Kaizala-Based Teaching Materials Oriented to Students' Numerical Ability and Interest in Learning

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Abstract

The current low level of students' numeracy ability has not been matched by the in-depth use of digital platforms such as Microsoft Kaizala. Therefore, this research aims to develop Mobile Learning-based teaching materials assisted by Microsoft Kaizala, focusing on students' numeracy ability and learning interest. The developed teaching materials were analyzed for their feasibility and effectiveness in improving students' numeracy ability and learning interest by two media experts and four material experts. The research utilized the Research and Development model ADDIE, involving 34 junior high school students in the city of Bandung. Instruments used included validation sheets, questionnaires, interviews, and numeracy skill tests. Data were analyzed using effect size, Pearson correlation, and descriptive statistics. The results of the research indicate: (1) The teaching materials are considered feasible by content experts and highly suitable by media experts; student responses fall into the excellent category. (2) Students' numeracy ability are categorized as moderate. (3) Students' learning interest is categorized as good. (4) The teaching materials are effective in improving students' numeracy ability. (5) There is no correlation between students' numeracy ability and learning interest. Therefore, the teaching materials can be utilized in mathematics learning based on m-learning. Integrating digital platforms into teaching materials can be a practical solution for teachers to optimize flexible and interactive numeracy learning.

Keywords: Learning Interest; Microsoft Kaizala; M-learning; Numeracy Ability.

Abstrak

Rendahnya kemampuan numerasi siswa saat ini belum diimbangi dengan pemanfaatan platform digital seperti Microsoft Kaizala secara mendalam. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan bahan ajar berbasis Mobile Learning berbantuan Microsoft Kaizala yang berorientasi pada kemampuan numerasi dan minat belajar siswa. Bahan ajar yang dikembangkan dianalisis kelayakan dan efektivitasnya pada kemampuan numerasi dan minat belajar siswa oleh dua orang ahli media dan empat orang ahli materi. Penelitian ini menggunakan metode Research and Development model ADDIE yang melibatkan 34 siswa SMP di Kota Bandung. Instrumen yang digunakan adalah lembar validasi, angket, wawancara, dan tes kemampuan numerasi. Data dianalisis menggunakan effect size, Pearson correlation, dan deskriptif. Hasil penelitian menunjukkan: (1) Bahan ajar termasuk kategori layak dari ahli materi dan sangat layak dari ahli media, berdasarkan respon siswa berada pada kategori sangat baik; (2) Kemampuan numerasi siswa termasuk dalam kategori sedang; (3) Minat belajar siswa termasuk dalam kategori baik; (4) Bahan ajar efektif untuk meningkatkan kemampuan numerasi siswa; dan (5) Tidak terdapat korelasi antara kemampuan numerasi dan minat belajar siswa. Sehingga bahan ajar dapat digunakan dalam pembelajaran matematika berbasis m-learning. Integrasi platform digital dalam bahan ajar dapat menjadi solusi praktis bagi guru untuk mengoptimalkan pembelajaran numerasi yang fleksibel dan interaktif.

INTRODUCTION

In the industrial revolution 4.0, basic numeracy literacy ability are important abilities for students to have. Good numeracy helps students interpret information, identify patterns, and make decisions based on mathematical understanding (Chan & Scalise, 2022). Therefore, numeracy ability are very important in providing insight into students' academic development and contributing in shaping analytical thinking and decision-making ability necessary for success in various aspects of life (Epran, E., Dahlan, J. A.., & Kusumah, Y. S, 2025). Numeration is the ability of students to use numbers in solving and solving problems practically in everyday life, for example when shopping, planning to build a house, this requires numeration (Ayuningtyas & Sukriyah, 2020; Goos et al., 2011). By mastering good numeracy, one will be able to compete with other countries (Hasan Basri et al., 2021). Based on the results of interviews with mathematics teachers at one of the junior schools in Bandung that students' numeracy ability are still not good, with an average of 75.45 which is still not far from the KKM value of 73. This achievement gap indicates the need for further investigation into the factors underlying students' academic performance in the classroom.

Factors that affect student achievement or student learning success, namely internal factors and external factors (Baharun & Ummah, 2018). One of the internal factors that achieve student learning success is student interest in learning. Learning interest will directly affect the initiative and enthusiasm of students in learning, it is an important factor to promote students to think actively and improve learning efficiency. Junior high school mathematics is a highly logical subject, and its complexity and abstraction can easily bore students, so students' interest in learning should be cultivated in teaching (Yang, G, 2021) There is a significant positive relationship between interest in learning and learning achievement in mathematics (Apriyanto & Herlina, 2020; Islamiah, 2019; Syahputri & Khasanah, 2019).

Despite the importance of learning interest, classroom observations show teachers rarely use interactive learning applications, especially Microsoft Kaizala. The mathematics learning process carried out by the majority of teachers explained the material, gave examples of questions, gave practice questions, and discussed practice questions (Syahputri & Khasanah, 2019). The stages of the monotonous learning process with less interactive material resulted in students

getting bored in learning and lack of interest in learning. In increasing or generating student interest in learning mathematics, a teacher needs to use learning methods and subject matter that is easy for students to learn (Sriyanti, 2016; Zukhrufurrohmah & Dintarini, 2021).

To solve these problems, then developed teaching materials based on Mobile Learning. M-learning can run interactively and become more interesting to increase student interest and enthusiasm for learning (Poppy Yaniawati et al., 2020) without being limited by space and time (Crompton & Burke, 2020) which places students in an easy virtual context. imagined and understood in reality (Bano et al., 2018). Even though the pandemic has ended, the use of mobile learning remains a crucial tool in modern education. Recent research by (Hardika et al., 2024) shows that the use of mobile-based interactive media significantly improves the learning outcomes of junior high school students. This aligns with the argument of (Zhou et al, 2023) who stated that post-pandemic, the education system has evolved from mere emergency distance learning to a sustainable digital education framework, where technology integration remains relevant to creating an adaptive learning ecosystem.

The learning process with M-learning can benefit from the availability of teaching materials that can be accessed at any time and visualization of material that makes students interested. In this study, the M-Learning used was Microsoft Kaizala. Microsoft Kaizala is a mobile chat based communication platform that can be used for M-Learning learning. Kaizala is the result of the Microsoft Garage project in India (Sari et al., 2021). Microsoft Kaizala has a number of interesting features such as announcements, assignments, attendance, training, simple games. These diverse features allow for the presentation of contextual mathematics problems to stimulate numeracy ability, while the interactive chat-based interface is designed to increase students' engagement and interest in learning. Therefore, these features are expected to help teachers as a means of delivering teaching materials effectively to students.

However, research specifically focusing on the integration of Microsoft Kaizala to address the gap between numeracy ability and learning interest in PLSV (Linear Equations of One Variable) material remains scarce. To address this gap, this research aims to: (1) produce PLSV teaching materials based on M-Learning assisted by Microsoft Kaizala which contain numeracy ability; (2) analyze numeracy ability after using M-Learning-based teaching materials on PLSV materials; (3) analyze students' interest in learning after using M-Learning-based teaching materials on PLSV material; (4) evaluate the effectiveness of PLSV teaching materials based on Microsoft Kaizala-assisted M-Learning oriented to students' numeracy ability; and (5) determine the correlation between numeracy ability and student interest in learning who receive M-Learning-based teaching materials. The results of this study indicate that there is no correlation between numeracy ability and learning interest in students who received M-Learning-based teaching materials supported by Microsoft Kaizala.

This study differs from previous research that found that high learning interest automatically results in high numeracy ability in a digital environment. This provides empirical evidence that another connecting factor (mediator) is missing. This is an important note for digital curriculum developers: the

platform alone is not sufficient to bridge student interest and numeracy mastery.

METHOD

The research method used is the Research and Development (R&D) method of the ADDIE model, namely Analysis, Design, Development, Implementation, and Evaluation based on the theory of Lee and Owens who developed PLSV M-Learning learning media using the Microsoft Kaizala application.

In the analysis stage, the initial activities undertaken by researchers to meet these students' needs include literature studies, field studies, and studies on the development of technology for developing learning media. Literature studies are activities to collect data in the form of theoretical support for the learning media to be created, such as books on learning media, research journals, junior high school mathematics syllabi, school mathematics textbooks, and other resources relevant to the research.

The field study is an activity to determine what students need, what supports, and what hinders media trials in the field when the product is ready for testing. Pre-activity includes interviews with mathematics teachers.

A technology development study is an activity conducted within a student's environment to learn about current technological developments. This includes gathering information about technological developments within the school, interviewing teachers at the school, and conducting student surveys.

This research was conducted in one of the public junior high schools in the city of Bandung, with a population of class VII students and class VII I samples with 6 students for small-scale trials, and 34 students for field trials. The sampling technique is non-probability sampling used purposive sampling.

Data collection techniques used was triangulation. Triangulation was conducted based on data collected through interviews, questionnaires, test instruments, and teaching material validation sheets.

The interview guide was used as a tool to gather information and data from teachers regarding student needs analysis. This needs analysis served as a reference in developing mobile learning materials and to collect information and data from students after using mobile learning materials supported by Microsoft Kaizala. Interviews were conducted during observations and at the end of the lesson.

The instrument used in this study was a test. The descriptive questions consisted of several variations that corresponded to the numeracy ability indicators.the numeracy ability test consisted of 6 numeracy ability questions given at the pretest and posttest. This pretest is given to determine students' initial abilities, while the posttest is to determine the effectiveness of M-Learning teaching materials.

The questionnaire used in this study aims to analyze students' learning interests and the development of M-Learning-based teaching materials assisted by Microsoft Kaizala. A learning interest questionnaire using a Likert scale with 30 statements with indicators of feelings of pleasure, attention, interest, and student involvement. In the questionnaire the feasibility of teaching materials with four indicators, namely content feasibility, presentation feasibility, linguistic feasibility, and graphic feasibility. The questionnaire on the feasibility of teaching materials consists of a validation questionnaire of

four material experts, two media experts, and student responses.

There are 7 questions interviewed to students related to M-Learning-based teaching materials assisted by Microsoft Kaizala, analyzed and then interpreted descriptively.

Quantitative data was obtained from questionnaires and tests, then qualitative data was obtained from interviews and student responses after using M-Learning based teaching materials.The data analysis technique used qualitative methods in the form of descriptive and quantitative using quantitative descriptive analysis, Effect Size test and Pearson Correlation test. Pretest and Posttest data analysis techniques are used to test the effectiveness of teaching materials by providing numeracy ability test questions and measuring learning outcomes to see the level of effectiveness of the product using effect size. Pearson analysis technique is used to determine the relationship between one variable with another variable. The correlation analysis in this study aims to calculate the correlation coefficient between students' numeracy ability scores and the scale of students' learning interest attitudes after using M-Learning-based teaching materials assisted by Microsoft Kaizala on PLSV material.

RESULT AND DISCUSSION

Results

Development of Teaching Materials

In the first stage of the analysis, by conducting interviews with mathematics teachers, the researchers found that students' literacy was good but students' reading interest was still low, lack of cooperation between teachers, and parents at home. Lack of interest in reading is influenced by learning media or teaching materials used by teachers, students prefer IT to printed books because they are more varied, interesting, and full color. During research at schools with distance learning systems, teachers there used mobile learning (M-Learning) in their teaching. The learning medium was Google Classroom. Mathematics learning in schools is still rare using M-Learning assisted learning applications such as Kaizala, Moodle, and others.

The second stage of design includes the manufacture of teaching materials with the subject of PLSV as the development of M-Learning-based teaching materials assisted by Microsoft Kaizala that the researchers did. The components contained in the design of teaching materials, namely: making the design of teaching materials, preparation of materials, quizzes, and preparation of instrument validation of the feasibility of teaching materials.

The third stage of development is the product realization stage, namely the preparation of M-Learning-based teaching materials assisted by Microsoft Kaizala which includes material content, validation and production. The content of the teaching materials is PLSV material. The assessment stage of the feasibility of M-Learning-based teaching materials assisted by Microsoft Kaizala by experts, namely material experts and media experts. The display of PLSV teaching materials based on M-Learning assisted by Microsoft Kaizala which was developed can be seen in the figures 1 to 10.
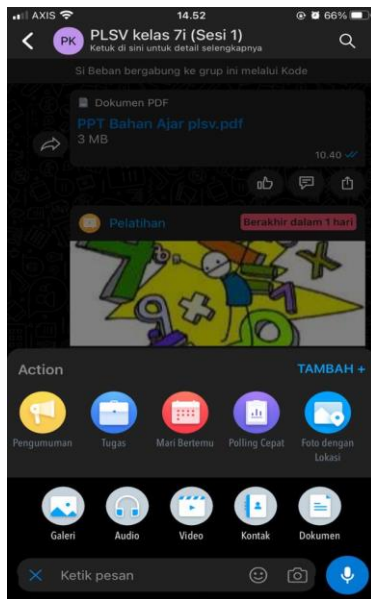
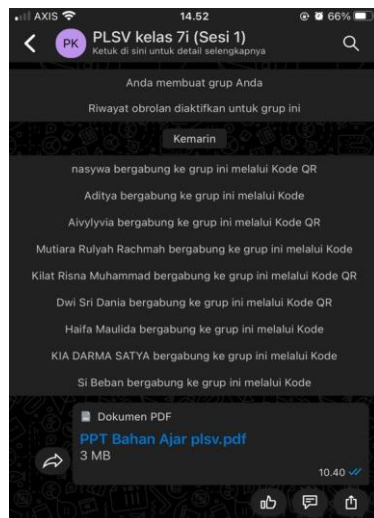*Figure 1. Menu Display in Microsoft Kaizala*

Figure 2. Initial Display of Material Presentation

Figure 3. Material Display

Figure 4. Material in the Form of Text

Figure 5. Material in the Form of Videos
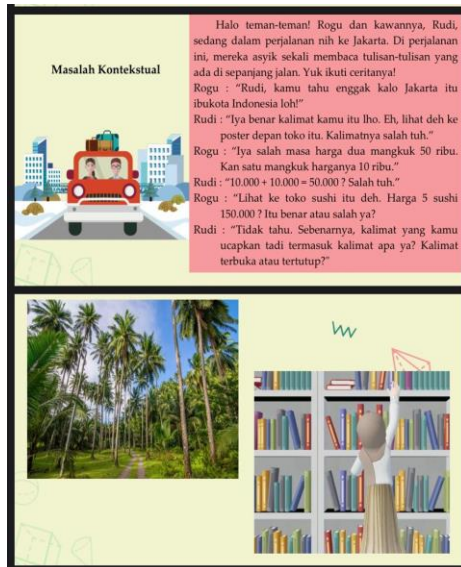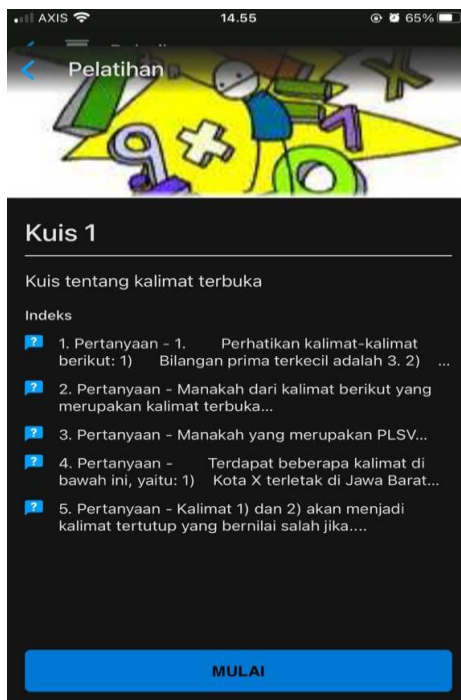
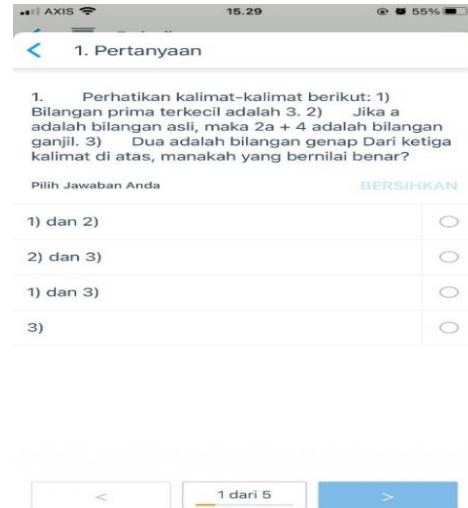Figure 6. Material in the Form of Images

Figure 8. Quiz Question Display
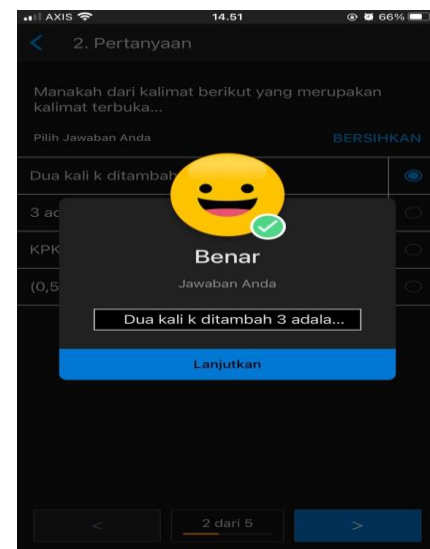

Figure 7. Quiz Initial View

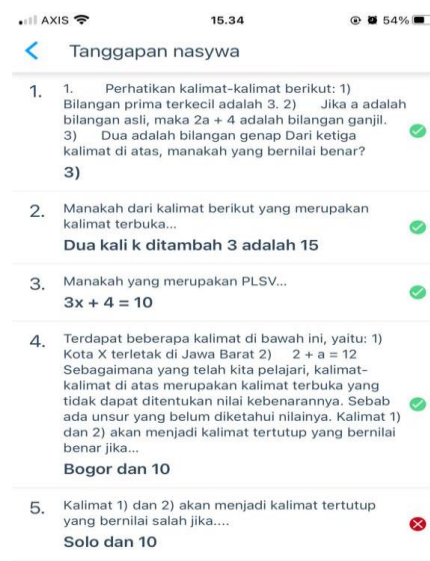Figure 9. Display of Correct Quiz Answers

Figure 10. Overall Quiz Answer Display

The following are the results of the assessment of the four material experts on the three aspects as shown in the Table 1.

Table 1. Material Expert Validation Result

No	Aspect	Average Value				Average Score	Criteria
		V1	V2	V3	V4		
1	Content Eligibility	4	4,33	4	4	4,08	Feasible
2	Serving Eligibility	4	4,2	3,9	3,9	4	Feasible
3	Language Eligibility	4,11	4,33	3,67	4,56	4,17	Feasible
Validator Average						4,083	
Criteria						Feasible	

Based on Table 1, the average validation of the material is 4.083, it can be concluded that in terms of the material for M-Learning teaching materials assisted by Microsoft Kaizala, it is included in the criteria for use with slight revisions. In addition to being based on the data analysis, the researcher also considered suggestions and comments from the validator regarding the less appropriate part, namely showing more student involvement, and providing written motivation with animation, on quiz questions you can use applications such as games, so that students are not bored, and deficiencies in the apperception of students at the beginning of learning. M-Learning teaching materials can help students share their knowledge and experiences, and collaborate with their friends (Chen & Tsai, 2021).

The results of the assessment of teaching materials by media experts are presented in Table 2.

Table 2. Media Expert Validation Result Data

No	Aspect	Average Value		Average Score	Criteria
		V1	V2		
1	Appearance	3,8	4,333	4,067	Feasible
2	Use	4,4	5	4,7	Very Worthy
3	Utilization	3,833	4,333	4,083	Feasible
Average Validator				4,283333	
Criteria				Very Worthy	

In Table 2, the average score of media expert validation is 4.283, indicating that, in terms of media, the M-Learning teaching material assisted by Microsoft Kaizala is considered very suitable for application with minor revisions. In addition to the data analysis, the researcher considered suggestions and comments from the validator, including avoiding excessive complexity, adding next and back buttons, and acknowledging that the material is already quite good, with a recommendation to limit the amount of text.

In the fourth stage of implementation, after the teaching material is deemed suitable by the validator, the PLSV M-Learning-based teaching material assisted by Microsoft Kaizala is implemented in both distance learning (PJJ) and face-to-face learning (PTM). During this stage, the researcher executed all activities outlined in the teaching material. The results of the first trial with six students from the eighth grade, who had previously received PLSV material, yielded an average score of 2.693. This score falls within the range of 2.6 to 3.4, indicating that the trial of this stage produced a satisfactory result, making the M-Learning-based teaching material assisted by Microsoft Kaizala sufficiently suitable for use. Consequently, the study proceeded to the second trial involving 34 students.

The fifth stage involves evaluation or assessment, focusing on the attractiveness aspect of the PLSV M-Learning-based teaching material assisted by Microsoft Kaizala. The attractiveness aspect is evaluated based on student responses obtained through a questionnaire. Effectiveness is assessed by comparing pretest and post-test scores. The data on student response questionnaire results are presented in Table 3.
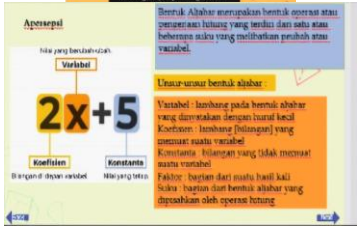
Table 3. Product Revision

Comments/ Suggestions	Before	After
Provide written motivation supported by animation	None	
Lack of an apperception (prior knowledge activation) section at the beginning of learning	None	
Add **Next** and **Back** buttons		
Text is too dense		

Table 4. Student Response Questionnaire Result Data

No	Aspect	Total Score	Percentage	Category
1	Aspect of Interest	809	79%	Strong
2	Aspect of material Comprehension	662	78%	Strong
3	Aspect of Language Comprehension	441	86%	Very Strong
	Total		81%	Very Strong

In Table 4, the teaching material has a response value that is very good. This can be seen from the large average percentage of 81% with a category of very strong, indicating that the use of M-Learning-based teaching materials assisted by Microsoft Kaizala received a very favourable response in mathematics learning for the PLSV topic.

According to Pocatilu (cited in Rahayu et al., 2018), multimedia plays a significant role in learning because through multimedia, students can learn anytime and anywhere, unrestricted by space and time, as is the case when students use mobile phones and other devices.

Data from pretest and posttest results to assess the effectiveness of teaching materials are presented in Table 5 below:

Table 5. Data Result of Pretest and Posttest

	N	Mean	Std. Dev	Variance
Pretest	34	34.03	16.656	277.423
Post-test	34	66.97	15.308	234.332
Valid N (listwise)	34			

In Table 5, the average pretest score is 34.03, and the average posttest score is 66.97. This indicates an improvement. In

addition to examining the averages obtained from the pretest and posttest, the effectiveness of the developed M-Learning-based teaching materials assisted by Microsoft Kaizala is also evaluated through the calculation of the effect size.

The calculation results show that the magnitude of the effect size is 2.06, which falls into the high criteria. This indicates that the M-Learning-based teaching materials assisted by Microsoft Kaizala for the PLSV topic are effective in the learning process and significantly enhance students' learning outcomes. From the description above, it is evident that learning using M-Learning-based teaching materials assisted by Microsoft Kaizala is effective in improving students' numeracy ability. Mobile technology-supported learning is more intense and effective in understanding learning (Bernacki et al., 2020). Kaizala serves as both synchronous and asynchronous media, providing an alternative in learning (Amalia, 2021).

Numeracy Ability

Assessment of students' numeracy ability test results is conducted by presenting and categorizing the percentage. The recapitulation of posttest numeracy ability results is presented in Table 6.

Table 6. Recapitulation of Posttest Numeracy Ability Results

Measured Indicator	Task Number	Percentage (%)	Percentage Indicator (%)	Criteria
Indicator 1	1	92,65	69,49	Low
	2	83,82		
	6a	67,65		
	6b	33,82		
Indicator 2	3	77,94	80,88	High
	5	83,82		
Indicator 3	4	44,12	26,96	Low
	6c	20,59		
	6d	16,18		
Total Averagel (%)		57,84		Middle

Note: Indicator 1, Able to use various numbers and symbols related to basic mathematics to solve practical problems in various everyday life contexts. Indicator 2, Able to analyze information presented in various forms (graphs, charts, tables, etc.). Indicator 3, uses the interpretation of the analysis results to predict and make decisions (Puspaningtyas & Ulfa, 2020).

Based on Table 6, it can be concluded that the numeracy ability results after using M-Learning-based teaching materials assisted by Microsoft Kaizala obtained an average percentage of 57.84% with a moderate category, able to improve students' numeracy ability. Most students were able to answer maximally. Microsoft Kaizala shapes active learning, promotes interactive discussions, encourages critical thinking, and enables effective problem-solving in mathematics (Parlina Mila et al., 2021).

The second indicator, the ability to analyze information presented in various forms (graphs, charts, tables, etc.), has a high criterion. This indicates that students can understand and analyze information presented in questions in the form of tables and charts. Tables, charts, and the like are static visual media. Media encompass all forms and channels used to convey data or messages. Through this media, students can understand and apply it in everyday life, making them more capable of solving problems that arise in their learning (Romika & Amalia, 2014).

Regarding the first indicator, the ability to use various numbers, symbols related to basic mathematics to solve practical problems in everyday life contexts, it has a moderate criterion. This indicates that students are sufficiently able to use various numbers and symbols related to basic mathematics to solve practical problems in everyday life

contexts. This occurs because some students are still confused and unable to use mathematical modeling, especially in narrative problems with long contexts in everyday life that require good literacy. Based on the analysis results, students are accustomed to literacy activities at school, but there is a constraint: students have low reading interest, so literacy is not optimal. The ability to use numbers and symbols is a prerequisite for acquiring various knowledge and ability, such as reading machine manuals, programming computers, or learning foreign languages (Lechner et al., 2021). Based on the analysis (Yaniawati, et al., 2017), students with good cognitive abilities have excellent mathematical literacy ability in communication, mathematics, representation, reasoning, and argumentation using symbols, language, and formal and technical operations.

For the third indicator, using the interpretation of analysis results to predict and make decisions has a low criterion. This indicates that many students are not yet able to understand and analyze information in questions to answer them correctly, and there are still many students who do not answer and leave the questions blank. Understanding and analyzing a question require good mathematical problem-solving and reasoning ability. Reasoning is one of the basic ability in numeracy; therefore, to improve numeracy ability, good mathematical reasoning is essential (Kusumawardani et al., 2018). The mathematical reasoning of an individual in numeracy ability can be trained by increasing non-routine problem-solving exercises. In line with the analysis results, it is found that they are not accustomed to solving non-routine problems at school; hence, they do not know how to work on those problems and lack practice in numeracy problems at school. To improve

students' numeracy ability, reinforcement by teachers in the form of numeracy problem-solving exercises is required (Ovan & Nugroho, 2017).

Learning Interest

Based on the results of the questionnaire distribution, the average scores for the feeling of happiness indicator are 3.83, attention 3.86, interest 3.875, student satisfaction 3.53, and overall satisfaction 3.78, all falling into the good category. This illustrates that almost all students, overall, have an interest in learning using M-Learning-based teaching materials assisted by Microsoft Kaizala. Unlike other communication applications, Kaizala goes beyond communication functions, allowing users to collaborate and engage in other productive activities (Yani, 2019). There is a significant positive influence between learning interest and mathematics learning achievement (Apriyanto & Herlina, 2020; Islamiah, 2019). M-learning enhances students' interest in engaging in co-academic activities such as STEM (P. Yaniawati et al., 2021).

All four indicators are categorized as good. Regarding the interest indicator, almost all students have an interest in learning with M-Learning-based teaching materials assisted by Microsoft Kaizala, indicating that students have a motivating force to be interested in the activity itself. In this indicator, students are interested in Kaizala-assisted teaching materials because they have an attractive appearance; students ask questions through the chat feature if something is not understood. This shows that asking questions is a form of students' interest in the learning process. Asking and answering questions can increase learning interest, improve students' cognitive abilities, and enhance students' curiosity

about a problem (Tohir, 2016). Teachers can use learning media to enhance students' motivation and interest in learning mathematics (Suryani & Lestari, 2019). This aligns with the analysis results that the school literacy movement has been implemented in schools, but students' reading interest (literacy) is still low.

Next is the feeling of happiness indicator. A student who has a feeling of happiness or enjoyment towards the subject being studied means they must continue to study related subjects, and there is no sense of coercion. On the feeling of happiness indicator, almost all students have a feeling of happiness or enjoyment towards the subject being studied. In this indicator, teachers as facilitators can make learning enjoyable by interspersing it with entertainment such as the gaming features found in Microsoft Kaizala. Utilizing the Kaizala application in the mathematics learning process is effective in increasing students' interest in learning (Humairah, 2021). Learning with a sense of happiness and giving more attention makes it easier for students to understand learning (Wulansari & Manoy, 2021). Interest plays a very important role in students' lives and has a significant impact on students' attitudes (Dores et al., 2019).

Moving on to the attention indicator. Attention is the concentration or mental activity toward observation and understanding, disregarding everything else. On the attention indicator, almost all students pay attention to the learning process using M-Learning-based teaching materials assisted by Microsoft Kaizala, meaning students have a concentrated attitude toward what they are facing, disregarding everything else. This indicates that good attention is required for learning. Learning cannot happen without attention (Lubis, 2019).

The last indicator is student engagement. Student engagement is an individual's interest in an object that makes them happy and interested in doing or working on activities related to that object. On the student engagement indicator, almost all students are engaged in the learning process using teaching materials. This indicates that students have an interest in an object that makes them happy and interested in doing or working on activities related to that object. However, there is still a lack of students' interest in engaging in more routine mathematics learning activities such as attending tutoring/classes. This results in students being less trained in non-routine problem-solving exercises, especially in numeracy problems.

Correlation Between Numeracy Ability and Learning Interest

After knowing the results of students' numeracy ability and learning interest, the correlation between the two is explored. The research results show that there is no correlation between students' numeracy ability and learning interest who receive teaching materials based on M-Learning assisted by Microsoft Kaizala. This condition indicates that the influence between numeracy ability and learning interest, and the influence of learning interest on numeracy ability, are still relatively weak. Online learning during the COVID-19 pandemic has had a negative impact on students' numeracy ability and learning interest. This indicates that the implementation of online mathematics learning requires special attention to ensure students achieve good results, especially in numeracy ability. Further research is needed to explore the relationship between numeracy ability and learning interest.

There is no correlation between

students' numeracy ability and learning interest using M-Learning-based teaching materials assisted by Microsoft Kaizala. Therefore, it cannot be assumed that students with high interest are necessarily able to achieve high numeracy ability.

Interviews

In the questions, students responded that it was fun and not boring, but that learning through face-to-face learning would be better for students to understand the material better and more easily. In the second question, students said that learning math was fun when they understood it and the teacher explained it clearly and engagingly. In the third question, students responded that they preferred face-to-face learning because the material was easier to understand. In the fourth question, students responded that they disliked distance learning at school: students didn't understand the material explained by the teacher and were embarrassed to ask questions. In the fifth question, students responded that some enjoyed solving problems in the context of everyday life because they were fun and easy to understand, while others disliked them. In the sixth question, some students responded that they enjoyed learning non-routine problems, while others disliked them.

Discussion

Development of M-Learning Based Teaching Materials

The learning process with Microsoft Kaizala also made students enjoy it. During breaks, the researcher encouraged students to relax and play games within the Microsoft Kaizala application, such as terrestrial, chess, brain training games, etc., to create a comfortable learning environment and enhance their focus. This aligns with the statement (Fitriani et al., 2021) that Microsoft Kaizala is a very easy and interactive learning medium that supports online learning. Based on the development stages above, it can be concluded that M-Learning-based teaching materials assisted by Microsoft Kaizala are suitable for use as teaching materials that have very good quality (valid), practical, and effective.

Numeracy Ability

Numeracy Ability has three indicators. Students' overall numeracy ability is considered moderate. The second indicator, the ability to analyze information presented in various formats (graphs, charts, tables, etc.), is considered high. This indicates that students are able to understand and analyze information presented in problems in the form of tables and charts. Tables, charts, and so on are still visual media. Media are all forms and channels used to convey data or messages. Through these media, students are able to understand and apply them to their daily lives, thus improving their ability to solve problems that arise during their learning.

The first indicator, the ability to use various numbers and symbols related to basic mathematics to solve practical problems in various everyday contexts, is considered moderate. This indicates that students are sufficiently capable of using various numbers and symbols related to basic mathematics to solve practical problems in various everyday contexts. This occurs because some students are still confused and unable to use mathematical modeling, namely using mathematical symbols in story problems, especially those with long narratives related to everyday life that require good literacy ability. The analysis revealed that

students are accustomed to literacy activities at school, but there are obstacles, namely, students' low interest in reading, resulting in suboptimal literacy. The third indicator, namely using the interpretation of analysis results to predict and make decisions, has low criteria. This indicates that many students are unable to understand and analyze the information contained in the problem to answer the problem correctly, and many students still do not answer or leave the problem blank. Understanding and analyzing a problem requires strong mathematical problem-solving and reasoning ability. This aligns with the statement of (Kusumawardani et al., 2018) that reasoning is one of the basic ability in numeracy. Therefore, improving numeracy ability requires good mathematical reasoning.

Learning Interest

Indicators of learning interest include feelings of pleasure, attention, interest, and student involvement. All four indicators are categorized as good. The interest indicator relates to the driving force that encourages students to tend to feel attracted to activities, objects, or people, which can be in the form of effective experiences stimulated by the activity itself. In the interest indicator, almost all students are interested in learning M-Learning-based learning materials assisted by Microsoft Kaizala, this means that students have a driving force that encourages students to feel attracted to the activity itself. In this indicator, students are interested in Microsoft Kaizala-assisted learning materials because they have an attractive appearance, students ask questions if there is something they don't understand through the chat feature. This shows that asking questions is a form of student

interest in the learning process. This is in line with (Tohir, 2016) who stated that if students ask questions it can increase interest in learning, improve students' cognitive abilities, and can increase students' curiosity about a problem. However, in the learning process, students still feel discouraged when working on math problems, especially problems with long narratives. This statement is supported by (Komalasari & Wihaskoro, 2018) who stated that although students frequently encounter word problems, many still struggle to solve math word problems. This aligns with the analysis that shows that school literacy movements have been implemented in schools, but students' reading (literacy) interest remains low.

Furthermore, the indicator of enjoyment is a student's feeling of enjoyment or liking for the subject being studied, which means they must continue studying related knowledge without feeling forced. In the enjoyment indicator, almost all students expressed enjoyment or liking for the subject being studied. In this indicator, teachers, as facilitators, can make learning enjoyable by interspersing it with entertainment, such as the games available in Microsoft Kaizala. This aligns with (Humairah, 2021) statement that utilizing the Kaizala application in mathematics learning is effective in increasing student interest in learning. Next, the indicator of attention. Attention is the concentration or mental activity of observation and understanding, to the exclusion of other aspects. In terms of attention, almost all students were attentive during the learning process using Microsoft Kaizala-assisted M-Learning learning materials. This indicates that students concentrated on the task at hand, ignoring other distractions. This demonstrates that learning requires strong attention. This is

supported by Gage and Berliner's statement (Lubis, 2017), which states that learning is impossible without attention.

The next indicator is student engagement. Student engagement is a person's interest in an object that makes them happy and interested in doing or completing activities related to that object. In terms of student engagement, almost all students were engaged in the learning process using learning materials. This indicates that students are interested in an object, which makes them happy and interested in doing or completing activities related to that object. However, there was still a lack of student interest in engaging in more routine mathematics learning activities, such as attending tutoring sessions. This results in students lacking practice in non-routine problems, especially numeracy. Based on the four indicators of student learning interest in the good category, almost all students showed interest in learning using M-Learning-based teaching materials assisted by Microsoft Kaizala. This is in line with the opinion of (Meliana et al., 2016) in their research, which stated that student learning interest increased after using M-Learning, and students felt their gadgets were more useful in the learning process.

Correlation of Numeracy Ability and Interest in Learning

Based on the research results, there was no correlation between numeracy ability and learning interest of students who received M-Learning-based teaching materials assisted by Microsoft Kaizala. Thus, it can be concluded that the results of numeracy ability have no correlation with student learning interest. Therefore, the results of this study contradict the thesis research conducted by (Syahputri & Khasanah, 2019) which stated a positive and significant relationship between learning interest and students' mathematical literacy abilities.

Researchers have several assumptions that influence the lack of correlation between numeracy ability and learning interest. The results of the study indicate that students with moderate or low numeracy ability exhibit good learning interest. This indicates that students are unable to solve problems effectively, but they do exhibit a high level of learning interest. This suggests that students still lack understanding and are confused about how to use mathematical symbols in word problems in everyday contexts, or that they lack mathematical reasoning ability in answering these problems.

Students' low understanding of mathematical modeling and reasoning is due to a lack of numeracy practice and low reading/literacy ability. This is in line with the analysis that indicates low reading/literacy ability, along with a lack of collaboration between parents, teachers, and schools in improving student literacy. Furthermore, there are no regular activities for numeracy practice at school, resulting in students being unfamiliar with non-routine problems like these, leading to students' inability to understand how to solve them. This may also be related to the results of the analysis that when PJJ students do not understand the material presented by the teacher, and still need direct guidance from the teacher, then students feel embarrassed to send messages to the teacher to ask questions.

Therefore, from the statement above, it can be concluded that there are several weaknesses in online learning during the COVID-19 pandemic regarding students' numeracy ability and learning interests. This statement aligns with the opinion of (Rohmah et al., 2022) who

stated that one of the weaknesses of e-learning-based distance learning is the teacher's limited interaction with students, as the learning process cannot be directly supervised by the teacher. This indicates that implementing online mathematics learning requires special attention to achieve good student achievement, particularly in numeracy ability. This means that students with high interest may not necessarily achieve high numeracy ability. Therefore, further research is needed to examine the relationship between numeracy ability and learning interests.

Interview

From the interview results, in general, mathematics learning using M-Learning-based teaching materials assisted by Microsoft Kaizala attracts students' interest because it is fun and not easily bored, however, because at the time of the research, the school was implementing PJJ and students were studying independently, sometimes it makes things difficult for students because of the obstacles that have been explained in the results chapter.

Implication of Research

Integrating digital platforms into teaching materials can be a practical solution for teachers to optimize flexible and interactive numeracy learning. Integrating digital platforms into teaching materials can be a practical solution for teachers to optimize flexible and interactive numeracy learning. For further research, it's recommended to conduct further research to achieve optimal results. Researchers can reiterate the importance of participating in this quiz training to all students by providing motivation and explaining the benefits of participating, so students can practice

solving non-routine problems (numeracy problems) in a fun way.

Microsoft Kaizala app developers should ensure the app can be used offline and on all smartphone versions.

Limitation

The research was conducted over two weeks, a relatively short timeframe that impacted the learning process, resulting in less than optimal results. During the learning process, some students did not participate in the quizzes on the Microsoft Kaizala app, hindering the learning process. Microsoft Kaizala requires an internet connection to use. Not all smartphones can install the Microsoft Kaizala app, as the minimum Android version is 4.3 and the minimum iOS version is 9.0. Limited data and memory on students' phones hampered the app download process.

CONCLUSION

The effectiveness of the teaching materials is rated as high in numeracy ability, making it effective in improving students' learning outcomes. However, students' numeracy ability using M-Learning-based teaching materials assisted by Microsoft Kaizala. This study reveals a distinct finding that constitutes a novelty. The difference lies in the identification of inhibiting factors within the digital ecosystem. There is no correlation between learning interest and numeracy ability. Unlike previous findings that suggested a positive correlation, this study demonstrates that barriers to digital interaction and limited direct guidance create a gap that prevents high learning interest from automatically converting into strong numeracy reasoning ability. This study demonstrates that numeracy ability require aspects of reading literacy and

mathematical modeling, which cannot be achieved through interest alone but require collaboration between teachers and parents through regular numeracy practice at school and at home. This study provides a new perspective on the paradoxical profile of post-pandemic students: a group of students with "high interest but low ability" due to psychological constraints (embarrassment to ask questions via digital media) and a group with "high ability but low interest" due to the loss of social interaction.

Recommendation:

The developed M-learning teaching materials assisted by Microsoft Kaizala serve as a viable alternative resource for teachers to enhance the modern learning experience. However, since the students' numeracy ability in this study remained in the moderate category, repeated and sustained research across various mathematical topics is essential to achieve more optimal results in the current digital education era. Adequate preparation both in terms of technical infrastructure and pedagogical design is required for the effective implementation of such M-learning materials. Furthermore, future research is encouraged to expand this development by utilizing different digital media and broader instructional content to continuously adapt to the evolving needs of students.

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