanding of subject matter at school. The existence of rapid technology in the era of globalization makes it easy for humans to access information from anywhere and anytime (Akbar, 2019). The rise of technology changes how a child develops, and technology is used in all activities.

One of the subjects that elementary school students are afraid of and less in-terested in is mathematics because it is considered difficult to learn (Tang, 2021), so many children are reluctant to learn mathematics. Even though mathematics at the elementary level is basic mathematics that students must know because it is very useful and can be applied in everyday life (Bulut, 2021). Facts obtained from the field show that, learning at Brangkal I State Elementary School at this time, many teachers still use teaching media in the form of texts that stick to books. Even though, considering that there are many children in the village of Barangal, currently 100% of students aged 7-12 years have mastered the use of mobile devices and understand the use of various applications. Then from the reports of the parents, especially grade 5, they said that when at home the chil-dren played more on cellphones than reading books, so that children's academic abilities did not improve. So, this should be one of the opportunities and oppor-tunities to be able to develop creative Android-based learning media so that stu-dents are more motivated to learn (Khasanah & Lestari, 2021),(Sugiyarto et al., 2018). Because students can learn through cellphones so that students' motiva-tion to learn mathematics can increase.

From the phenomenon above, it is necessary to develop interesting and cre a-tive teaching media to support an active learning process between educators and students so as to increase student motivation, especially in mathematics. One of the learning media that is able to attract students' interest is to apply teaching media that involves gadgets or cellphones. Utilizing Android-based learning me-dia can be a powerful way because currently most children, especially upper-level elementary school students, already have their own cell phones. So that the development of Android-based teaching media can be the right tool or media for educators to use in order to increase students' motivation to learn in mathematics (Hasanudin et al., 2022),(Aripin & Suryaningsih, 2019).

With the presence of digital media, it is hoped that there will be many choices of creative, innovative and diverse teaching media that can be applied in learning mathematics. Because according to various studies, the application of Android media can increase student motivation and learning outcomes (Haryanti et al., 2021), by increasing student learning motivation, it will help increase student understanding which will also increase the value obtained (Murod et al., 2021). In Android-based learning media, not only in the form of text and images, stu-dents can also understand the material conveyed by the teacher through video tutorials (Tabrani et al., 2021). In addition, there are evaluation questions to measure students' abilities so that they are more measurable and skilled in work-ing on questions (Sutrisni et al., 2022), Some cases related to students who have difficulty absorbing material can be assisted with media and simulations so that students are assisted in understanding the material, because the material in math-ematics is very diverse (Sari et al., 2020). With this learning media students can learn more independently whenever wherever students are not only limited to learning in class.

Based on the description of field facts and the analysis of the relevant research above, it is important to present an innovative digital learning media with charac-teristics that are easy to use and familiar to students. Therefore, this study aims to analyze the need for the development of android learning media whose material contains mathematics subjects for elementary school students.

METHODS

This research method belongs to the quantitative method, as it is known that the quantitative method is a method based on post-postivism philosophy to examine a particular sample/population with descriptive results (Salim, 2019). The sample of this research was 17 grade 5 elementary school students. This sampling uses a cluster sampling technique, namely taking samples according to a particular group or class (Sugiyono, 2018). This research was conducted in May 2023. In order to collect data, this study uses non-test data collection techniques, with the instrument being a questionnaire or questionnaire (Silalahi, 2015). This needs analysis questionnaire adopted from several studies that had previously been conducted by (Budiarto et al., 2020),(Hanif et al., 2018). Data from student re-sponses were then analyzed using the data analysis technique used, namely per-centage.

RESULTS AND DISCUSSIONS

The data collected is the result of a questionnaire on the need for learning media facilities. In this study, 17 students were taken as respondents. Students are given a questionnaire as a research instrument in determining an analysis of the need for Android-based learning media. The purpose of the analysis of this research is to find out the needs of android-based learning media really needed by students to support their learning, especially in mathematics which they think is also difficult to understand. The results of the responses from the questionnaire distributed to students are summarized in the following analysis table.

Table 1. Student Response Analysis

Questions / Statements	Response	Percentage (%)
Are you used to using an Android phone?	Yes	92,7%
	No	7,3%
Do Android phones have parents?	Agree	88,6%
	Disagree	11,4%
Approximately when using HP, for what purposes?	Studying	27,4%
	Play Youtube	34,6%
	Do Social	23,8%

	Media Play Games	14,2%
How often do teachers use Android phones for learning?	Often	16%
	Occasionally	84%
Does the teacher's explanation when learning is good?	Good	58,7%
	Enough	24,3%
	Not Good	17%
Do you agree or not if math learning will be assisted by an application that can be opened on an Android phone?	Agree	88,9%
	Disagree	11,1%
Why do you agree with the use of math learning applications?	Pleasant	15%
	Attractive	38,6%
	Display There is an illustration video	46,4%

Most learning media are packaged in the form of print media or printouts in the form of textbooks which are less attractive and less practical to use in pros. they. It was also identified that so far, they did not use Android phones too often for learning, but to watch videos on the YouTube application (34.6%) as a form of entertainment for students when they are bored in their daily lives. From the results of this questionnaire it is also seen that the explanation from the teacher is actually quite good (58.7%) when delivering mathematics subject matter. It's just that they want the presence of an android media product for learning mathematics because it is able to contain problem solving illustration videos and has an attractive appearance. Most students responded in agreement with the presence of an android-based application for learning mathematics (88.9%), considering that according to them this subject was quite difficult to understand and required a long time to be able to remember formulas and solve problems. With the presence of this media, they can access material when they return from class hours at school.

Most learning media are packaged in the form of print media or printouts in the form of textbooks which are less attractive and less practical to use in the process of learning activities (Alfiras & Bojiah, 2020),(Perdana et al., 2021), This is certainly in line with the opinions of students who want the presence of other learning resources in digital format. In addition, the prevalence of Android smartphones is the basis for developing learning applications, because many benefits are provided when technology-assisted learning begins to be applied to classes (Hasanudin et al., 2022),(Suryanda et al., 2019). In its development, learning media is needed at various levels, both elementary, secondary, and tertiary levels(Pinto da Mota Matos et al., 2016). To support the achievement of quality education goals, quality development must be carried out in all aspects, elements, components and objects that support the learning process (Bujang et al., 2020).

The presence of Android-based interactive media will of course be able to have a positive impact on student achievement (Setiawardhani, 2021),(Aranta et al., 2021). Therefore, this media is certainly considered relevant to the needs of students in learning and understanding mathematics material, because through interactive media that can be run on this Android smartphone, material can be accessed anytime and anywhere so that students have a greater level of flexibility regarding their study time.

CONCLUSION

Based on the results of the analysis that has been done, it can be concluded that in learning mathematics, the learning media used are still limited and not varied. Students stated that they needed media that could be accessed on smartphones with material content not only text, but also pictures and illustrations of solving practice questions. It should be known from various relevant research, that the use of interactive media based on Android is considered capable of having a positive impact on increasing student motivation and achievement. Considering that this research is still limited to a preliminary study, it is hoped that further research can develop Android-based interactive media to assist students in understanding existing material in mathematics learning, so that students will be able to improve their understanding which has implications for increasing academic achievement respectively.

REFERENCES

Akbar, A. (2019). TANTANGAN DAN SOLUSI DALAM PERKEMBANGAN TEKNOLOGI. PROSIDING SEMINAR NASIONAL PENDIDIKAN PROGRAM PASCASARJANA UNIVERSITAS PGRI PALEMBANG, 2(1).

Alfiras, M., & Bojiah, J. (2020). Printed Textbooks Versus Electronic Textbooks: A Study on the Preference of Students of Gulf University in Kingdom of Bahrain. International Journal of Emerging Technologies in Learning (IJET), 15(18), 40. https://doi.org/10.3991/ijet.v15i18.15217

Aranta, A., Wijaya, I. G. P. S., Husodo, A. Y., Nugraha, G. S., Dwiyansaputra, R., Bimantoro, F., & Putrawan, I. P. T. (2021). Learning media for the transliteration of Latin letters into Bima script based on android applications. Journal of Education and Learning (EduLearn), 15(2), 275–282. https://doi.org/10.11591/edulearn.v15i2.19013

Aripin, I., & Suryaningsih, Y. (2019). Pengembangan Media Pembelajaran Biologi Menggunakan Teknologi Augmented Reality (AR) Berbasis Android pada Konsep Sistem Saraf. Sainsmat : Jurnal Ilmiah Ilmu Pengetahuan Alam, 8(2), 47. https://doi.org/10.35580/sainsmat82107192019

Balkan Kiyici, F. (2018). Primary School Students' Perceptions Of Technology. Malaysian Online Journal of Educational Technology, 6(4), 53–66. https://doi.org/10.17220/mojet.2018.04.005

Budiarto, M. K., Joebagio, H., & Sudiyanto, S. (2020). Student's View of Using Digital Learning Media in Classroom Activities: A Case of Public Senior High School in Cirebon, Indonesia. Jurnal Pendidikan Progresif, 10(1), 47–54. https://doi.org/10.23960/jpp.v10.i1.202006

Bujang, S. D. A., Selamat, A., Krejcar, O., Maresova, P., & Nguyen, N. T. (2020). Digital Learning Demand for Future Education 4.0—Case Studies at Malaysia Education Institutions. Informatics, 7(2), 13. https://doi.org/10.3390/informatics7020013

Bulut, A. S. (2021). An empirical investigation of mathematics learning approaches and metacognitive awareness of students. Participatory Educational Research, 8(4), 84–102. https://doi.org/10.17275/PER.21.80.8.4

Hanif, M., Asrowi, A., & Sunardi, S. (2018). Students' Access to and Perception of Using Mobile Technologies in the Classroom: the Potential and Challenges of Implementing Mobile Learning. Journal of Education and Learning (EduLearn), 12(4), 644–650. https://doi.org/10.11591/edulearn.v12i4.8398

Haryanti, A., Yusuf, M., & Agung, L. (2021). Students' Perceptions About the Use of Android-Based Learning Media in Physical Education Learning. AL-ISHLAH: Jurnal Pendidikan, 13(2), 836–842. https://doi.org/10.35445/alishlah.v13i2.633

Hasanudin, C., Fitrianingsih, A., Nuri, D., Utomo, P., Fitriyana, N., & Language, I. (2022). Android Based Material to Teach Early Reading for Primary Students using Construct 2. Ingenierie Des Systemes d'Information, 27(6), 933–940.

Khasanah, K., & Lestari, A. (2021). The Effect of Quizizz and Learning Independence on Mathematics Learning Outcomes. Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah, 6(1), 63–74. https://doi.org/10.24042/tadris.v6i1.7288

Murod, M., Utomo, S., & Utaminingsih, S. (2021). Efektivitas Bahan Ajar E-Modul Interaktif Berbasis Android Untuk Peningkatan Pemahaman Konsep Lingkaran Kelas VI SD. Fenomena, 20(2). https://doi.org/10.35719/fenomena.v20i2.61

Ningsih, S. K., Suherdi, D., & Purnawarman, P. (2022). SSECONDARY SCHOOL TEACHERS' PERCEPTIONS OF MOBILE TECHNOLOGY ADOPTION IN ENGLISH AS A FOREIGN LANGUAGE LEARNING: TRENDS AND PRACTICE. International Journal of Education and Practice, 10(2), 160–170. https://doi.org/10.18488/61.v10i2.3004

Perdana, M. A., Wibowo, D. E., & Budiarto, M. K. (2021). Digitalization of Learning Media through Digital Book Development Using the Flipbook Application. Jurnal Pendidikan Dan Pengajaran, 54(2), 263. https://doi.org/10.23887/jpp.v54i2.34639

Pinto da Mota Matos, A., Isabel Festas, M., & Maria Seixas, A. (2016). Digital media and the challenges for media education. Applied Technologies and Innovations, 12(2). https://doi.org/10.15208/ati.2016.04

Rahman, T., & Aeni, S. Q. (2021). ANDROID-BASED LEARNING MEDIA DESIGN FOR INTRODUCTION TO SUNDA CULTURE FOR EARLY CHILDREN. Journal of Early Childhood Education (JECE), 3(1), 52–64. https://doi.org/10.15408/jece.v3i1.20229

Salim, H. (2019). Penelitian Pendidikan : Metode, Pendekatan, dan Jenis. In Jakarta: Kencana.

Sari, A. I., Suryani, N., Rochsantiningsih, D., & Suharno, S. (2020). Digital Learning, Smartphone Usage, and Digital Culture in Indonesia Education. Integration of Education, 24(1), 20–31. https://doi.org/10.15507/1991-9468.098.024.202001.020-031

Setiawardhani, R. T. (2021). Android-Based Multimedia Development and Worthiness for Economic Learning in High School. AL-ISHLAH: Jurnal Pendidikan, 13(2), 1185–1193. https://doi.org/10.35445/alishlah.v13i2.559

Silalahi, U. (2015). Metode Penelitian Sosial Kuantitatif. Journal of Visual Languages & Computing, 11(3).

Sugiyarto, A. W., Azizah, N. H., & Irsyad, A. N. (2018). Mathematics Learning Media With Augmented Reality (AR) Based On Android Mobile Application. The 2nd International Conference on Informatics for Development.

Sugiyono, D. (2018). Metode penelitian kuatintatif , kualitatif dan R & D. In Bandung: Alfabeta.

Suryanda, A., Sartono, N., & Sa'diyah, H. (2019). Developing smartphone-based laboratory manual as a learning media. Journal of Physics: Conference Series, 1402, 077077. https://doi.org/10.1088/1742-6596/1402/7/077077

Sutrisni, D. M., Utaminingsih, S., Murtono, M., Mariam, I. O., & Pratama, H. (2022). The effectiveness of android-based budiran game assisted by smart apps creator 3 to improve science learning outcomes of fourth graders in theme 1. Advances in Mobile Learning Educational Research, 2(2), 483–492. https://doi.org/10.25082/amler.2022.02.017

Tabrani, M. B., Puspitorini, P., & Junedi, B. (2021). Pengembangan multimedia interaktif berbasis Android pada materi kualitas instrumen evaluasi pembelajaran matematika. Jurnal Inovasi Teknologi Pendidikan, 8(2). https://doi.org/10.21831/jitp.v8i2.42943

Tang, K. Y. (2021). Paradigm shifts in e-book-supported learning: Evidence from the Web of Science using a co-citation network analysis with an education focus (2010–2019). Computers and Education, 175. https://doi.org/10.1016/j.compedu.2021.104323

Teeroovengadum, V., Heeraman, N., & Jugurnath, B. (2017). Examining the Antecedents of ICT Adoption in Education Using an Extended Technology Acceptance Model (TAM). International Journal of Education and Development Using Information and Communication Technology, 13(3), 4–23.

Viberg, O., Grönlund, Å., & Andersson, A. (2020). Integrating digital technology in mathematics education: a Swedish case study. Interactive Learning Environments, 31(1), 1–12. https://doi.org/10.1080/10494820.2020.1770801

Wang, J., Mendori, T., & Hoel, T. (2019). Strategies for Multimedia Learning Object Recommendation in a Language Learning Support System: Verbal Learners Vs. Visual Learners. International Journal of Human–Computer Interaction, 35(4–5), 345–355. https://doi.org/10.1080/10447318.2018.1543085

Yildirim, H. I., & Sensoy, O. (2018). The Effect of Science Teaching Enriched With Technological Applications on the Science Achievements of 7th Grade Students. Journal of Education and Training Studies, 6(9), 53. https://doi.org/10.11114/jets.v6i9.3363