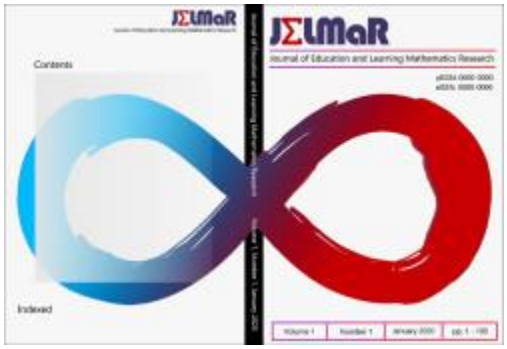

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Develpoment of Digital Teaching Material Bades on Numeration Numeracy For 4th Class Primary School

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***Abstract**: Indonesian students' mathematical literacy abilities are at a low level. Students have not been able to solve problems that require logical and applied thinking. So, teaching materials are needed that can facilitate critical thinking skills based on numeracy literacy which refers to 21st century learning by optimizing technology in learning. The teaching materials developed refer to several mathematical applications such as facts, operating principles, and problem solving in everyday life. The research method used in this research is Research and Development (R&D) with the ADDIE model consisting of Analysis, Design, Development, Implementation and Evaluation. The research results show that digital teaching materials are suitable for use based on validation results by material experts, media experts and language experts. Practical digital teaching materials are used based on the results of teacher and student response questionnaires.*
***Keyword**: digital teaching materials, numeracy literacy*

INTRODUCTION

Indonesia's mathematical literacy achievements were reviewed from Programme for International Student Assesment (PISA) in 2003, Indonesian students were ranked 39th out of 40 sample countries, in 2006 Indonesia was ranked 38th out of 41 countries, in 2009 it was ranked 61st out of 65 countries, and in 2015 Indonesia was ranked 62nd out of 70 countries (Afriyanti, Wardono, and Kartono 2018). This shows that Indonesian students' ability to solve problems in mathematics is still very low. Currently, the demands of the 21st century emphasize 4C-based competencies which include critical thinking, collaboration, communication and creativity. Apart from that, the literacy skills that students need to master are numeracy literacy and digital literacy (Faridah, Afifah, and Lailiyah 2022). These competencies are obtained so that students can survive, compete and face global challenges. So, innovation is needed in learning so that the learning process is more effective.

One of the prerequisites for realizing skills in the 21st century is improving literacy skills in students (Faridah et al. 2022). Numeracy literacy is the ability to analyze and understand a statement packaged through activities in manipulating symbols or language in everyday life and expressing it verbally or in writing (Ekowati et al. 2019). Numeracy literacy skills will be even more attractive if they are balanced with digital literacy to strengthen students' skills in competing globally (Faridah et al. 2022).

Quality education can be realized through efforts to synergize all educational components optimally so that the interaction process between students and learning resources can run in accordance with the learning setting (Cahyadi 2019). Teaching materials are materials that students must learn as a means of learning that contain knowledge, skills and attitudes related to certain competencies (Kosasih 2021). Teaching materials are an important part in determining the quality of learning (Cahyadi 2019).

This research aims to develop digital teaching materials based on numeracy literacy with reference to 21st century learning by optimizing technology in learning. Currently SD Muhammadiyah Pangkalpinang has facilitated tabs that can be used in the learning process. So its use requires a variety of learning innovations that can be integrated. The digital teaching materials developed are used to facilitate intellectual property and help overcome mathematics learning difficulties for Pangkalpinang Muhammadiyah Elementary School students. The digital teaching materials developed refer to numeracy literacy by utilizing the Canva application and referring to several mathematical applications such as facts, operating principles, and problem solving in everyday life. The problem formulation in this research is "How to develop digital teaching materials based on numeracy literacy for fourth grade students at SD Muhammadiyah Pangkalpinang".

METHOD

The research method used in this research is Research and Development (R&D). This research uses the ADDIE research and development model which consists of Analysis, Design, Development, Implementation, and Evaluation (Sugiyono 2019). The steps for this research are 1) Analysis, learning programs in schools already support the use of learning tablets but the teaching materials used are still not digital-based. 2) Design, digital teaching materials are needed that can be used to support learning activities, especially MTK learning. 3) Development, development of digital teaching materials for MTK subjects and product validation by material, media and language experts. 4) Implementation, to determine the practicality of the product, a product trial is carried out to determine the practicality of the digital teaching material product being developed.

RESULT AND DISCUSSION

This research was carried out in 4 stages, including analysis, development, design and implementation. In the first stage the researcher analyzed the problems and needs of the field. Based on the results of the analysis, schools have provided tablets and infocus in every class but this has not been balanced with the availability of digital teaching materials. According to the class IV teacher, the most difficult subject for students to master is Mathematics. Therefore, this research seeks to develop digital teaching materials for Phase B mathematics subjects.

The second stage is design, the researcher designs the product by considering the suitability of learning outcomes and learning objectives according to Phase B. This product is also developed based on indicators of numeracy literacy abilities. The teaching materials developed refer to several mathematical applications such as facts, operating principles, and problem solving in everyday life.

The third stage is development. At this stage the researcher validates the product with material, media and language experts. Then, researchers revised the product according to comments and suggestions from experts. Based on suggestions from material experts "add examples and practice questions". Advice from language experts "pay attention again to spelling errors in writing". Advice from media experts is "add page numbers and improve margins".

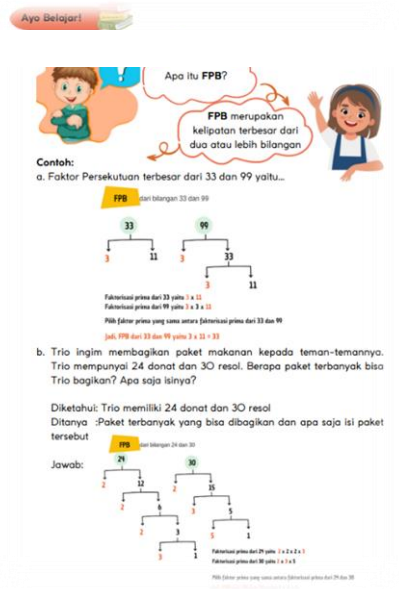

Figure 1. Before Revision

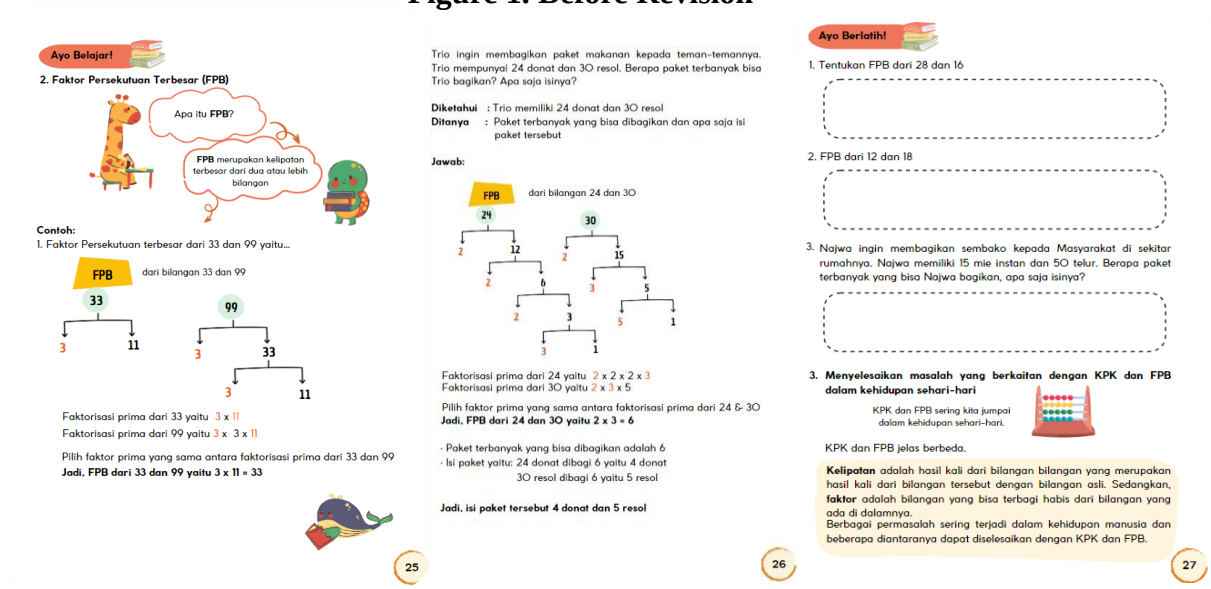

Figure 2. After Revision

Based on the assessment of material experts in terms of the suitability of digital teaching materials with the curriculum and integration of numeracy literacy, the overall average score was 4.30 with the criteria "very valid". The media expert's assessment in terms of design aspects, principles and suitability of digital teaching materials with tablet proportions overall received an average score of 4.50 with the criteria "very valid". Meanwhile, the linguist's assessment in terms of accuracy in the use of writing and language as well as ease in understanding language structure as a whole received an average score of 4.33 with the criteria "very valid".

The validity results of digital teaching material products in more detail can be seen in the table below.

Table 1. Material Expert Validation

No.	Aspect	Scor	Average Scores	Criteria
1.	Conformity to the Curriculum	22	4,40	Very Valid
2.	Numeracy Literacy	21	4,20	Very Valid

	Integration			
Overall Aspects		43	4,30	Very Valid

Table 2. Media Expert Validation

No.	Aspect	Scor	Average Scores	Criteria
1.	Numeracy Literacy Digital Teaching Material Design	49	4,45	Very Valid
2.	Principles of Digital Teaching Material Design Based on Nuemeracy Literacy	31	4,43	Very Valid
3	Suitability of Digital Teaching Materials	19	4,75	Very Valid
Overall Aspects		99	4,50	Very Valid

Table 3. Linguist Validation

No.	Aspect	Scor	Average Scores	Criteria
1.	Accuracy in the Use of Writing and Language	13	4,33	Very Valid
2.	Ease of understanding language structure	13	4,33	Very Valid
Overall Aspects		26	4,33	Very Valid

The fourth stage is implementation. At this stage, researchers conducted product practicality tests to see student and teacher responses regarding the digital teaching materials being developed. The trials used in this research were small-scale and large-scale trials. The small-scale trial involved 9 students and 1 teacher. The class teacher in the small scale trial argued that "The teaching materials developed have referred to the Merdeka curriculum. The material provided is detailed and related to everyday life. The illustrations presented can attract students' attention so that students are more interested in learning. "A little advice, illustrations that are not related to the material should be reduced so as not to disturb students' focus."

The large-scale trial involved 54 students and 2 teachers. The teacher's response was very good to the media developed. G1 stated "the digital textbook developed is very interesting, the material and example questions displayed are very easy to apply" while G2 thought "the textbook developed is interesting to use".

Based on the teacher questionnaire, in terms of suitability of teaching materials to the curriculum, integration of numeracy literacy, language and presentation, the small scale test got a score of 4.77 with the "Very Practical" criterion, while on the large scale the average score was 4.86 with the "very practical" criterion. The results of the teacher questionnaire regarding the practicality of the digital teaching materials being developed can be seen in the following table.

Table 4. Teacher Response Questionnaire

No.	Aspect	Average Scores	
		Small Scale	Large scale
1.	Conformity to the curriculum	5,00	5,00
2.	Integration of numeracy literacy	4,20	5,00
3.	Language	4,80	4,90
4.	Display	5,00	4,64
Overall Aspects		4,77	4,86
Criteria		Very Practical	Very Practical

Based on the student questionnaire, in terms of ease of understanding learning material, visual attractiveness and ease of language, the small scale test got a score of 4.41 with the "Very Practical" criterion, while on the large scale the average score was 4.59 with the "very practical" criterion. The results of the teacher questionnaire regarding the practicality of the digital teaching materials being developed can be seen in the following table.

Table 5. Student Response Questionnaire

No.	Aspect	Average Scores	
		Small Scale	Large scale
1.	Ease of understanding learning material	4,25	4,57
2.	Language	4,56	4,64
3.	Display	4,42	4,59
Overall Aspects		4,41	4,59
Criteria		Very Practical	Very Practical

Based on research results, the digital teaching materials developed are valid and practical. Digital teaching materials refer to the Merdeka curriculum, are interesting, easy to understand, and integrated with problem solving in everyday life. The need for numeracy literacy is needed in all aspects of life (Ekowati and Suwandayani 2019). To have good literacy skills, students must be able to think and communicate with various strategies involving concrete and abstract objects (Mahmud and Pratiwi 2019). The digital teaching materials developed already contain content and a collection of questions based on numeracy literacy. So that teachers can use it directly in the learning process.

CONCLUSION

Digital teaching materials are needed to meet digitalization and technology-based learning needs. Apart from that, learning innovations are needed that can facilitate mathematics learning so that it can be learned in a fun way, but still refers to problems in everyday life. The development of digital teaching materials for mathematics subjects can facilitate students' numeracy literacy skills because they refer to several mathematical applications such as facts, operating principles, and problem solving in everyday life. Based on research results, the digital teaching materials developed are valid and practical based on material/media/language experts and student/teacher responses. However, trials regarding the effectiveness of the product are needed in further research to determine the effect of the developed teaching materials on the numeracy literacy abilities of fourth grade elementary school students.

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