Needs Analysis Of Learning Media Development Math_0_Pedia On Fractional Number Calculation Material

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Article History
accepted 1/11/2024 approved 1/12/2024 published 1/2/2025

Abstract
One of the challenges felt by students in learning mathematics is the operation of calculating fractional numbers. The purpose of the study was to determine the needs of students on Android-based Math_O_Pedia learning media on Fraction number counting material. The type of research is qualitative with the research subjects of third grade students and elementary school teachers in Selogiri sub-district. The instrument used was a questionnaire, with the indicators being the need for Android smartphone facilities to support learning media and the tendency of students' learning styles. The results showed that: the indicator of the need for android Smartphone facilities is 100% stated that students have smartphones, 98.5% of students interact with smartphones more than 6 hours per day, 94.78% have used smartphones for more than 2 years, 21.35% of teachers use android-based learning media; 82.57% of teachers have not used android-based Math_O_Pedia learning media for math lessons, 100% of schools have Wifi support facilities; learning style tendency indicators, show that: 67.45% want to feel touch and hold, 83.65% remember more easily by seeing and doing, and 100% of students agree that there is an android-based learning media for math lessons. Based on the results of the questionnaire analysis, it can be concluded that the need for the development of Android-based Math_O_Pedia learning media in learning mathematics in class III Selogiri sub-district.
Keywords: *Learning media, Math_O_Pedia, counting operations, fractional numbers.*

Abstrak
Salah satu tantangan yang dirasakan siswa dalam pembelajaran matematika adalah operasi hitung bilangan pecahan. Tujuan penelitian ini adalah untuk mengetahui kebutuhan siswa terhadap media pembelajaran Math_O_Pedia berbasis Android pada materi hitung bilangan pecahan. Jenis penelitian ini kualitatif dengan subjek penelitian siswa kelas III dan guru sekolah dasar di Kecamatan Selogiri. Instrumen yang digunakan adalah kuesioner, dengan indikator kebutuhan fasilitas smartphone Android untuk mendukung media pembelajaran dan kecenderungan gaya belajar siswa. Hasil penelitian menunjukkan bahwa: indikator kebutuhan fasilitas smartphone Android sebesar 100% menyatakan bahwa siswa memiliki smartphone, 98,5% siswa berinteraksi dengan smartphone lebih dari 6 jam per hari, 94,78% telah menggunakan smartphone lebih dari 2 tahun, 21,35% guru menggunakan media pembelajaran berbasis android; 82,57% guru belum pernah menggunakan media pembelajaran Math_O_Pedia berbasis Android untuk pelajaran matematika, 100% sekolah memiliki fasilitas dukungan Wifi; indikator kecenderungan gaya belajar menunjukkan bahwa: 67,45% ingin merasakan sentuhan dan memegang, 83,65% lebih mudah mengingat dengan melihat dan melakukan, dan 100% siswa setuju bahwa ada media pembelajaran berbasis android untuk pelajaran matematika. Berdasarkan hasil analisis kuesioner, dapat disimpulkan bahwa terdapat kebutuhan pengembangan media pembelajaran Math_O_Pedia berbasis Android dalam pembelajaran matematika kelas III Kecamatan Selogiri.
Kata Kunci: Media Pembelajaran, Math_O_Pedia, Operasi Hitung, Bilangan Pecahan.

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

INTRODUCTION

Learning in the 21st century emphasizes the importance of using technology-based media. This is because elementary school students are now familiar with communication tools, such as mobile phones, internet-based media, and desktop application-based media. Technology-based media is also needed in math lessons, because it can overcome the gap of students in learning from concrete, semi, and finally to abstract stages. Given that mathematics is deductive or abstract knowledge, learning mathematics for students needs to be directed through the concrete stage.

Mathematics is a science that studies logic about shapes and quantities, and concepts in mathematics are interconnected with one another (Malasari *et al.*, 2017). Mathematics has an abstract object of study, bases itself on agreements, uses deductive thinking patterns and is imbued with consistent truths. Most of what is learned in Mathematics is counting operations. Counting operation is an ability that is part of mathematics in which there are activities to mention numbers, identify numbers, compare and operate numbers (Novianti, 2015). Oktriyani (2017) explains that counting operations are the basis for developing mathematical skills which include counting or mentioning number sequences, recognizing number concepts with objects, imitating number symbols, and matching numbers with number symbols. Based on the descriptions above, researchers can conclude that counting operations are activities to operationalize numbers into mathematical operations which include: addition, subtraction, division, and multiplication.

There is material in math arithmetic operations that is often an obstacle for students, namely Fractional number material. Fractions are an intact object, where in the object there is a picture of the part that is the focus of attention marked with shading, or often called the numerator (Haruman in Mariyani, 2019). The intact part is the part that is considered as a unit and is called the denominator. Unaenah *et al.*, (2020) explained that the definition of a fractional number is a number that is not a whole number or not whole and is expressed by $\frac{a}{b}, b \neq 0 \text{ dan } a, b \epsilon B$. Based on this description, researchers can define the definition of Fraction numbers as numbers that can be formed into $\frac{a}{b}, b \neq 0 \text{ dan } a, b \epsilon B$; where B is a whole number. According to Sidik (2021), it is said that students predominantly experience difficulties in counting operations of integers due to a lack of understanding of the concept. According to Alan and Afriansyah (2017) understanding the concept of counting Fractions is a fundamental aspect in learning mathematics, so the learning model must include the main things of understanding counting in Fractions, such as: objects include the object itself, relations with other similar objects, relations with other objects that are not similar. Meanwhile, Purwasih (2015) explains that understanding the concept of counting fractions is two aspects of the ability that need to be developed when learning mathematical arithmetic operations and solving mathematical problems that are being faced. Luna and Elle (2015) explained that understanding the concept of counting fractions is the ability of students to use mathematical counting operations in fractions. From the description above, researchers can conclude that understanding the concept of counting fractions is the ability of students to apply mathematical counting operations in learning fractions and understanding their properties.

In addition to understanding the concept, it is necessary to use a learning media to help students understand Fraction number operation material. Learning media is a means of delivering learning messages in relation to the direct learning model, namely through the way the teacher acts as an information provider and in this case the teacher must use a variety of appropriate media (Ramadhani, 2023). According to Indriyani (2019) explains that the use of learning media in the teaching and learning process can arouse new desires and interests, generate motivation and stimulation of students' learning activities. One of the media that is often used by teachers is modules. Modules

are a form of teaching material that is packaged systematically and completely which contains a set of learning processes that are planned and designed to help students master learning objectives (Pratiwi, *et al.*, 2017). Rumansyah (2016) explains that learning using modules has a foundation that each learner has potential abilities (intelligence and talent) that are different from one another, so that through the use of modules students can adjust their learning speed according to their respective abilities. One type of module is an electronic module (*e-module*) which is a form of systematically independent learning material, displayed in electronic format, audio, animation and navigation (Seruni *et al.*, 2019).

Asmiyunda *et al.*, (2018: 155) explain that *e-module math_o_pedia* is teaching material in the form of modules displayed in electronic format which is expected to increase students' interest and motivation to learn, this is because it involves the display of images, audio, video and animation. Android-based *math_o_pedia e-module* development can be accessed *offline*, so students can use it where and when needed. Meanwhile, Imansari and Suryatiningsih (2017: 12) explain that interactive *math_o_pedia e-modules* are learning materials that contain material, methods, limitations and ways to evaluate which are systematically designed and attractive to achieve the expected course competencies/subcompetencies according to their level of complexity. The definition of *e-module math_o_pedia* is explained by Kurniawan, *et al.*, (2015) that *e-module math_o_pedia* is an interactive module which is multimedia because it is a combination of two or more media (audio, text, graphics, images, animation and video) and there is interaction (reciprocal relationship / two-way communication or more) between the media and its users. So, from the description above, researchers can conclude that the *math_o_pedia e-module* is an electronic module that contains material packaged through the display of images, audio, video and animation that makes it easier for students to understand Fraction number counting operation material.

Math_o_pedia e-module is a digital learning module that offers a fun, interesting, and flexible way to learn math for students. In line with the results of research conducted by Maniq et al., (2022) which states that learning becomes more enjoyable, and can involve students actively in the learning process in class by using learning resources in the form of e-modules. The availability of e-modules in mathematics learning also helps teachers to explain the material effectively. This is in line with the results of research by Sholeh et al. (2023) which explains that the use of e-modules in the learning process can help teachers in conveying information on the material to be taught. In addition, the use of e-modules can also increase students' learning motivation and prepare them to face challenges in today's digital era (Safrina et al., 2024).

Based on the description above, this study can formulate the formulation of the problem, namely how the need for the development of learning media math_0_pedia on fractional number counting operations material in Selogiri sub-district? This study aims to determine the level of need for the development of Android-based Math_0_Pedia learning media in math lessons with Fractional number counting material.

METHODS

This research is qualitative research. Sugiyono (2019: 19) qualitative research is a research method used to research on natural object conditions, and the researcher himself as the key instrument. The research subjects in this study were third grade students and elementary school teachers in Selogiri sub-district. The data collection technique uses a questionnaire that has been tested for validity and reliability with indicators in the form of the need for Android Smartphone facilities to support Math_o_pedia learning media and student learning style tendencies. The validity test in this study uses the Pearson coefficient value using the Pearson Product Moment

formula, after which it is tested using the t test and then the interpretation and correlation index are seen. Validation is a measurement to determine the accuracy and accuracy of a measuring instrument (Purnomo, 2018) Measurement of data reliability is carried out after measuring data validity using the Cronbach's alpa method. In qualitative analysis, the research variables are arranged descriptively by describing the data in the form of a percentage Analysis of the questionnaire using the percentage formula, as follows:

$$Prosentase = \frac{Multiple\ Subject\ Answers}{Many\ Subjects}\ x\ 100\%$$

RESULTS AND DISCUSSION

Research Results

The research data through a questionnaire from a questionnaire with indicators in the form of the need for Android Smartphone facilities to support Math_o_pedia learning media and the tendency of students' learning styles obtained the following results:

Table 1. Questionnaire Results with Indicators of Smartphone Facilities Needs and Learner Learning Style Tendencies

No.	Average of Learners' Answers
1.	100% stated that learners have smartphones
2.	98.5% of learners interact with Smartphones more than 6 hours per day
3.	94.78% of learners have been using the Smartphone for more than 2 years
4.	21.35% of teachers use android-based learning media
5.	82.57% of teachers have not used android-based Math_O_Pedia learning media for math lessons
6.	100% of schools have Wifi support facilities
7.	Learning style tendencies, showed that: 67.45% want to feel touch and hold, 83.65% remember more easily by seeing and doing.
8.	100% of students agree that there is an android-based learning media for math lessons

Discussion

Based on Table 1, it can be interpreted that the android-based Math_O_Pedia learning media is very necessary to develop and use for learning mathematics. This is reinforced from the table of questionnaire results, obtained data that there are 100% of students who have smartphones with the android operating system. There are 98.5% of students who interact with smartphones for more than 6 hours per day. In addition, there are 94.78% of students who have used smartphones for more than 2 years. This can be interpreted that the use of smartphones among students has now become an inseparable part of everyday life. More than just a communication tool, smartphones have become a window to the world for them. Through this device, students can access information quickly, learn subject matter independently, and develop creativity through various applications. In the teaching and learning process, there are facilities and infrastructure, especially wifi, which has been provided by the school, as evidenced by the questionnaire data, namely 100% of schools have Wifi support facilities. However, this is not maximally utilized by teachers as evidenced by there are only 21.35% of teachers who use android-based learning media. In addition, there are 82.57% of teachers who have not used android-based Math_O_Pedia learning media for mathematics lessons. The use of android-based math learning media offers a more interactive and interesting approach for students. With features such as simulations, visualizations, and interactive quizzes, mathematical concepts that are often abstract

become easier to understand and remember. This is in line with Zakiy *et al.* (2018) who stated that learners learn more effectively when they are actively involved in the learning process, especially using media that uses vision, hearing, and direct participation.

Based on the data in table 1, it is also found that the learning style tendencies of students, namely: as many as 67.45% want to feel touch and hold, and as many as 83.65% are easier to remember by seeing and doing directly. This shows that the use of android-based learning media is very significantly needed, because the media provides features that can later be felt, touched, held seen or read, listened to, and can provide feedback for students to evaluate and measure how much student understanding of the material that has been presented on the learning media. For this reason, 100% of students think they agree in using android-based learning media in the mathematics learning process. This is in line with the opinion of Safrina et al.(2024) that the use of andorid-based learning, namely e-modules, can increase student learning motivation because interesting features can make math learning more fun and effective.Based on the data in Table 1, it can be concluded that students agree if android-based learning media is developed in supporting the learning activity process as a necessity in helping students master the material, especially in mathematics subjects.

One of the android-based learning media that helps in the process of student learning activities is Math_O_Pedia learning media. Math_O_Pedia learning media offers a more interactive and fun approach to learning math. With features such as simulations, visualizations, and interactive quizzes, students can more easily understand abstract concepts. As emphasized by Apsari, and Rizki (2018), interactivity is key in learning mathematics. Math_O_Pedia provides a more personalized learning experience and allows students to learn at their own pace. In addition, Math_O_Pedia learning media provides wider access to math learning materials. Through the online platform, students can learn anytime and anywhere. This is very useful for students who have difficulty following classroom learning or who want to explore certain material. This shows that innovation in learning media that is in accordance with technological developments is needed, especially Android-based learning media. In its development, learning media is needed at various levels, including elementary, secondary, and even tertiary levels. To support the achievement of quality educational goals, quality developments must be made in all aspects, elements, components, and objects that support the learning process. The higher the quality of aspects, elements, components and objects supporting learning, including learning media, the more effective the learning process will be so that the quality of learning will be better and in accordance with the needs of students for supporting infrastructure from schools or the need for learning styles that adopt technological developments.

The development of learning media is needed at various levels, including primary, secondary, and even tertiary education.This is in accordance with the opinion of Yunus and Fransisca (2020) that learning media innovations that are in accordance with technological developments are needed, especially Android-based learning media. 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.The higher the quality of aspects, elements, components, and objects supporting learning, including learning media, the more effective the learning process will be so that the quality of learning will be better and in accordance with the needs of students for supporting infrastructure from schools or the need for learning styles that adopt technological developments.

CONCLUSION

Based on the results of the analysis of this study, it can be concluded that the application of the Android-based Math_O_Pedia learning model has a significant influence on students on the material of fractional number calculation operations. This is evidenced through the value of the indicator of the need for android Smartphone facilities is 100% stated that students have a Smartphone, 98.5% of students interact with Smartphones for more than 6 hours per day, 94.78% have used smartphones for more than 2 years, 21.35% of teachers use android-based learning media; 82.57% of teachers have not used android-based Math_O_Pedia learning media for math lessons, 100% of schools have Wifi support facilities; learning style tendency indicators, show that: 67.45% want the word: feel touch and hold, 83.65% remember more easily by seeing and doing, and 100% of students agree that there is an android-based learning media for math lessons. Thus, the alternative hypothesis is accepted, indicating that the Android-based Math_O_Pedia learning model is able to improve students' skills, especially in the material of calculating fractional numbers. The use of this learning media also requires quality development in all aspects so that learning objectives can be achieved easily. The development of this learning media is expected to make it easier for students to access learning both at school and outside school through Android media devices that students already have.

REFERENCE

Alan, U. F., & Afriansyah, E. A. (2017). Kemampuan Pemahaman Matematis Siswa Melalui Model Pembelajaran Auditory Intellectualy Repetition dan Problem Based Learning. Jurnal Pendidikan Matematika, 11(1), 68-78.

Apsari, P. N., & Rizki, S. (2018). Media pembelajaran matematika berbasis android pada materi program linear. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 7(1), 161-170

Asmiyunda, Guspatni, & Azra, F. (2018). Pengembangan E-Modul Keseimbangan Kimia Berbasis Pendekatan Saintifik. Jurnal Eksakta Pendidikan, 2(2), 155-161.

Imansari, N., & Sunaryantiningsih, I. (2017). Pengaruh Penggunaan E-Modul Interaktif Terhadap Hasil Belajar Mahasiswa pada Materi Kesehatan dan Keselamatan Kerja. Jurnal Ilmiah Pendidikan Teknik Elektro, 2(1), 11-16. Diambil kembali dari

Indriyani, L. (2019). Pemanfaatan Media Pembelajaran dalam Proses Belajar untuk Meningkatkan Kemampuan Berpikir Kognitif Siswa. Prosiding: Seminar Nasional Pendidikan, 2(1).

Kurniawan, D, Suyatna. A, Suana. W. (2015). Pengembangan Modul Interaktif Menggunakan Learning Content Development System Pada Materi Listrik Dinamis. Jurnal Pembelajaran Fisika, 3(6), 1-10.

Luna, Elle. (2015). Persimpangan antara Harus dan Harus: Temukan dan Ikuti Passion Anda. New York: Workman Publishing Company.

Malasari, N., dan Hakim, A. R. (2017). Pengembangan Media Pembelajaran pada Operasi Hitung Untuk Tingkat Sekolah Dasar. Jurnal Kajian Pendidikan Matematika, 3(1), 11-12.

Maniq, L. N. K., Karma, I. N., & Rosyidah, A. N. K. (2022). Pengembangan E-Modul Matematika Pada Materi Pecahan. Journal of Classroom Action Research, 4(1), 83–88.

Mariyani, I. I. (2019). Pengembangan Media (KAPIMA) Kartu Pintar Matematika pada Materi Bilangan Pecahan untuk Siswa Kelas V SD. Skripsi. Universitas Muhammadiyah Malang.

Muawanah. (2020). Analisis Kesulitan Pengolahan Data Kelas IV dengan Menggunakan Metode STAD. Bintang: Jurnal Pendidikan dan Sains, 2(1), 115-126.

Novianti, R. (2015). Pengembangan Permainan Roda Putar Untuk Meningkatkan Kemampuan Berhitung Anak Usia 5-6 Tahun. Educhild, 4, 56-63.

Oktriyani, N. (2017). Peningkatan Kemampuan Berhitung Anak Usia Dini Melalui Permainan Lingkaran Angka di Taman Kanak-Kanak Qatrianda Kecamatan Kota Tengah Padang. Skripsi. Unilak, 1(1), 83-96.

Pratiwi, P., Hidayah, N., & Martiana, A. (2017). Pengembangan Modul Mata Kuliah Penilaian Pembelajaran Sosiologi Berorientasi HOTS. Cakrawala Pendidikan, No. 2, 201-209.

Purnomo, D. (2018). Uji Validitas dan Realibilitas Step Test Sebagai Alat Ukur Keseimbangan Pada Lansia. Jurnal Fisioterapi Dan Rehabilitasi, 2(2), 53-70.

Purwasih, R. (2015). Peningkatan Kemampuan Pemahaman Matematis Dan Self Confidence Siswa MTs di Kota Cimahi Melalui Model Pembelajaran Inkuiri Terbimbing. ThesisII. Jurusan Pendidikan Matematika, STKIP Siliwangi Bandung, 9(1), 16-25.

Ramadani, Kirana, Astuti, Marini. (2023). Pengaruh Penggunaan Media Pembelajaran Terhadap Dunia Pendidikan: Studi Literatur. Jurnal Pendidikan Dasar Dan Sosial Humaniora, 2(6), 749-756.

Rumansyah, M. (2016). Perbedaan Pengaruh Pembelajaran Dengan Menggunakan Modul Interaktif Dan Modul Konvensional Terhadap Pemahaman Konsep IPA. Jurnal Pendidikan Matematika dan Sains, 4(1), 54-62.

Safrina, K., Darwani, D., Susanti, S., dan Nurfaiza, S. 2024. Pengembangan E-Modul Matematika untuk Pembelajaran Remedial pada Materi Bilangan. Jurnal Pendidikan Matematika, 8(3): 2076-2090

Seruni, Rara, Siti, M., Fera, K. D., dan Muktiningsih, N. (2019). Pengembangan Modul Elektronik (E-Modul) Biokimia Pada Materi Metabolisme Lipid Menggunakan Flip Pdf Prosessional. JTK:Jurnal Tadris Kimiya, 4(1),48-56.

Sholeh, B., Hufad, A., & Fathurrohman, M. (2023). Pemanfaatan E-Modul Interaktif dalam Pembelajaran Mandiri Sesuai Kapasitas Siswa. Risalah: Jurnal Pendidikan Dan Studi Islam, 9(2), 2614–3275.

Sidik, G. S., Maftuh, A., dan Salimi, M. (2021). Analisis Kesulitan Belajar Matematika pada Siswa Usia 6-8 Tahun. Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 5(2), 2179-2190. https://doi.org/10.31004/obsesi.v5i2.1137

Sugiyono. (2019). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: Alfabeta Unaenah, E., Maemunah, S., Astuti, I. M., Insyirah, A., Putri, N. A., Rahma, S. B., &

Yunus, Y., & Fransisca, M. (2020). Analisis kebutuhan media pembelajaran berbasis android pada mata pelajaran kewirausahaan. Jurnal Inovasi Teknologi Pendidikan, 7(2), 118-127.

Zakiy, M. A., Syazali, M., & Farida, F. (2018). Pengembangan media android dalam pembelajaran matematika. Triple S (Jurnal Pendidikan Matematika), 1(2), 87-96.