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# DEVELOPING CONTEXTUAL MATHEMATICS TEACHING MATERIALS USING KVISOFT FLIPBOOK TO ENHANCE MATHEMATICAL LITERACY

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**ABSTRACT**
Students' mathematical literacy is an essential competency that needs to be developed to address the challenges of 21st-century learning. However, the limited availability of engaging teaching materials that are relevant to real-life contexts remains a major obstacle in improving this ability. This study aims to develop technology-based mathematics teaching materials using Kvisoft Flipbook Maker with a contextual approach to support students' mathematical literacy skills in number pattern material for eighth-grade students at SMPN 1 Bayah. This research employed the Research and Development (R&D) method using the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation stages. The product developed is a flipbook-based mathematics teaching material that integrates indicators of mathematical literacy skills. The product validity test based on expert evaluations indicated that the developed teaching materials were highly valid, with validation scores of 89,16% from material experts, 92,5% from media experts, and 97,22% from education experts. The practicality test results showed that the product was highly practical, with a response rate of 99,44% from educators and 94,93% from students. Furthermore, the effectiveness test based on the N-Gain Score of 57,7% indicated that the product was moderately effective in improving students' mathematical literacy skills. The findings demonstrate an improvement in students' mathematical literacy before and after using the developed teaching materials. Therefore, the technology-based mathematics teaching materials developed using Kvisoft Flipbook Maker with a contextual approach are considered valid, practical, and sufficiently effective in supporting students' mathematical literacy skills.
**Keywords**: contextual approach; kvisoft flipbook maker; mathematical literacy; mathematics teaching materials development.

***ABSTRAK***
*Kemampuan literasi matematis peserta didik merupakan kompetensi penting yang perlu dikembangkan untuk menghadapi tantangan pembelajaran abad ke-21. Namun, keterbatasan bahan ajar yang menarik dan relevan dengan konteks kehidupan sehari-hari masih menjadi kendala dalam meningkatkan kemampuan tersebut. Penelitian ini bertujuan untuk mengembangkan bahan ajar matematika berbasis teknologi menggunakan Kvisoft Flipbook Maker dengan pendekatan kontekstual guna mendukung kemampuan literasi matematis peserta didik pada materi pola bilangan di kelas VIII SMPN 1 Bayah. Penelitian ini menggunakan metode Research and Development (R&D) dengan model ADDIE yang meliputi tahap Analysis, Design, Development, Implementation, dan Evaluation. Produk yang dihasilkan berupa bahan ajar matematika berbasis flipbook yang memuat indikator kemampuan literasi matematis. Hasil uji validitas produk berdasarkan penilaian para ahli menunjukkan bahwa bahan ajar yang dikembangkan berada pada kategori sangat valid, dengan persentase penilaian dari ahli materi sebesar 89,16%, ahli media 92,5%, dan ahli pendidikan 97,22%. Hasil uji kepraktisan menunjukkan bahwa produk termasuk kategori sangat praktis, dengan persentase respon pendidik sebesar 99,44% dan respon peserta didik 94,93%. Selanjutnya, hasil uji*

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*efektivitas berdasarkan N-Gain Score sebesar 57,7% menunjukkan bahwa produk berada pada kategori cukup efektif dalam meningkatkan kemampuan literasi matematis peserta didik. Hasil ini menunjukkan adanya peningkatan kemampuan literasi matematis sebelum dan sesudah penggunaan bahan ajar. Dengan demikian, bahan ajar matematika berbasis Kvisoft Flipbook Maker dengan pendekatan kontekstual dinyatakan layak, praktis, dan cukup efektif untuk mendukung peningkatan kemampuan literasi matematis peserta didik.*
***Kata kunci**: literasi matematis; kvisoft flipbook maker; pendekatan kontekstual; pengembangan bahan ajar matematika.*



## Introduction

Mathematical literacy is an essential competency in mathematics education because it enables individuals to understand, apply, and interpret mathematics in various real-life contexts. According to the OECD, mathematical literacy refers to a person's ability to formulate, use, and interpret mathematics in different situations through reasoning and the application of mathematical concepts, facts, and procedures (Nora Chusna Saputri, Rika Kurnia Sari, & Ayunda, 2021). Therefore, mathematical literacy not only emphasizes mastery of mathematical concepts but also develops students' critical thinking and their ability to make rational decisions when solving real-world problems (Khotimah & Aini, 2022).

However, students' mathematical literacy skills are still relatively low. Preliminary research conducted at SMP Negeri 1 Bayah showed that only about 50% of students achieved mastery in number pattern material. Many students experienced difficulties connecting mathematical concepts with their application in real-life problem-solving situations. In fact, number patterns are fundamental material that plays an important role in developing logical thinking and recognizing mathematical relationships (Chrisnawati & Pratama, 2023). Talib et al. (2024) also state that number patterns contain basic mathematical elements that are frequently used in solving practical problems in everyday life. Therefore, students' limited understanding of number patterns may hinder the development of their mathematical literacy skills.

Various studies have attempted to improve mathematics learning through technology-based media, including digital flipbook-based teaching materials. Research by Sandy et al. (2022) and Anggraini et al. (2022) shows that flipbook-based materials can improve students' conceptual understanding and create a more engaging learning experience. Flipbooks allow learning materials to be presented interactively through the integration of text, images, animations, audio, and video (Wibowo & Pratiwi, 2018). However, most of these studies focus on improving conceptual understanding or learning motivation and have not specifically examined the development of flipbook-based teaching materials designed to support students' mathematical literacy skills.

In addition, several digital learning media used in previous studies are still relatively static and do not sufficiently connect mathematical concepts with real-life contexts. Therefore, there is a need to develop interactive teaching materials that link mathematical concepts with students' real-life experiences. Kvisoft Flipbook Maker enables conventional teaching materials to be transformed into

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interactive digital books that support multimedia elements such as animations, audio, videos, and hyperlinks, providing a more engaging learning experience.

To maximize its potential, this media can be integrated with a contextual learning approach, which connects learning materials with real-life situations so that students can construct meaningful understanding of the concepts being studied (Ahmad & Nasution, 2019). The contextual teaching and learning model is a learning process that connects learning to everyday life, making learning more meaningful (Winarto et al., 2023). This approach supports the development of mathematical literacy skills, particularly in formulating problems, applying concepts, and conducting mathematical reasoning (Noor, Purwosetiyono, Wardani, & Muhtarom, 2024). Pranata, Nindiasari, and Fatah (2020) also state that the contextual approach is effective in improving students' mathematical literacy skills.

Based on these considerations, this study aims to develop mathematics teaching materials using Kvisoft Flipbook Maker integrated with a contextual approach to support students' mathematical literacy skills in number pattern material. This study is expected to contribute to the development of interactive technology-based teaching materials that enhance students' understanding of mathematical concepts and their ability to apply mathematics in real-life contexts.

## Research Methods

This study employed a Research and Development (R&D) approach to develop and evaluate mathematics teaching materials. R&D is a method used to produce educational products and test their effectiveness (Sugiyono, 2013). The development process followed the ADDIE model, which includes five stages: analysis, design, development, implementation, and evaluation (Cahyadi, 2019). The subjects of this study were 30 eighth-grade students at SMP Negeri 1 Bayah, and the research object was contextual mathematics teaching materials developed using Kvisoft Flipbook Maker. Data were collected through interviews, questionnaires, tests, and documentation. The research instruments consisted of non-test and test instruments. Non-test instruments included validation questionnaires completed by subject matter experts, media experts, and education experts, as well as practicality questionnaires filled out by educators and students. Test instruments were used to measure students' mathematical literacy skills. The implementation of the developed teaching materials was conducted over five meetings (2 × 40 minutes each). At the first meeting, students completed a pretest to measure their initial mathematical literacy skills. Learning activities were then carried out using flipbook-based teaching materials through discussions and contextual problem-solving activities. At the final meeting, a posttest was administered to measure the improvement in students' mathematical literacy skills. The mathematical literacy test instrument was developed based on number pattern indicators and validated by experts before use.

The mathematical literacy tests consisted of pretest and posttest questions based on the following indicators: (1) describing mathematical situations using symbols in number patterns; (2) identifying number pattern concepts in problems; (3) constructing mathematical models; (4) designing strategies to determine number patterns; (5) applying mathematical facts, operations, algorithms, and

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structures to obtain solutions; (6) drawing conclusions; and (7) evaluating results (Dinarti, Qomariyah, & Agustina, 2023).

Data analysis techniques included qualitative and quantitative descriptive analysis. Qualitative analysis was used to process preliminary interview data and analyze curriculum, needs, materials, and expert suggestions for product improvement. Quantitative descriptive analysis was used to assess the developed teaching materials based on validity, practicality, and effectiveness. The results were calculated using specific formulas and interpreted according to predetermined categories, as presented in Table 1 and Table 2.

$$V_V = \frac{TV}{TM} \times 100\% \text{ ..... (1)}$$

Description: $V_V$ : Validity score of flipbook maker teaching materials; $TV$ : Total validation score; and $TM$: Total maximum score.

Table 1. Criteria for the Validity of Teaching Materials in Kvisoft Flipbook Maker

| Criteria | Score |
|---|---|
| Very Valid | $85{,}00\% < V_V \leq 100{,}00\%$ |
| Valid | $70{,}00\% < V_V \leq 85{,}00\%$ |
| Less Valid | $50{,}00\% < V_V \leq 70{,}00\%$ |
| Not Valid | $1{,}00\% < V_V \leq 50{,}00\%$ |

(Wati *et al*., 2022)

$$V_p = \frac{TP}{TM} \times 100\% \text{ ..... (2)}$$

Description: $V_p$ : Practicality score of flipbook maker teaching materials; $TP$ : Total score obtained from users; and $TM$ : Total maximum score (Wati *et al*., 2022)

Table 2. Practicality Criteria for Kvisoft Flipbook Maker Teaching Materials

| Crteria | Score |
|---|---|
| Very Practical | $85{,}00\% < V_p \leq 100{,}00\%$ |
| Practical | $70{,}00\% < V_p \leq 85{,}00\%$ |
| Less Practical | $50{,}00\% < V_p \leq 70{,}00\%$ |
| Not Practical | $1{,}00\% < V_p \leq 50{,}00\%$ |

The effectiveness of mathematics teaching materials is measured based on pretest and posttest data obtained from student learning outcomes before and after using mathematics teaching materials created with Kvisoft Flipbook Maker. To calculate the increase in scores between the pretest and posttest, the N-Gain Score calculation is used with the following formula:

$$N - Gain\ Score = \frac{S_o - S_e}{n_{max} - S_e} \text{ ... (3)}$$

Description: $S_o$ : Posttest score; $S_e$ : Pretest score; and $n_{max}$ : Maximum value as presented in Table 3

Table 3. Interpretation of N-Gain Score

| N-Gain Score | Categories |
|---|---|
| $-1{,}00 < g < 0{,}00$ | *Decreased* |
| $g = 0{,}00$ | *Stable* |
| $0{,}00 < g < 0{,}30$ | *Low* |
| $0{,}30 < g < 0{,}70$ | *Keep* |
| $0{,}70 < g < 1{,}30$ | *Tall* |

Hake (2002) in (Nindiasari et al., 2024)

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After that, to determine the effectiveness interpretation category of mathematics teaching materials using Kvisoft Flipbook Maker, Table 4 below can be used as a reference for the effectiveness interpretation:

Table 4. Product Effectiveness Interpretation Category

| Precentage | Interpretation Category |
|---|---|
| $g < 40\%$ | Ineffective |
| $40\% \leq g < 56\%$ | Less Effective |
| $56\% \leq g < 76\%$ | Quite Effective |
| $g \geq 76\%$ | Effective |

(Mulyani, Syamsiah, & L., 2023)

**Results and Discussion**

Based on the ADDIE development stages, the following are the results and discussions explained in more detail based on the ADDIE stages:

1. Analysis

   At this stage, researchers conducted interviews with educators at SMPN 1 Bayah to analyze learning conditions, including curriculum, needs, and material analysis (Hidayat & Nizar, 2021). The results showed that the Merdeka Curriculum had been implemented; however, the use of technology in mathematics learning remained limited, particularly in utilizing computer laboratories. Educators generally relied on traditional methods supported by textbooks, simple worksheets, and occasionally YouTube links. Printed teaching materials tend to be less effective and may reduce student engagement in learning (Pamungkas, 2017, in Nafidah & Suratman, 2021). Therefore, a needs analysis was conducted to identify problems and understand students' needs related to learning media and teaching methods in mathematics learning.

   Material analysis indicated that number patterns were considered difficult, with only about 50% of students achieving the minimum competency standard of 68. This finding aligns with Chrisnawati & Pratama (2023), who state that number pattern material is relatively abstract for junior high school students. At SMPN 1 Bayah, students' main difficulty was connecting mathematical concepts with problem-solving situations. Therefore, more effective teaching interventions are needed to improve conceptual understanding and achieve learning standards. This is also supported by Novianti & Pratama (2022), who state that number pattern material requires strong conceptual understanding.

2. Design

   Researchers will develop mathematics teaching materials using a flipbook maker with a contextual approach to support mathematical literacy skills as teaching materials to support student learning. The design includes: determining the application to be used to develop products for media design; creating a research instrument grid; and creating test instruments in accordance with mathematical literacy skills.

3. Development

   At this stage, researchers developed mathematics teaching materials using Kvisoft Flipbook Maker with a contextual approach to support students'

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mathematical literacy skills on number pattern material for eighth-grade students.

a) Development of Mathematics Teaching Materials.

The developed product is presented in the form of a soft file. The teaching materials consist of a front cover, introduction, textbook identification, table of contents, keywords, general learning outcomes, learning objectives, concept map, figure descriptions, material explanations, example questions, student activity sections, practice questions, group activities, material summaries, glossary, bibliography, and back cover. The final product is an executable file (exe) that can be accessed through a computer.

b) Product Validation Test Results.

Researchers conducted product validation with subject matter experts, media experts, and education experts to determine the suitability of the product.

1) Subject Matter Expert.

This validation aimed to ensure that the material content was aligned with learning objectives, the depth and suitability of the material, and the expected competencies. The validation questionnaire consisted of 10 assessment items. The results showed a total score of 107 with a percentage of 89.16%, which falls into the highly valid category. Detailed results of the subject matter expert validation are presented in Table 5.

Table 5. Expert Material Validity Results

| No. | Aspects Observed | Score Achieved | Percentage |
|---|---|---|---|
| 1. | Material Aspects | 64 | 88,89% |
| 2. | Language Aspects | 22 | 91,67% |
| 3. | Evaluation Aspects | 21 | 87,5% |
| **Total** | | **107** | **89,16%** |

From the table above, the material aspect obtained 88.89%, indicating that the content is relevant and aligned with the learning outcomes, indicators, objectives, and students' needs. The language aspect reached 91.67%, showing that the material is clear, readable, and appropriate for students' level of understanding. Meanwhile, the evaluation aspect obtained 87.5%, indicating that the questions are suitable for measuring students' competency achievement.

2) Media Expert.

This validation aimed to assess the quality of visual appearance, navigation, readability, interactivity, and the suitability of the media design with the characteristics of the target users, ensuring that the product is easy to use, attractive, and effective in supporting learning. The media expert validation questionnaire consisted of 10 assessment items. The results showed a score of 111 with a percentage of 92.5%, which falls into the highly valid category. The details of the media expert validation results are presented in Table 6.

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Table 6. Media Expert Validity Results

| No. | Aspects Observed | Score Achieved | Percentage |
|---|---|---|---|
| 1. | Learning Objective Alignment Aspect | 46 | 95,83% |
| 2. | Design/Appearance Aspect | 43 | 89,58% |
| 3. | Usability Aspect | 11 | 91,67% |
| 4. | Accessibility Aspect | 11 | 91,67% |
| **Total** | | **111** | **92,5%** |

From the table above, the learning objective alignment aspect obtained 95.83%, indicating that the product supports the achievement of objectives, activities, assessments, and learner characteristics. The design/appearance aspect reached 89.58%, showing that the media is visually attractive and well structured, although several elements such as graphics, colors, and layout can still be improved. Meanwhile, the usability and accessibility aspect obtained 91.67%, indicating that the learning media is easy to use and accessible on available devices.

3) Education Experts.

Product validation by education experts aims to assess products to ensure they meet educational standards, learning approaches used, the needs of students, and are effective in supporting overall learning. The education expert validity questionnaire consists of 6 assessment items, with the validation results showing a score of 70 with a percentage of 97,22% and categorized as highly valid. The following are the details of the media expert validity results presented in Table 7.

Table 7. Expert Education Validity Results

| No. | Aspects Observed | Score Achieved | Percentage |
|---|---|---|---|
| 1. | Content Aspects | 35 | 97,22% |
| 2. | Material Presentation Aspects | 35 | 97,22% |
| **Total** | | **70** | **97,22%** |

From the table above, the percentage of content and presentation aspects is 97,22% respectively. The content in the teaching materials is highly relevant and supports the level of difficulty and abstraction of the concepts for students. It has been compiled in accordance with the curriculum and student needs to support the optimal achievement of competencies. The presentation of material and sample questions is designed systematically, making it easier for students to understand the concepts being taught.

From the three validators, namely subject matter experts, media experts, and education experts, the average validity results are as shown in Table 8.

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Table 8. Average Validity Results of Experts

| No. | Validator | Validity Level | Percentage |
|---|---|---|---|
| 1. | Subject Matter Expert | Very Valid | 89,16% |
| 2. | Media Expert | Very Valid | 92,5% |
| 3. | Education Expert | Very Valid | 97,22% |
| **Average validity of 92.96% with very valid criteria.** | | | |

From the table above, this study produced Kvisoft Flipbook Maker-based mathematics teaching materials with a contextual approach to support students' mathematical literacy. The validity of the teaching materials reached 92.96%, which is categorized as very valid, indicating that the materials meet the expected quality standards. Similar findings were reported by Nenohai, Sudirman, Naat, and Sarifudin (2022). Maesaroh, Ihsanudin, and Khaerunnisa (2022) also found that flipbook-based teaching materials are feasible for learning. Hiralda and Zulherman (2023) further stated that Kvisoft Flipbook Maker-based teaching materials have high validity and are suitable for classroom use. The contextual approach is considered effective in improving students' understanding of mathematical concepts and mathematical literacy because it makes learning more meaningful and relevant. Rahayu et al. (2023) explained that contextual learning helps students understand mathematical concepts through real-life situations. Kifayah and Kusuma (2024) also reported that contextual learning can support the development of students' mathematical literacy skills. From a theoretical perspective, contextual learning is closely related to constructivist learning theory, which emphasizes that students actively construct knowledge through interactions with real-life situations. Through mathematical problems connected to everyday contexts, students are encouraged to interpret, model, and apply mathematical concepts as essential components of mathematical literacy. Therefore, integrating contextual learning in flipbook-based teaching materials can facilitate deeper conceptual understanding and support the development of students' mathematical literacy skills. These findings are also consistent with Vygotsky's theory of the Zone of Proximal Development (ZPD), which highlights the role of real-life experiences and social interaction in understanding abstract concepts (Rahmawati & Purwaningrum, 2022).

Based on expert assessment and deemed feasible, the product proceeded to the implementation stage. The following is an overview of the mathematics teaching materials product using Kvisoft Flipbook Maker, which has been deemed valid by experts:

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Figure 2. Front Cover Display

Figure 3. Foreword Display and Textbook Identity

Figure 2 presents the front cover of the developed teaching materials, while Figure 3 shows the foreword and textbook identity. These sections introduce the learning objectives, the contextual approach used, and the integration of mathematical literacy indicators within the material.

Figure 4. able of Contents, Keywords, General Learning Outcomes, and Learning Objectives

Figure 5. Concept Map Display and Information about Figures

Figure 4 presents the table of contents, keywords, and learning objectives, while Figure 5 shows the concept map and figure descriptions related to the number pattern material.

Figure 6. Introduction to the Material

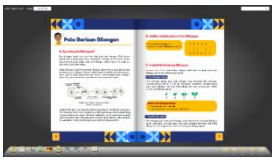

Figure 7. Display of Material Content

Figure 6 presents an introduction to number pattern material, while Figure 7 shows the main content of the developed teaching materials. The material is supplemented with codes indicating mathematical literacy indicators and includes contextual learning activities related to constructivism and modeling. These activities present real-life examples of number patterns followed by questions that encourage students to provide other examples. This design helps students connect mathematical concepts with real-world situations, which is an important aspect of mathematical literacy. Previous studies also show that contextual-based learning materials can improve students' conceptual understanding and their ability to apply mathematics in everyday situations. Therefore, integrating contextual tasks within flipbook-based teaching materials supports students in actively constructing knowledge and developing mathematical literacy skills.

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Figure 8. Example of Number Pattern Problems

Figure 9. View of the Student Room and Group Activities

Figure 8 presents examples of number pattern problems adapted to real-life contexts, while Figure 9 shows student discussion and group activities designed to support contextual learning.

Figure 10. Practice Questions Display

Figure 11. Glossary and Bibliography Display

Figure 12. Back Cover Display

Figure 10 presents exercises related to number patterns and summarizes the key concepts of the material. Figure 11 shows the glossary and references used in developing the teaching materials, while Figure 12 displays the back cover containing motivational closing remarks. The high validation results are influenced by several factors, including the alignment of the material with the curriculum and students' cognitive levels, the clarity and completeness of the presented concepts, and the attractive flipbook design. The flipbook uses clear layouts, appropriate color combinations, and interactive features that enhance student engagement. In addition, the material structure follows the curriculum, ensuring that the learning content supports the competencies that students need to achieve.

4. Implementation
   a) Product Practicality Test Results

Product practicality was assessed by filling out educator response questionnaires and student response questionnaires by educators and students of SMPN 1 Bayah, consisting of three mathematics educators and 30 students from class VIII-A. The following table shows the results of the educator and student response questionnaires:

Table 9. Average Results of Educator & Student Response Questionnaires

| No. | Respondent | Percentage | Criteria |
|---|---|---|---|
| 1. | Educators | 99,44% | Very Practical |
| 2. | Students (VIII-A) | 94,93% | Very Practical |
| | **Total** | **97,18%** | **Very Practical** |

The practicality of the teaching materials reached 97.18%, which was categorized as very practical based on the accumulated average of the questionnaires from educators and students. This practicality shows that the teaching materials are easy to use, support interactive learning, and

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increase student interest, as supported by research by Ningtyas, Triwahyuningtyas, & Rahayu (2020). In addition, Repi, Kaunang, & Pulukadang (2022) also stated that teaching materials created with Kvisoft Flipbook Maker are interactive and can help students understand the learning material. The high practicality score also indicates that the teaching materials are easy to access and use during the learning process. The flipbook format allows students to use the materials through a computer or digital device without having to carry printed textbooks, making the learning process more efficient and flexible.

b) Product Effectiveness Test Results

1) Normality Test

The normality test was conducted through pre-tests and post-tests on students in class VIII-A to measure their mathematical literacy skills. The data was analyzed for normality using the Shapiro-Wilk method with SPSS Version 25 in Table 10.

Table 10. Normality Test Results

| | Shapiro-Wilk | | |
|---|---|---|---|
| | **Statistic** | **df** | **Sig.** |
| Mathematical Literacy Pretest | .939 | 30 | .088 |
| Mathematical Literacy Posttest | .932 | 30 | .054 |

Normality Test ResultsBased on Table 10, it is known that the significance value obtained from the pretest was 0,088 and from the posttest was 0,054. These two results show that the significance values of the pretest and posttest were $\geq 0.05$, which means that the tested data was normally distributed.

2) T-test (Paired Sample T-Test)

Next, after testing the normality of the data, a T-test was conducted as a hypothesis test. This hypothesis test was conducted to compare the average pretest and posttest scores of the same class after being given treatment in the form of mathematics teaching materials using Kvisoft Flipbook Maker in Table 11 and Table 12.

Table 11. Paired Sample Statistic

| | Mean | N | Std. deviation | Std. Error Mean |
|---|---|---|---|---|
| Mathematical Literacy Pretest | 29.6667 | 30 | 11.13656 | 2.03325 |
| Mathematical Literacy Posttest | 70.5000 | 30 | 14.10246 | 2.57474 |

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Table 12. Paired Sample T-Test Results

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Pretest Literasi Matematis - Posttest Literasi Matematis | -40.83333 | 15.31752 | 2.79658 | -46.55299 | -35.11368 | -14.601 | 29 | .000 |

Based on Table 12, the sig. value (2-tailed) is $< 0.05$, which means that there is a significant difference before and after the use of mathematics teaching materials using Kvisoft Flipbook Maker.

3) N-Gain Test

The N-Gain test was conducted to assess the effectiveness of using Kvisoft Flipbook Maker mathematics teaching materials based on the pretest and posttest scores of students in class VIII-A ini Table 13.

Table 13. N-Gain Test Results

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| NGain_Score | 30 | .22 | 1.00 | .5771 | .20049 |
| NGain_Persen | 30 | 22.22 | 100.00 | 57.7067 | 20.04878 |

The effectiveness of the teaching materials was measured through improvements in students' pretest and posttest results on mathematical literacy skills. The results fall into the maintain/keep category and are interpreted as quite effective with a percentage of 57.7%, as shown in Table 13. The average score increased from 29.67% to 70.5% after using the developed product (Table 11). This fairly effective category may be influenced by several factors, including the low pretest scores indicating that students' initial mathematical literacy skills were still limited, the relatively short implementation period that required students to adapt to the teaching materials, and the high difficulty level of the evaluation questions, which also affected the posttest results despite the observed improvement.

Nevertheless, the teaching materials received very good validation results because the content matches students' cognitive levels, the concepts are presented clearly and systematically, and the flipbook design is visually attractive and easy to navigate. The material structure is also aligned with the applicable curriculum, supporting the relevance of the learning content. With further optimization and longer implementation, these teaching materials have the potential to achieve higher effectiveness. The following is an example of the results of the pretest and posttest conducted by the students:

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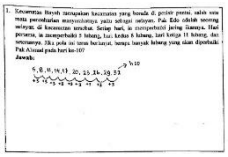

Figure 13. Pretest Result

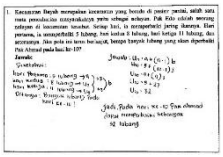

Figure 14. Posttest Result

Figures 13 and 14 show an improvement in students' abilities based on their pretest and posttest results. The questions measure mathematical literacy indicators, particularly describing mathematical situations using symbols in number patterns. The pretest results indicate that students' answers were still simple and did not meet the expected mathematical literacy indicators, while the posttest results show significant improvement. This finding is consistent with previous studies showing that digital teaching materials and contextual learning can enhance students' understanding of mathematical concepts and improve mathematical literacy.

The results also support Anggraini et al. (2022), who found that teaching materials assisted by Kvisoft Flipbook Maker effectively improve student learning outcomes. According to Piaget (1971) in Arafah et al. (2023), effective learning occurs when students actively construct understanding through experience and interaction. The contextual approach helps students relate mathematical concepts to real-life problems, as reflected in the improvement of pretest and posttest results. In addition, Kvisoft Flipbook Maker supports interactive and visual learning, encouraging students to explore concepts independently and engage actively with the material. This condition enables students to interpret problems, represent them mathematically, and determine appropriate solution strategies. Within the PISA framework (OECD, 2019), these teaching materials also support mathematical literacy by helping students formulate, employ, and interpret mathematical situations in everyday problem solving.

5. Evaluation

In the final stage, data from all stages of ADDIE were collected to refine the product according to suggestions from subject matter, media, and education experts. The researchers realized that there were still shortcomings in this teaching material and hoped that further research could refine it to make it better, more complete, and more useful.

## Conclusion and Suggestion

The development of mathematics teaching materials based on Kvisoft Flipbook Maker with a contextual approach has been proven to be valid, practical, and effective in supporting students' mathematical literacy skills. Developed using the ADDIE model, the product's validity was confirmed through expert evaluation, while its practicality and effectiveness were demonstrated through classroom implementation. The improvement in students' mathematical literacy skills

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occurred because the teaching materials integrate contextual problems, interactive digital media, and structured learning content that help students connect mathematical concepts with real-life situations. These findings are consistent with previous studies showing that flipbook-based and contextual learning materials can enhance students' engagement and understanding of mathematical concepts. Therefore, this teaching material can serve as an innovative alternative for teachers to improve students' mathematical literacy through interactive learning relevant to everyday life while contributing to the development of digital-based mathematics learning media.

For future research, the product is recommended to be developed in HTML format so it can be accessed through mobile browsers. In addition, the teaching materials should be implemented more intensively and over a longer period to obtain more optimal results. Practically, teachers can use these materials as digital learning resources to support contextual learning activities and encourage students to actively engage in solving mathematical problems. Future researchers may also expand the material scope beyond number patterns.

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