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IMPLEMENTATION OF DIGITAL NUMERATION METHOD TO IMPROVE STUDENTS' NUMERACY SKILLS AT SMP SWASTA JERISA MANDIRI MEDAN

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ABSTRACT

This study confirms that the implementation of digital numeracy methods significantly improves students' numeracy skills at SMP Swasta Jerisa Mandiri Medan. Through a technology-based approach, students are not only able to understand basic mathematical concepts better, but also show increased interest and motivation in the learning process. The results of the analysis show that the application of interactive media, as part of this method, plays an important role in creating an interesting and exciting learning environment, so that students are more involved in learning activities. Furthermore, the positive relationship between the implementation of digital numeracy methods and students' numeracy skills indicates that the use of technology in education can be an effective solution to overcome learning difficulties experienced by students, especially in the subject of mathematics. In addition, the learning interest factor was shown to mediate the relationship between the two variables, indicating the importance of active student involvement in the learning process. Thus, digital numeracy methods not only function as learning aids, but also as a way to arouse students' enthusiasm for mathematics. Based on these findings, the study recommends that schools and other educational institutions consider integrating digital numeracy methods into their curriculum. Support in the form of training for teachers and increasing access to digital devices is also important to ensure the success of the implementation of this method. Overall, this research makes a significant contribution to the development of mathematics education in Indonesia, with the hope of improving the quality of education and students' numeracy skills in a sustainable manner.

Keywords: Digital Numeracy; Student Numeracy Skills; Digital Learning Methods

INTRODUCTION

In today's digital era, developing numeracy literacy in students is one of the priorities in the world of education. Numeracy literacy, especially understanding basic mathematical concepts such as multiplication, is an important foundation that influences students' ability to absorb material at the next level of education (Rogowsky et al., 2018). Based on initial observation data, understanding the concept of multiplication is still a significant challenge at the elementary school level, which has the potential to hinder the learning process if not addressed. In addition, literacy culture also requires special attention, especially in reading activities that are still less popular with students (Purpura & Lonigan, 2013). This low interest in reading is caused by the perception that reading is a boring activity, as well as a lack of support from the environment, including from parents.

On the other hand, the introduction of educational games oriented towards numeracy literacy has been shown to have a positive impact on increasing students' interest in learning (Megawati & Sutarto, 2021). For example, through the Kampus Mengajar Program implemented at SD Negeri 13 Kota Sorong, students showed a significant increase in literacy and numeracy skills after being involved in educational games. This program is implemented in four stages: Situation Analysis or Partner Problem Study (Pre-Test), Preparation and

Creation of Educational Games, Introduction of Educational Games, and Evaluation of Program Results (Post-Test). Based on the results of the pre-test and post-test on the Minimum Competency Assessment (AKM), it can be seen that there was an increase in literacy in 50% of students, while in numeracy as many as 56.25% of students experienced an increase after participating in the program.

In a broader context, this study will focus on "Implementation of Digital Numeration Method to Improve Students' Numeracy Skills at SMP Swasta Jerisa Mandiri Medan." With this background, this study aims to explore the effectiveness of the digital numeracy method in improving the numeracy skills of junior high school students. This method is expected to provide solutions to the challenges of numeracy learning and improve literacy culture through a more interactive approach and in accordance with technological developments. This digital numeracy method is expected to help students understand mathematical concepts more easily and interestingly, considering that technology has a strong appeal to the younger generation (Disney et al., 2019). With a digital-based approach, students can learn through interactive media that supports the visualization of basic mathematical concepts such as multiplication, division, and other arithmetic operations. In addition, the use of technology in numeracy learning is expected to be able to foster a higher interest in learning in students, reducing the perception that mathematics is a boring or difficult subject.

This program will be implemented with several strategic stages including student needs analysis, preparation of digital learning materials, training in the use of numeracy software, and evaluation of learning outcomes. Through a series of stages, it is hoped that students can experience significant improvements in their understanding and application of numeracy skills. Data from the pre-test and post-test will be analyzed to measure the level of effectiveness of this method on improving student learning outcomes, especially in numeracy skills.

Furthermore, this study will also look at external factors that can influence the effectiveness of digital numeracy learning, such as parental support, the availability of technological devices at home, and the student's learning environment at school. By understanding these factors, it is hoped that the digital numeracy method can be implemented more optimally and sustainably, not only at SMP Swasta Jerisa Mandiri Medan but also in other educational institutions (Sayekti & Sukestiyarno, 2021).

RESEARCH METHOD

This study uses a quantitative approach with a quasi-experimental research design to measure changes in students' numeracy skills before and after the implementation of the digital numeracy method. The quasi-experimental method was chosen because it allows research to be conducted in a classroom environment that cannot be fully controlled strictly, but still provides comparative data. This design involves two groups, namely the experimental group that will receive the digital numeracy method intervention and the control group that will use the conventional numeracy learning method. With this design, the study can identify whether there are significant differences in numeracy learning outcomes between the two groups (Prayuda, 2020).

The research subjects consisted of grade VII students at SMP Swasta Jerisa Mandiri Medan who were selected using purposive sampling. The purposive sampling technique was used to ensure that the characteristics of the students who were the subjects of the study were in line with the required criteria, namely students who had challenges in basic numeracy literacy. The experimental group and control group will be selected randomly from several grade VII classes available at the school, taking into account the homogeneity of the initial numeracy ability levels of students based on the pre-test results (Prayuda, 2023).

The instruments used in this study include numeracy tests, observation sheets, and questionnaires. The numeracy test is compiled based on numeracy indicators relevant to the junior high school curriculum, which include basic arithmetic operation skills, understanding of basic mathematical concepts, and numeracy applications in the context of

everyday life. Observation sheets are used to record the process of student interaction during learning with the digital numeracy method, especially to identify active participation, understanding of concepts, and student responses to the material presented. In addition, a questionnaire is given to explore students' perceptions and responses to the use of technology in numeracy learning, which is expected to provide a deeper picture of students' attitudes towards digital-based learning methods.

DISCUSSION

In this chapter, the results of the research obtained from the implementation of the digital numeracy method at SMP Swasta Jerisa Mandiri Medan will be described and analyzed. Based on the data obtained from the pre-test, post-test, observation sheets, and questionnaires, the effectiveness of this method in improving students' numeracy skills will be discussed. This analysis will also discuss the significant differences between the experimental and control groups and the factors that influence students' acceptance of the digital numeracy learning method. This chapter describes the successes, challenges, and potential for further application of the digital numeracy method in numeracy learning in secondary schools. The pre-test results showed that most students in both groups, both experimental and control, had relatively low levels of numeracy skills. Based on the pre-test results, it was found that students had difficulty in basic mathematical operations such as multiplication, division, and the application of arithmetic concepts in story problems. These difficulties indicate an urgent need to implement more effective and interesting learning methods for students. In the experimental group, after the implementation of the digital numeracy method, there was a significant increase in the post-test score. In contrast, the control group that received the conventional learning method experienced a smaller increase in their post-test results. The difference in results shows that the digital numeracy method is able to provide a greater positive impact on improving students' numeracy skills compared to traditional learning methods.

The increase that occurred in the experimental group can be caused by the characteristics of the digital numeracy method which uses interactive and visual media (Setyo et al., 2024). This media helps students understand mathematical concepts concretely through simulations and educational games that stimulate a deeper understanding of the material. Overall, the increase in learning outcomes in the experimental group indicates that the digital numeracy method can be a solution to improve understanding of mathematical concepts, especially among students who have difficulty in mastering basic arithmetic operations.

The digital numeracy method relies on interactive software and applications designed to make it easier for students to understand numeracy concepts visually. These interactive media, such as animations and games, have been shown to attract students' interest and foster learning motivation. Based on the results of observations, students in the experimental group appeared more actively involved in the learning process, showing higher enthusiasm when interacting with digital media. This is in contrast to the control group which tended to be passive and showed lower interest in the conventional numeracy learning process.

Learning using interactive media also provides a more personal and adaptive learning experience. Students who understand concepts more quickly can proceed to higher levels of difficulty, while students who need more time can repeat simulations and exercises without pressure. These adaptive characteristics indicate that the digital numeracy method not only helps conceptual understanding but also provides space for students to learn according to their own pace and needs. The success of this method shows that a technology-based approach can meet diverse learning needs, especially in classes with high heterogeneity of abilities.

Based on the results and discussions that have been described, it can be concluded that the implementation of the digital numeracy method has succeeded in improving students' numeracy skills at SMP Swasta Jerisa Mandiri Medan. This method is not only effective in improving the understanding of basic mathematical concepts, but also

successfully fosters students' interest and motivation to learn through interactive and visual media that are fun. The success of this method has important implications for the development of technology-based numeracy learning at the elementary and secondary education levels.

During the research process, I also observed that learning interest acts as a mediating factor that strengthens the relationship between digital numeracy methods and students' numeracy skills. When students feel more interested in this digital method, they tend to be more motivated to be actively involved in learning. From my perspective, this learning interest not only supports students' understanding of the material but also plays a major role in determining how far they improve. With an interesting and student-oriented method, learning interest becomes a catalyst that maximizes learning outcomes. This observation convinced me that technology-based teaching methods not only improve academic skills but are also able to change students' perceptions of mathematics. This learning interest factor proves that a learning approach designed to meet students' interests can provide more significant and lasting results.

In addition, this study shows that with the support of adequate facilities, teacher training, and access to technology, the digital numeracy method has the potential to be widely applied and provide a significant positive impact on mathematics education in Indonesia. However, to achieve more optimal results, further support is needed in terms of resources and curriculum development that is in line with technological developments.

This study has two main variables analyzed, namely the implementation of the digital numeracy method as an independent variable and students' numeracy skills as a dependent variable. Specifically, the independent variable in this study refers to the digital numeracy method used to improve students' numeracy skills through interactive media, such as educational game-based applications and numeracy visualization software. Meanwhile, students' numeracy skills which include the ability in basic mathematical operations, such as addition, subtraction, multiplication, and division, as well as understanding basic mathematical concepts act as variables influenced by the implementation of this method.

The results of the study showed a positive relationship between the implementation of digital numeracy methods and the improvement of students' numeracy skills. This is indicated by a significant increase in the post-test scores obtained by the experimental group compared to the control group. This increase indicates that the more intensively and effectively the digital numeracy method is implemented, the greater its influence on students' numeracy skills. This positive relationship is supported by observational data showing that students participating in the experimental group showed higher interest and involvement, factors that play a role in improving their numeracy skills.

CONCLUSION

This research confirms that the implementation of digital numeration methods significantly improves students' numeracy skills at Jerisa Mandiri Medan Private Middle School. Through a technology-based approach, students are not only able to understand basic mathematical concepts better, but also show increased interest and motivation in the learning process. The results of the analysis show that the application of interactive media, as part of this method, plays an important role in creating an interesting and exciting learning environment, so that students are more involved in learning activities. Furthermore, the positive relationship between the application of digital numeracy methods and students' numeracy skills shows that the use of technology in education can be an effective solution to overcome learning difficulties experienced by students, especially in the subject of mathematics. In addition, the learning interest factor was proven to mediate the relationship between the two variables, indicating the importance of students' active involvement in the learning process. Thus, digital numeration methods not only function as learning aids, but also as a way to arouse students' enthusiasm for mathematics.

Based on these findings, the research recommends that schools and other educational institutions consider integrating digital numeracy methods in their curriculum. Support in

the form of training for teachers and increasing access to digital tools is also important to ensure the successful implementation of this method. Overall, this research makes a significant contribution to the development of mathematics education in Indonesia, with the hope of improving the quality of education and students' numeracy skills in a sustainable manner.

REFERENCES

Disney, L., Barnes, A., Ey, L., & ... (2019). Digital play in young children's numeracy learning. *Australasian Journal of ….* https://doi.org/10.1177/1836939119832084

Megawati, L. A., & Sutarto, H. (2021). Analysis numeracy literacy skills in terms of standardized math problem on a minimum competency assessment. *Unnes Journal of Mathematics ….* https://journal.unnes.ac.id/sju/ujme/article/view/49540

Prayuda, M. S. (2020). An error analysis of Indonesian-English translation. In *Kairos*. core.ac.uk. https://core.ac.uk/download/pdf/327176737.pdf

Prayuda, M. S. (2023). Integrated Group Investigation Model Impact on Students' Writing Achievement. *Kampret Journal*. https://plus62.isha.or.id/index.php/kampret/article/view/129

Purpura, D. J., & Lonigan, C. J. (2013). Informal numeracy skills: The structure and relations among numbering, relations, and arithmetic operations in preschool. *American Educational Research ….* https://doi.org/10.3102/0002831212465332

Rogowsky, B. A., Terwilliger, C. C., Young, C. A., & ... (2018). Playful learning with technology: the effect of computer-assisted instruction on literacy and numeracy skills of preschoolers. *International Journal of ….* https://doi.org/10.1080/21594937.2017.1348324

Sayekti, I., & Sukestiyarno, Y. L. (2021). Perception and understanding of Madrasah Tsanawiyah teachers on numerical literacy in mathematics learning. *Journal of Physics: Conference ….* https://doi.org/10.1088/1742-6596/1918/4/042029

Setyo, A. A., Layn, M. R., Trisnawati, N. F., & ... (2024). Introduction of Numeration Literacy Skills-Oriented Educative Games Through the Campus Teaching Program. *ABDIMAS: Jurnal ….* https://journal.umtas.ac.id/index.php/ABDIMAS/article/view/4924