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NEED ANALYSIS OF LEARNING MEDIA WITH REALISTIC MATHEMATICS EDUCATION (RME) APPROACH IN ELEMENTARY MATHEMATICS LEARNING COURSES

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Abstract

This study aims to analyze the need for Realistic Mathematics Education (RME)-based learning media in supporting distance learning in the Universitas Terbuka Elementary School Teacher Education (PGSD) program in elementary mathematics learning courses. The RME approach was chosen because it emphasizes contextual learning that relates mathematical concepts to daily life, so it is expected to increase student understanding and involvement in independent learning conditions. This research is a qualitative descriptive research. The method used is observation and interviews involving PGSD students to identify the characteristics of the learning media needed. The study results show an urgent need for learning media that are not only easily accessible online but also able to facilitate the application of mathematical concepts in real contexts. The desired media must be adaptive, equipped with clear guidelines, and allow students to understand the material independently. The recommendations of this research include the development of RME-based learning media that are relevant to real contexts and easily accessible to students. Thus, it is hoped that this learning media can improve the quality of mathematics learning at PGSD Universitas Terbuka effectively and efficiently.

Keywords: needs analysis, learning media, elementary mathematics learning courses, Realistic Mathematic Education

1 INTRODUCTION

As an institution that focuses on distance education, the Universitas Terbuka is expected to be able to provide effective learning media based on the characteristics of students and the materials taught. At the higher education level, especially in the field of teacher education, there is a very influential role in preparing competent and creative educators (Lestari, 2024). The way the material is delivered when you are a student will certainly affect how the teacher teaches the material to students. In the elementary school teacher education study program, of course, you must pay attention to how to deliver material to students, considering that they must provide the material to elementary school-age children.

According to Aktaş & Ünlü, (2013) In the world of education, teachers with critical thinking skills and who are well-trained in terms of content knowledge and pedagogical skills are needed

so that students can develop critical thinking skills when implementing teaching programs. Developing critical thinking skills through RME learning is beneficial for students during their education and will positively impact their future careers as educators.

One of the courses taught in the PGSD study program of the Universitas Terbuka is elementary mathematics learning. This course contains learning materials and theories that can be used as an alternative to teaching mathematics in elementary schools. Keep in mind that learning mathematics is not just memorizing formulas but training students to think critically about how to get answers to the problems given (Atika & MZ, 2016). Therefore, students must understand the material and its usefulness in conveying it to them. In addition, students, as prospective teachers, must also be able to prepare for effective and efficient learning.

Effective and efficient learning can be achieved by using learning media (Mansur & Rafiudin, 2020). Learning media is one of the facilities for transferring knowledge to students. According to Kustandi & Darmawan (2020), learning media is a tool that can help the teaching and learning process. It functions to clarify the message's meaning so that the lesson's purpose is better and perfect. Learning media is a forum to convey information and messages in learning. Learning media is an instrument that can be used to convey messages to students (Widodo & Wahyudin, 2018). According to Heinich in Buchori et al. (2016), learning media is an intermediary that helps students convey messages or knowledge between sources and recipients that are instructional or contain learning intentions. From these various definitions, it can be concluded that learning media is an intermediary tool in the teaching and learning process that helps convey information between teachers and students, which can clarify the meaning and message of learning.

Learning media is needed not only by students at school but also by students at the university level. Learning media holds an important position in learning activities because it is an information medium for distributing lecturers' knowledge to students (Mansur & Rafiudin, 2020). The function of learning media is so that students can easily understand the information and messages conveyed so that they can achieve learning goals perfectly (Zahwa & Syafi'i, 2022). Mansur & Rafiudin (2020) emphasized that using learning media in education can increase students' interest in learning.

Learning media development is often combined with a certain approach to be more optimal. This is also done in developing learning media for mathematics materials, especially for elementary schools. Mathematics material taught in elementary schools is material that will be

the basis for learning mathematics at a higher level (Nisa, 2023). To be more meaningful, of course, the material must be delivered properly and easily understood by both prospective elementary school teachers and elementary school students. Challenges in mathematics teaching are often related to the mismatch between an approach that focuses too much on computational mechanics and the need for students to understand concepts in depth and applicatively. Teaching mathematics should concentrate on the process of how students can find their answers (Nisa et al., 2024). One way that can be done is to associate learning with real life. Linking mathematics learning in daily life can make it easier for students to understand the problems presented in learning (Fitri et al., 2023).

According to Afriansyah et al., (2021) Realistic Mathematical Education (RME) is an alternative approach to solving problems in the learning process, although RME itself is not new to learning materials. Through RME, it is hoped that a teacher can become a quality educator who can guide students in applying the knowledge they have obtained.

Realistic Mathematics Education (RME), developed in the Netherlands by Freudenthal in the 1970s, is an approach that emphasizes reality and relevance in mathematics teaching (Freudenthal, 2006). Realistic Mathematic Education or RME is mathematics learning that applies direct problems in life (Kurniawati et al., 2019). In RME, students are invited to explore mathematical problems that are close to everyday life so that they can constructively build their knowledge (Gravemeijer, 1994). RME encourages students to find mathematical solutions through real contexts, which not only improves conceptual understanding but also encourages the application of mathematics in practical situations (Treffers, 2012).

The RME approach emphasizes that mathematics is an activity (Nisa et al., 2024). This means that in learning using RME, students will be directed to carry out learning activities to provide direct experience to students. In addition, learning with the RME approach is also designed by presenting contextual problems that are close to students' lives. Thus, learning will be more meaningful because it gives students direct experience solving contextual problems. According to Van Den Heuvel Panhuizen, the use of the word realistic refers to the focus of Realistic Mathematics education in emphasizing the use of a situation that can be imagined by students (Yudhi, 2017).

Learning media based on the RME approach for PGSD students of the Universitas Terbuka must provide an interactive, accessible, and contextual learning experience so that students not only understand mathematical concepts in theory but also can apply them in daily life and teach

the usefulness of the material to students later. This is a challenge for the PGSD Study Program at the Universitas Terbuka in designing learning media that supports the RME approach amid limited physical interaction between teachers and students.

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2 METHODOLOGY

In this study, qualitative descriptive research is used. This research was conducted in the Elementary School Teacher Education (PGSD) study program of the Universitas Terbuka. The subject of the study is PGSD students who are also elementary school teachers. The object of the research is a learning medium with an RME approach in distance learning. The research instruments used are observation and interviews. Observations were made on the teaching materials used, namely BMP and e-learning for elementary mathematics learning courses.

Observations were made to see the feasibility of the teaching materials used. The interview was aimed at 5 PGSD students from different Regional UTs. Interviews were conducted with students who had received elementary mathematics learning courses. Interviews are conducted to determine the needs of learning media that are in accordance with the needs of both students and teachers.

As a humanist method, qualitative research helps to establish the focus of study, be selective in choosing data sources and data collection, evaluate data quality, interpret data, and draw conclusions from findings (Derudinansyah, 2021). The focus of this study is to describe the need for learning media with the RME approach in elementary mathematics learning courses for PGSD students of the Universitas Terbuka, who are enrolled in distance learning.

3 FINDINGS AND DISCUSSION

This research activity began by analyzing the available teaching materials. In this case, the teaching materials in question are the Subject Matter Books (BMP) and e-learning elementary mathematics learning courses used by students and tutors. Based on the elementary mathematics learning BMP analysis, the material listed is complete and still relevant. In addition, the cases given in BMP are quite realistic because they are close to students' real lives. However, some materials can be updated, considering that the elementary school curriculum in the present day has been increasingly developed. After analyzing the BMP, an analysis was carried out on the e-learning of elementary school mathematics learning. The results of the e-learning analysis can be seen in Table 1.

Table 1. Results of Analysis of E-Learning of Elementary Mathematics Learning

No	Indicator	Observation Results
1	Presentation of learning materials in e-learning	The material presented in e-learning is complete and in accordance with the BMP. The initiation material includes a description and presentation of the PPT. In addition, students can practice with some quizzes. E-learning also provides student discussions and assignments.
2	Learning approach used	The approach used to expose material in e-learning is not yet clear. No learning approach helps students understand the material contextually and realistically.

3	Learning media used	The learning media used in e-learning are PPT, Images, and Videos. There is no interactive learning media yet.

Based on Table 1, it is a fact that in the e-learning of elementary mathematics learning courses, the material presented is by the semester learning plan (RPS). In addition, the material is equipped with descriptions and PowerPoint slides (PPT) that can make it easier for students to understand it. However, the learning media is still limited to PPT slides, videos, and images. In addition, the learning approach has also not helped students understand the material contextually and realistically, so the material presented in e-learning has not shown its usefulness in daily life. The learning media used in e-learning is also not interactive.

After analyzing the available teaching materials, the next step is to conduct interviews with students. Five students who had received elementary mathematics learning courses from different regional Open Universities were interviewed. Table 2 summarizes the interview results.

Table 1. Results of Interviews with PGSD Students of the Universitas Terbuka

No	Question	Answer
1	What are the main challenges students face in learning elementary mathematics courses through distance learning?	Almost all students answered that it was difficult to understand certain materials, especially difficult materials. They had difficulty asking the tutor for a more in-depth explanation. They also said that many of their fellow students found it difficult.
2	How often do teachers use learning media based on contextual approaches, such as RME, in elementary mathematics learning courses in e-learning?	All students answered rarely. According to students, most of the materials in e-learning are just general theories that have not been used in real contexts close to students' lives.
3	What are the types of learning media currently available and used in elementary mathematics learning e-learning? (e.g., videos, pictures, MFIs on e-learning)	The media that has been used are images and learning videos.

4	Do you think the learning media used today is enough to facilitate distance learning?	The existing learning media is not enough. Other learning media need to be developed that can provide more in-depth explanations and are closer to students to make them easy to understand.
5	In RME, students are invited to explore mathematical problems that are close to everyday life to build their knowledge constructively. Do you think PGSD students need learning media with the RME approach? Give the reason.	Yes. Students need learning media with an RME approach to add insight into understanding and deliver material to students later. In addition, it is also expected to increase interest in mathematics.
6	How is it hoped that RME-based learning media can help PGSD students connect mathematical concepts with real-life contexts?	RME-based learning media is expected to display learning that is easy for students to understand thoroughly and close to real life. Thus, students hope to become creative and innovative teachers of mathematics.
7	To what extent do students feel they need support utilizing RME-based learning media in distance learning?	Students feel that they need support to take advantage of RME-based learning. With the existence of RME-based learning media, students hope to provide more quality mathematics to their students.
8	In your opinion, what materials are possible to provide learning media facilities based on the RME approach?	Geometry, measurement, algebra, linear equations, integers, fractions, and statistics.

The summary of the interview results in Table 2 shows that many students still struggle to understand difficult materials due to in-depth explanations. In addition, students feel that they need learning media to help them understand the material, attract interest, and be close to real life. Students also expressed their hope that with the existence of RME-based learning media, they can teach mathematics that is easy to understand to students because they already understand the usefulness of the material.

Based on the results of the needs analysis that has been carried out, it can be concluded that students need learning media based on the RME approach in elementary mathematics learning

courses as a provision for them to be able to teach mathematics with better quality. These results are in line with the research of Sudarman et al., (2022). In the research of Sudarman et al., (2022), it was concluded that based on the results of the needs analysis that has been carried out, it is necessary to develop teaching materials that refer to technological developments for mathematics education students. In addition, the results of this study are also in line with the research of Derudinansyah (2021) based on the needs analysis results, there is a need for the development of media and learning methods, such as RME-based e-modules, to stimulate mathematical literacy. Theoretically, this study's implication is to add reference sources regarding learning media based on the RME approach that suits students' needs. Meanwhile, practically, the results of this need analysis can be implemented and become a consideration for developing learning media based on the RME approach in elementary mathematics learning courses.

4 CONCLUSION

Based on the analysis of student needs, it can be concluded that students need learning media based on the RME approach in elementary mathematics learning courses. This is because the learning media in e-learning mathematics learning in elementary school has not used a realistic approach. To support student understanding, learning media that can provide realistic understanding and can be a provision for students in preparing for mathematics learning at school is needed. Referring to the results of the study related to the needs analysis that has been carried out, the researcher recommends that the development of learning media based on the RME approach in elementary mathematics learning courses is inserted into e-learning so that it is easily accessible to students.

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