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NEEDS ANALYSIS FOR MAZE GAME LEARNING MEDIA TO SUPPORT GRADE 1 STUDENTS' UNDERSTANDING OF NUMBER CONCEPTS

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ABSTRACT

This study aims to analyze the initial needs in the development of Maze Game learning media as a means of improving understanding of the concept of integers in grade 1 elementary school students. The background of this research departs from the problem of students' low understanding of integers due to the use of conventional learning methods and the lack of interactive media that is in accordance with the characteristics of early childhood. This study uses a qualitative descriptive approach with a need analysis method as the initial stage of media development. Data was collected through observation, 2 teacher interviews, and the distribution of questionnaires to 60 student grade 1 in Cluster 03 East Telukjambe District, Karawang Regency. The results of the study showed that learning integers is still centered on teachers with limited media use, students have difficulty recognizing symbols and number sequences, understanding place values, and connecting numbers with the number of objects. Teachers and students need learning media that is engaging, interactive, and easy to use. Maze Game is considered a relevant alternative media because it is able to combine elements of games, challenges, and meaningful learning according to the child's cognitive development stage. Based on the results of this needs analysis, it can be concluded that the development of Maze Game media is very necessary to improve understanding of the concept of integers through a learning while playing approach. The results of this research are expected to be the basis for the product development stage in the next research to produce valid, practical, and effective learning media for elementary school students.

Keywords: Learning Media, Maze Game, Elementary School Students

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PRELIMINARY

In the early stages of the learning process in elementary school, especially in grade 1, understanding the concept of integers is an important basis for later mastery of mathematics material (Trisnawati et al., 2025). The ability to recognize numbers, understand place values, and relate numbers to the number of objects is the foundation for more complex mathematical calculation and problem-solving skills (Nurafni, 2018; Takdirmin et al., 2024). However, in practice, many grade 1 students still have difficulty in understanding the

concept of numbers concretely, especially because learning is still abstract and does not involve interesting and contextual activities. Mathematics learning in elementary school has an important role in forming the basis of logical, analytical, systematic, critical, and creative thinking skills in students (Handayani et al., 2022; Unaenah et al., 2020). At the 1st grade level of elementary school, one of the basic competencies that students must master is the understanding of the concept of integers. This understanding includes the ability to recognize symbols and number names, show the order of numbers, connect numbers with the number of objects, understand place values, and use numbers in the context of daily life. These abilities are the main foundation in advanced mathematics learning such as addition, subtraction, multiplication, and division (Ahzani et al., 2024; Risantika et al., 2025). The results of observations regarding the understanding of the concept of integers carried out on 30 students are as follows.

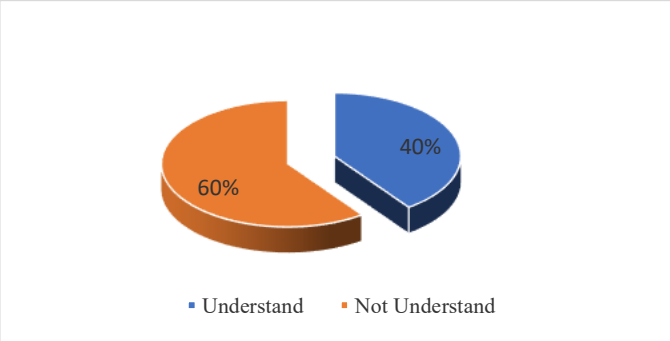

Figure 1. Preliminary Study Understanding the Concept of Reel Numbers

Based on the results of initial observations made on grade I elementary school students, information was obtained that students' understanding of the concept of integers is still relatively low. This can be seen from the results of a simple diagnostic test given to 30 students related to the ability to recognize, pronounce, and sequence integers from 1 to 20. The test results showed that only 12 students (40%) were able to answer questions correctly above the minimum completeness criteria, while 18 students (60%) still had difficulty understanding the concept of integers.

To overcome these problems, teachers need to use learning media that are able to facilitate the learning process in an active, interactive, and fun way. One of the potential media to be developed is game-based learning media, game-based learning is a learning approach that utilizes game elements to increase student engagement and learning motivation (Juhanaini et al., 2024). Games provide an active and challenging learning experience, where students not only passively receive information, but also interact and experiment. Maze Game as a form of educational game, can help students understand the

concept of numbers through challenges to find the correct path based on the sequence of numbers or the results of simple operations (Apriani & Ilham, 2025). Maze Game is a maze of numbers game (Zakaria et al., 2025). This media is designed so that students can learn while playing, by tracing a maze path that contains simple challenges or questions related to numbers. Through these activities, students not only learn to recognize and sequence numbers, but also train logical thinking skills, precision, and motor coordination (Manullang et al., 2025).

One of the cognitive aspects that must be developed in 1st grade elementary school students is the ability to recognize integers. At this stage, learners are in the early stages of concrete thinking development, where they begin to learn to understand basic mathematical concepts through hands-on experience and activities involving real objects. The ability to recognize integers includes understanding number symbols (1, 2, 3, and so on), number names, and the ability to associate numbers with the corresponding number of objects (Hobri et al., 2022). The introduction of the symbol of integers should be given from the beginning to children by paying attention to the stages of the child's development as well as in the correct way. Children's ability to deal with numbers in daily life is generally very high in children's environments, various forms of numbers are often found, such as on wall clocks, calendars, puzzles, various remote controls, and so on (Sunarto, 2022). Initial observations regarding the need for the use of learning media were obtained as follows.

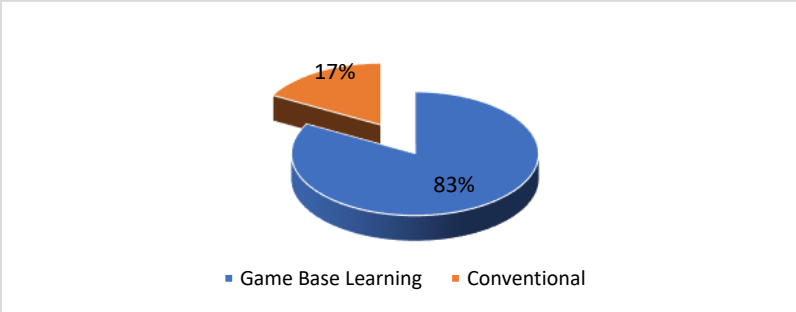

Figure 2. Preliminary Study Learning Media Needs

The results of the needs questionnaire given to teachers and students also showed that 83% of students were more interested in learning using game media or games compared to lecture or conventional methods. The teacher also stated that the use of game-based learning media can help increase student learning motivation, especially in abstract number material for early grade students. In addition, based on observations during the learning process, around 70% of students seem more active and enthusiastic when learning involves elements of games. This shows that grade I students tend to understand learning materials

more easily through interactive and fun play activities. Based on these findings, an interesting, interactive, and appropriate learning media is needed for the characteristics of elementary school early grade students. One of the media that can be used is the Maze Game media, which is a maze-shaped game that directs students to find the right path by choosing the right sequence of numbers. This media is expected to help students understand the concept of integers more concretely, increase student involvement in learning, and improve students' mathematics learning outcomes.

This initial needs analysis is expected to provide a comprehensive overview of the urgency of developing Maze Game media and ensure that the media to be created is really relevant and useful to improve the understanding of integers concepts in elementary school early grade students. Based on observations in the field and the findings of various studies, 1st grade elementary school students often have difficulty in understanding the concept of numbers thoroughly. These difficulties are caused by several factors, including because students are still at the concrete operational stage according to (Piaget, 2002) theory of cognitive development, so that they can more easily understand concepts through real objects and direct activities, rather than through symbols or abstract explanations. In addition, the media and learning methods used by teachers are often still conventional, such as monotonous whiteboards, textbooks, and practice questions, so that they do not attract students' interest in learning and are not fully in accordance with early childhood learning styles that tend to be kinesthetic and visual.

METHODS

This study uses a qualitative descriptive approach of needs analysis by combining simple quantitative data and qualitative data. According to (Creswell, 2017), needs analysis is the initial stage in the development of an educational product, which aims to identify actual conditions in the field and compare them with the expected ideal conditions. The qualitative descriptive approach was chosen because this study focuses on an in-depth description of the conditions of mathematics learning, especially the understanding of the concept of integers in grade 1 elementary school students, as well as the need for the development of innovative learning media in the form of Maze Games. This research was carried out at Cluster 03 Elementary School, East Telukjambe District, Karawang Regency, West Java Province. The population in this study is all grade I elementary school students in Cluster 03, East Telukjambe District. Meanwhile, the research sample was selected by purposive sampling, which is a non-probability sampling technique in which the researcher selects

members of the population based on certain considerations, criteria, or special characteristics that are considered most relevant to answer the research objectives, grade I students of SDN WADAS I in group 03 who are the sample in the study with a total of 60 students, as well as 2 main informant teachers, namely class I teachers. The class represents the characteristics of early grade students and allows for in-depth observations related to the mathematics learning process and the use of learning media. Data was collected through four main techniques, namely Observation, to observe the mathematics learning process, media use, and student activities. Semi-structured interviews, to explore information from teachers about the obstacles and needs of learning media. Questionnaire, to obtain data on students' perceptions and interests as well as teachers' needs for interactive media. Documentation, in the form of lesson plans, teaching materials, and photos of learning activities. Data were analyzed in a qualitative descriptive manner following a model (Sugiyono, 2018), which included three stages of data reduction, by selecting and focusing relevant data; presentation of data, in the form of narratives and descriptive tables; conclusion drawn, to describe the actual conditions and media development needs of Maze Game. The validity of the data is tested through triangulation of sources and techniques so that the results of the needs analysis are valid and accountable. Interview data was analyzed using a simple coding technique (open coding). The first step is to transcribe the results of the interview, then read all the data repeatedly to find important information related to the needs of the learning media. Next, statements that have similar meanings are coded and grouped into specific categories. After the coding process, the categories that have similar meanings are grouped into main themes. Questionnaire responses were calculated using simple descriptive statistics in the form of frequency and percentage. Triangulation is carried out through triangulation techniques, which are comparing data obtained from several data collection techniques, namely observation, interviews, and questionnaires.

RESULT AND DISCUSSION

1. Curriculum and learning objectives

Based on the results of the analysis of the curriculum used in grade I of Elementary School Cluster 03, East Telukjambe District, it is known that mathematics learning has referred to the Independent Curriculum. In the curriculum, number material is included in the number element that emphasizes students' ability to recognize, mention, compare, and sequence integers. In the learning achievements of phase A (grades I and II), students are expected to be able to understand the concept of integers simply and be able to use them in

daily activities. However, based on the results of the analysis of learning tool documents such as lesson plans and teaching materials, the learning activities designed still focus on the teacher's explanation method and practice questions in the package book. The use of innovative and interactive learning media is still limited so that the learning process does not fully support active and fun learning. Thus, it is necessary to design a learning device with learning activities through the use of educational game media such as Maze Game. (Hobri et al., 2022) revealed the importance of using effective, interactive, and innovative learning media that are tailored to students' educational levels.

The results of observations of the mathematics learning process in grade I show that teachers generally use a conventional learning model with lectures, questions and answers, and the provision of practice questions. This learning model tends to make students passive because learning activities are more teacher-centered. The information conveyed by MD that "in learning the concept of integers, teachers usually explain the material using a whiteboard and package book, then students are asked to do practice questions individually". Meanwhile, WS revealed that "in teaching the concept of integers, teachers occasionally use the media of number cards, their use is still limited and does not involve interactive play activities". In fact, the characteristics of elementary school early grade students tend to favor learning activities that involve games and exploration. Therefore, a more innovative and fun learning model is needed by utilizing media that can increase student involvement in the learning process, such as the use of Maze Game game media that can combine elements of learning and play. In addition, the use of maze-shaped game media has also been proven to be able to increase students' concentration and involvement in the learning process because students are required to think, solve problems, and actively follow the game path during learning (Manullang et al., 2025).

2. Current classroom practices and media use

Based on the results of interviews with grade I teachers with the initials MD, it is known that one of the obstacles in mathematics learning is the lack of interesting and interactive learning media. The teacher stated that "the media used so far is still limited to package books and number cards so that students easily feel bored and less motivated in learning". In line with WS which states that "the learning media used in learning is package books and lectures". The results of the questionnaire given to the students showed that most students preferred learning that used game media compared to lecture methods or practice ordinary questions.

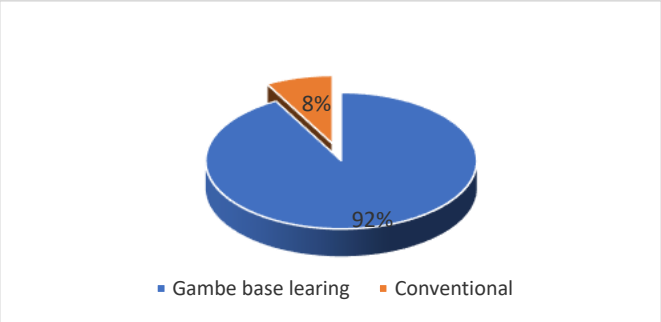

Figure 3. Learning Media Needs

Of the 60 students who were respondents, as many as 55 students (92%) stated that they were more interested in learning mathematics through games, while 5 students (8%) stated that they did not mind conventional learning methods or number cards. In addition, the results of observations also show that when learning involves play activities, students seem more active and enthusiastic in participating in learning. This shows that learning media is needed that can increase students' motivation to learn while helping them understand the concept of integers more easily. Based on these findings, Maze Game media is considered to have the potential to be used as an interesting and interactive learning medium in helping students understand the concept of integers. Maze Game is considered to be able to integrate cognitive, affective, and psychomotor elements in one learning activity. As students navigate a maze of maze paths containing numbers or simple operations, they not only practice recognizing numbers, but also thinking logically, making decisions, and developing fine motor coordination. This is in line with the opinion (Kasiti, 2021; Mulyawati & Elizabeth, 2023; Tubagus, 2025) which states that game-based learning can improve students' concentration, memory, and intrinsic motivation.

3. Students' difficulties in number concepts

Based on the results of observations, interviews, and the distribution of questionnaires, it was found that some students still had difficulty understanding the concept of numbers. The most common difficulties include recognizing the symbol of numbers, connecting the symbol of numbers with the number of objects, sorting numbers, and distinguishing the value of a larger or smaller number. The teacher explained that students' ability to understand the concept of numbers is very diverse because it is influenced by previous learning experiences and the level of learning readiness of each student. The results of the questionnaire also showed that students understood the material more easily when learning was accompanied by games, pictures, and activities that involved them directly.

These findings show that abstract and monotonous learning is still an obstacle for students in building an optimal understanding of number concepts.

4. Student and teacher needs for game-based media

Based on the results of observations, interviews, and the distribution of questionnaires, it was found that some students still had difficulty understanding the concept of numbers. The most common difficulties include recognizing the symbol of numbers, connecting the symbol of numbers with the number of objects, sorting numbers, and distinguishing the value of a larger or smaller number. The teacher explained that students' ability to understand the concept of numbers is very diverse because it is influenced by previous learning experiences and the level of learning readiness of each student. The results of the questionnaire also showed that students understood the material more easily when learning was accompanied by games, pictures, and activities that involved them directly. These findings show that abstract and monotonous learning is still an obstacle for students in building an optimal understanding of number concepts.

5. Implications for Maze Game design

The results of the needs analysis show that the development of Maze Game media has high urgency because it can bridge the gap between concrete and abstract thinking stages, present fun and contextual mathematics learning, increase student participation and learning motivation, and can be used by teachers as an innovative media based on play activities. In the initial design, the Maze Game to be developed was geared towards interactive learning with visual elements (colors and attractive images) as well as simple game elements such as finding sequential number paths or completing small math operations. This media not only serves as an aid, but also as a means of active learning that combines the concept of learning while playing. The results of this study are consistent with previous theories and research. (Mashuri, 2019) emphasized that learning media plays an important role in facilitating message delivery and reducing learning saturation. Fun learning through games has been shown to increase student retention and engagement (Manullang et al., 2025; Piaget, 2002). In addition, these results also support the principle of game-based learning put forward by (Yudiyanto et al., 2023), that the elements of challenge, direct feedback, and in-game achievement can increase students' intrinsic motivation. In this context, Maze Game is the right medium because it provides an active and repetitive learning experience, while strengthening the understanding of number concepts through visual and kinesthetic contexts. Based on the results of observations, interviews, and questionnaires, it can be concluded that the learning of the concept of integers in grade 1 of elementary school still tends to be

conventional and does not involve play activities. Students show a high interest in game-based learning. Teachers need new media that is interactive and in accordance with the characteristics of students in the concrete operational stage. Thus, the results of this need analysis become a strong basis for the next stage, namely the design and development of Maze Game media as an innovation in mathematics learning in the early elementary school grades.

CONCLUSION

The process of learning integers is still dominated by lecture methods, written exercises, and the use of simple media such as number cards or whiteboards. Students' activities are relatively passive and their involvement in learning is still low. This condition shows that learning is not fully oriented to the needs and characteristics of student development that require concrete experience and play activities. The main difficulties of students lie in the recognition of number symbols, the sequencing of numbers, the understanding of place values, and the ability to connect numbers with the number of objects meaningfully. The understanding formed is still memorized and not yet conceptual. This reinforces the need for learning media that helps students understand number concepts through hands-on experience and engaging visualizations. The learning media used by teachers has not been fully effective. The teacher admitted that the media used is still limited and less varied. Most teachers state that they need innovative media that is able to grab students' attention, be easy to use, and support active engagement in math learning.

Maze Game is considered relevant because it is able to combine elements of gameplay, challenge, and exploration with the concept of integers in a fun way. This media also has the potential to develop students' cognitive, affective, and psychomotor abilities simultaneously. Needs analysis is an important basis for the media development stage. The results of this study confirm that needs analysis is a crucial first step in the process of developing learning media. Empirical data from teachers and students became the basis for designing Maze Game media to be truly in accordance with the learning context in the early elementary school class and the characteristics of students aged 6–7 years. Thus, it can be concluded that learning integers in grade 1 elementary school requires innovation in the form of Maze Game media as an interesting, interactive, and supportive learning tool for students to understand numbers. The results of this study have implications for learning practices in elementary schools. The use of game-based learning media not only improves the understanding of the concept of integers, but also supports children's social and emotional

development. Therefore, Maze Game is expected to be a media innovation that is in line with the principle of "learning while playing" in the Merdeka Curriculum, where learning focuses on real experiences and active involvement of students.

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