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Numeraktif: development of a numeracy activity book based on democratic parenting for elementary school students

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Abstract

Numeracy skills are a foundational component of primary education; however, national assessments indicate that Indonesian students' numeracy proficiency remains suboptimal. One often-overlooked factor in the development of numeracy learning materials is the role of parenting styles—particularly democratic parenting—which supports children's autonomy and active participation in the learning process. This study aims to develop a numeracy activity book titled Numeraktif, grounded in the principles of democratic parenting, to enhance numeracy learning among primary school pupils. The research adopts a Research and Development (R&D) methodology, utilizing a simplified version of the Borg and Gall model, encompassing seven stages: preliminary study, planning, product draft development, expert validation, revision, limited trials, and final revision. Content and media experts conducted the validation process, while practicality and effectiveness were assessed through trials involving students, teachers, and parents. The validation results demonstrated a high level of feasibility, with an average score of 4.6. The practicality test yielded a score of 4.3, indicating the material's usability and engagement value. Furthermore, the effectiveness test revealed a mastery level of 90%, underscoring the product's significant impact on improving students' numeracy skills. These results affirm that the Numeraktif activity book is both pedagogically sound and responsive to learners' psychosocial needs, presenting a promising and innovative approach to numeracy education in Indonesian primary schools.

INTRODUCTION

Background of the Study

The Indonesian government, through the Ministry of Education, places strong emphasis on literacy, numeracy, and character development as core competencies that must be mastered by students (Prananto et al., 2023; Rochmat et al., 2022; Santoso et al., 2024; Widiyasari & Eminita, 2023). Numeracy refers to the ability to identify, understand, and solve problems involving mathematical concepts, and it requires critical and strategic thinking skills to navigate situations that demand mathematical solutions (Díez-Palomar et al., 2023; Hoogland, 2023; Tout, 2020). It is recognized as one of the essential competencies for life in the 21st century—not merely involving the ability to calculate, but also encompassing logical reasoning, analytical skills, and problem-solving in real-life contexts. Numeracy is intrinsically linked to everyday life, as it constitutes a life skill (Gal et al., 2020; Hoogland, 2023). These abilities are vital, serving as a fundamental foundation that influences academic progression, the fulfilment of daily life needs, employment opportunities, and social engagement (Singh & Agarwal, 2024).

Numeracy supports students in developing critical thinking, problem-solving, and informed decision-making skills (Jannati et al., 2025; Novitasari et al., 2022; Yustitia et al., 2025). These competencies enable learners to think logically and analytically in various situations. Unfortunately, data from the Programme for International Student Assessment (PISA) indicate that Indonesia ranks 68th, with scores of 366 in mathematics, 383 in science, and 359 in reading (OECD, 2023). These results suggest that over the past two decades, Indonesia has remained far below the global average, with no significant progress. This is a serious concern, as poor numeracy skills negatively impact students' ability to tackle problems requiring logical and analytical reasoning (Chinn, 2020; Novitasari et al., 2022). Students with low numeracy skills often struggle to apply mathematical concepts to real-life situations, which creates gaps in their problem-solving abilities (Chinn, 2020). Given the importance of these skills, numeracy has been integrated into the Indonesian national curriculum.

The latest Indonesian national curriculum provides flexibility for schools and teachers to identify and address students' learning needs(Hunaepi & Suharta, 2024; Laila et al., 2025; Simarmata & Mayuni, 2023). Through this approach, the "Merdeka Curriculum" is expected to promote educational equity—not by assuming uniform treatment for all students, but by empowering schools and teachers to respond to

individual learning needs through instruction tailored to students' developmental levels. Literacy and numeracy are core components of the national curriculum, as these are key competencies assessed in the Minimum Competency Assessment (AKM). Results from the National Assessment indicate that many elementary school students still struggle to grasp basic numeracy concepts, particularly when solving problems that require contextual understanding and meaningful application (Anggraini & Setianingsih, 2022; Naila et al., 2024).

Various strategies have been developed to improve children's numeracy skills, including the use of instructional media, contextual learning, and project-based approaches (Rahmi et al., 2025; Sumarno et al., 2022). However, these strategies often overlook the psychological and sociocultural dimensions that influence children's engagement in learning, such as the nature of relationships between children and adults in their learning environment. One aspect that remains underexplored in numeracy material development is the role of parenting, particularly democratic parenting, in fostering children's independence and active participation in learning.

Previous studies have shown that democratic parenting is positively correlated with children's learning engagement, self-confidence, and metacognitive abilities (Fitrianto et al., 2025; Mayangsari et al., 2024b; Wolf et al., 2024). This approach views children as active participants in the learning process—an orientation that aligns well with numeracy instruction, which demands active involvement and cognitive flexibility. Nevertheless, the integration of democratic parenting values into the design of numeracy activity books remains limited, especially for elementary school students.

Based on interviews and needs analysis involving parents, teachers, and students at the elementary level, several challenges in numeracy learning were identified. Parents expressed strong support for numeracy education and even voiced a desire for home-based numeracy programs that allow for collaborative learning between parents and children. Some parents felt that more concrete learning methods, such as daily life-based activities, could help children better understand numeracy concepts. These views were echoed by teachers, who reported that parental involvement greatly supports student achievement. Therefore, a clear need emerges to develop a numeracy activity book that fosters collaboration between children and their parents.

The Problem of The Study

Awareness of the importance of numeracy as a fundamental 21st-century skill continues to grow. However, elementary school students in Indonesia still face

significant challenges in mastering essential numeracy competencies (Deda et al., 2023; Iswara et al., 2022; Nityasanti et al., 2025). The 2022 PISA results revealed that Indonesian students' numeracy performance remains far below the OECD average, with only 18% of students reaching Level 2—the minimum level required to participate effectively in daily life and future learning (OECD, 2023). This condition highlights a substantial gap, both in students' cognitive understanding of mathematical concepts and in the instructional approaches used in numeracy education in schools.

Recent studies have shown that numeracy instruction in Indonesia is still largely dominated by procedural, textbook-based approaches that tend to lack contextual relevance and fail to actively engage students (Dewi et al., 2025; Gumilar & Ismail, 2023). Moreover, most available numeracy learning materials have yet to optimally incorporate the social and psychological dimensions of learning, including parenting factors that have been shown to significantly affect children's engagement and learning autonomy (Aminulloh et al., 2021).

One parenting style considered relevant but rarely integrated into numeracy instruction is democratic parenting (Nofrizal et al., 2020; Wati et al., 2025). This approach is characterized by warmth, support for autonomy, and open communication, and has been found in numerous studies to promote children's motivation and active participation in learning. Nevertheless, the development of numeracy learning materials that incorporate democratic parenting values remains very limited, especially for elementary school students.

Therefore, this study aims to address the need for innovative numeracy learning resources that not only focus on cognitive aspects but also embrace a humanistic approach that integrates democratic parenting principles. Through the development of the numeracy activity book *Numeraktif*, this research seeks to fill both practical and theoretical gaps in the literature, while also contributing meaningfully to the improvement of numeracy learning quality in Indonesian primary schools.

Research's State of the Art

The development of numeracy skills among elementary school students has become a global concern, as these competencies serve as the foundation for logical thinking, problem-solving, and decision-making in everyday life (Novitasari et al., 2022; OECD, 2023; Prananto et al., 2023). In Indonesia, various instructional approaches have been implemented to address students' low numeracy achievement. However, most of these approaches remain cognitive in nature and emphasize

procedural learning (Barbieri et al., 2020). This indicates a need for innovation in numeracy learning materials that takes into account affective and contextual dimensions.

Instructional models that incorporate real-life contexts, such as Realistic Mathematics Education (RME), have been shown to positively impact students' conceptual understanding and learning motivation (Mardia et al., 2024; Ramadhan et al., 2022). Nevertheless, such approaches often lack integration of children's social and emotional connections with their environment, such as the role of parenting in shaping attitudes and learning habits. Research on the influence of parenting styles on learning engagement and autonomy has shown that democratic parenting—characterized by open communication, respect for children's opinions, and support for autonomy—positively contributes to the academic development of elementary-aged children (Anggreni & Dibia, 2022; Kamaruddin et al., 2023; Oktaliana et al., 2021). his parenting style is closely associated with self-regulated learning and intrinsic motivation, both of which are crucial in numeracy learning.

However, a review of the literature reveals a significant lack of research explicitly connecting the development of numeracy learning materials with democratic parenting approaches, particularly within the context of the national curriculum in elementary schools. Existing numeracy activity books tend to be standardized and are rarely designed to promote reflective interaction between children, teachers, and parents in an egalitarian and democratic manner. Therefore, this study offers a novel contribution by integrating contextual numeracy material development with the core values of democratic parenting. It also emphasizes the design of activity books that foster active student engagement and create inclusive, dialogical learning environments—an area that remains underexplored in current elementary school teaching practices.

As such, this research expands the scope of numeracy material development by enriching it with social-emotional dimensions in instructional design. It also provides both theoretical and practical contributions to the field of character-based and participatory elementary education.

Novelty, Research Gap, & Objective

This study introduces a novel approach to the development of numeracy learning materials by integrating democratic parenting, a perspective that has rarely been explicitly embedded in mathematics instruction design at the elementary school level, particularly in Phase C. The activity book *Numeraktif* not only presents

contextual numeracy tasks but is also designed to foster reflective, participatory, and dialogical interactions among students, teachers, and parents. Another key innovation lies in the integration of context-based numeracy and democratic values within the learning process—dimensions that are still underutilized as foundations for the development of mathematics learning materials in Indonesia.

A review of the literature reveals that most studies on numeracy material development focus on learning strategies and technological supports (Mardia et al., 2024; Ramadhan et al., 2022), while the role of parenting—particularly democratic parenting—in numeracy learning, both in formal and informal settings, remains largely unexplored. Studies on the effects of democratic parenting tend to be disconnected from curriculum development or numeracy instructional material research (Anggreni & Dibia, 2022; Oktaliana et al., 2021). Furthermore, most numeracy research still emphasizes cognitive development, without sufficiently considering the influence of social and emotional interactions in children's numerical reasoning processes. This gap is precisely what this study seeks to address.

Based on the preliminary studies described above, this research aims to: (1) describe the validity of the numeracy activity book *Numeraktif* for Phase C elementary students by integrating a democratic parenting approach; (2) assess the practicality of the activity book for Phase C students; and (3) examine the effectiveness of *Numeraktif* in supporting numeracy learning for Phase C elementary students within the framework of democratic parenting.

METHOD

Type and Design

This study adopts a Research and Development (R&D) approach, based on the development model proposed by Borg and Gall. This model was selected for its systematic steps in developing and evaluating educational products that are grounded in real-world needs. The focus of the research is the development of a numeracy activity book titled *Numeraktif*, which integrates a democratic parenting approach for Phase C elementary school students.

The development process follows ten stages, including needs analysis, planning, design development, preliminary field testing, revision, main field testing, final revision, product validation, dissemination, and implementation. The scheme for conducting this research and development process is illustrated in Figure 1 below.

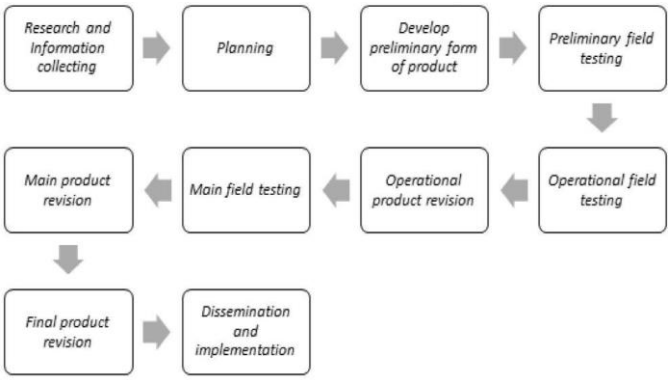

Figure 1. Borg & Gall Development Scheme

The research and development (R&D) process based on the Borg & Gall model typically involves ten stages. However, in this study, the stages were simplified into nine to better align with the research's specific needs and characteristics. In the development of the *Numeraktif*-based numeracy activity book, this simplification aimed to ensure efficiency and relevance throughout the process. The adjustments were made by considering time constraints, available resources, and the primary research focus—namely, to produce a valid, practical, and effective educational product. The rationale for these adjustments is outlined as follows:

1. Importance of systematisation: The nine stages provide a clearly structured framework from start to finish. This structure ensures that each stage receives appropriate attention so that the final product—the numeracy activity book—meets expectations.
2. Problem identification: The initial stage focuses on analysing educational needs and numeracy problems faced by students. This ensures that the developed book is relevant and responsive to actual classroom challenges.
3. Initial product design: Based on the problem identification stage, the researchers designed a numeracy activity book tailored to the characteristics of Phase C students and grounded in a democratic parenting approach.
4. Development and trials: Through a series of trials, involving both small and large groups, the researchers evaluated and refined the product to enhance its effectiveness and educational relevance.
5. Revision and improvement: Feedback from the trials was used to revise and improve the quality of the book. After multiple cycles of evaluation and revision, the numeracy activity book is expected to be ready for broader implementation.

The research subjects were fifth-grade students at a public elementary school in Temanggung Regency. A total of twenty-two students and their parents participated in the study.

Data Collection Technique

Data were collected through interviews, observations, and questionnaires.

Observation

Observations were conducted to gather information regarding issues occurring in the school, particularly the challenges experienced by students during the learning process. Through observation, the researchers were able to identify the availability of facilities and supporting books for literacy activities, the obstacles encountered during literacy practices, as well as literacy habits developed during the pandemic and their impact on students' critical literacy skills.

Interview

The type of interview used in this study was unstructured, with the interview guide containing only the main points to be explored. Interviews were conducted with teachers, students, and parents. The indicators used as the basis for the interviews are presented in **Table 1** below.

Table 1. Interview Indicators/Guidelines

Subject	Question Indicators
Teacher	Students' numeracy problems
	Strategies for teaching numeracy
	Barriers to numeracy learning in school
	Needs for numeracy learning books and media
	Student engagement and suitability
Parent	Parents' perspectives on their children's numeracy
	The role of parents in home-based learning
	Support for democratic parenting in numeracy learning
	Parents' suggestions for numeracy learning media
	Parents' expectations regarding their children's numeracy
Student	Students' understanding of numeracy
	Numeracy learning at school
	Application of numeracy in everyday life
	Suggestions for numeracy learning media

Validation Sheet

Content Expert Validation

The content expert validation instrument consists of assessment aspects focusing on the content quality of the numeracy activity book, particularly in terms of content feasibility and coverage. The expert involved is a university lecturer specialising in numeracy. The instrument blueprint is presented as follows.

Table 2. Blueprint of the Content Expert Validation Sheet

Aspect	Indicator
Content Feasibility	Alignment of content with the curriculum and AKM (Asesmen Kompetensi Minimum) numeracy
	Alignment of content with learning objectives
	Appropriateness of content for students' characteristics
	Accuracy and clarity of the material
	Depth of the material
	Relevance of exercises to numeracy
	Content supports students' numeracy skills
Presentation Feasibility	Coherence of the activity book presentation
	Attractiveness of the activity book presentation
	Ease of understanding the activity book
	Quality of feedback provided in the activity book
	Material presentation facilitates independent learning with parental guidance
Language Use	Clarity of the language used
	Ease of understanding the language
	Language appropriateness for students' developmental level

Media Expert Validation

The media expert instrument contains an assessment of the media feasibility of the numeracy activity book. The media expert involved in this validation is a lecturer with a concentration in instructional media. The blueprint of the media expert instrument used for assessing media feasibility is presented below.

Table 3. Media Expert Validation Sheet

Aspect	Indicators
Visual Design	Accuracy of color proportions
	Accuracy of layout in the activity book
	Appropriateness of illustrations in the activity book
	Suitability of media size
	Relevance of supporting images to the content of the activity book

Aspect	Indicators
Usability	Accuracy in choosing font size for the activity book
	Appropriateness of font type used in the activity book
	Ease of understanding for students
	Suitability of the activity book for parents as learning companions
	Safety of using the activity book
	Practicality of using the activity book
	Clarity of usage instructions in the activity book
Benefits	Effectiveness of using the activity book in daily activities
	The activity book provides support for independent learning with parental guidance
	The activity book helps meet students' needs in understanding numeracy
	The activity book enhances the relationship between students and close family members
	The activity book increases students' motivation and interest in learning
	The activity book makes numeracy easier to understand for students
	The activity book makes numeracy easier to apply in daily life
	The activity book raises parents' awareness of the importance of education

Parent and Student Response Questionnaire

The instrument blueprint for responses from parents and students as users is presented in the table below.

Table 4. Blueprint of the Parent and Student Response Instrument

Aspect	Indicator
Content	The activity book contains appropriate learning materials
	The materials and exercises are easy to understand
Appearance	Appropriate selection of layout and supporting images
	Appropriate color choices
	The text is easy to read
Language	The language is easy to understand
Usability	The activity book is easy to use
	The activity book is safe to use
Usefulness	The activity book encourages students to be more active
	The activity book facilitates student understanding
	The media fosters closeness between students and parents
	The activity book makes learning more meaningful
Motivation	The activity book is presented in an engaging way
	The activity book increases interest in learning numeracy
	The activity book enhances curiosity

Data Analysis

The data analysis technique was employed to determine the feasibility, practicality, and effectiveness of the developed product. In this study, the data analysis technique used was quantitative descriptive analysis based on questionnaire responses from subject matter experts, media experts, and students along with their parents. Quantitative descriptive analysis is the process of analyzing data by classifying the collected data without making generalizations.

Feasibility Analysis

Feasibility analysis was conducted to determine whether the teaching materials or instructional media meet specific standards. The focus is on content quality, presentation, and alignment with learning objectives. A Likert scale was used to measure perceptions, interests, and satisfaction levels of students and educators regarding the developed book. This is essential to evaluate the extent to which the book is relevant, engaging, and effective in supporting numeracy-based learning. The feasibility analysis used the following rating scale:

Table 5. Feasibility Assessment Rating Scale

Category	Feasibility Level	Score
Very Good	Highly Feasible	5
Good	Feasible	4
Fair	Moderately Feasible	3
Poor	Less Feasible	2
Very Poor	Not Feasible	1

The data analysis stage involves calculating the total average score for each component. The formula used to calculate the total average score of each component is as follows:

$$\mathcal{X}_1 = \frac{\sum x}{n}$$

Where:

$\mathcal{X}_1$ = Average total score for component 1

$\sum x$ = Total score obtained from the measured component

n = Number of respondents providing the assessment

Next, the data were converted into qualitative data based on ideal assessment criteria. The assessment criteria are presented in Table 8 below.

Table 6. Feasibility Assessment Criteria

Score	Category
> 4.2	Very Good
3.4 – 4.2	Good
2.6 – 3.4	Fair
1.8 – 2.6	Poor
≤ 1.8	Very Poor

Practicality Analysis

This analysis aims to evaluate the extent to which the book can be easily used by both parents and students. The scale used is the same as that of the feasibility assessment. The same procedure is applied in drawing conclusions, whereby the book is considered practical if it is rated at least in the “good” category by users.

Effectiveness Analysis

The success percentage is used to measure quantitative achievements, such as the students’ success rate in completing activities, improvements in numeracy understanding, and the attainment of competencies aligned with the Merdeka Curriculum. The combination of these two evaluation tools—qualitative and quantitative—provides a holistic overview. This enables the evaluation results to serve as a solid foundation for refining, improving, and optimizing the "*Numeraktif*" book to better meet the needs of students within the context of learning based on democratic parenting. The indicators of effectiveness include (1) Conceptual understanding, (2) Application skills, and (3) Task analysis and evaluation. The product is considered effective if it achieves a minimum success rate of 75%. The effectiveness of the book development can be calculated using the following success percentage formula.

$$\text{Success Percentage} = \frac{\text{Total Score Obtained}}{\text{MaximumPossible Score}}\ x\ 100\%$$

Assessment indicators for each activity in the "*Numeraktif*" book, with each activity weighted at 25%.

Table 7. Calculation of Success Percentage Scores

Activity	Assessment Indicator	Max Score	Percentage	Total
Let's Place Your Money!	Understanding of Place Value Concept	10	40%	25%
	Accuracy of Results	10	40%	
	Documentation and Collaboration	5	20%	
Shopping Together	Compilation of Shopping List	10	40%	25%
	Accuracy of Total Calculation	10	40%	
	Reflection and Documentation	5	20%	
Flat Shapes Adventure at Home	Identification and Classification of Flat Shapes	10	40%	25%
	Perimeter and Area Calculation	10	40%	
	Activity Documentation	5	20%	
Measurement Mission	Accuracy of Measurement	10	40%	25%
	Unit Conversion	10	40%	
	Documentation and Reflection	5	20%	

RESULTS

Needs Analysis Results

The results of the analysis indicate that numeracy skills are highly important for children's academic development. However, many parents feel that they are not yet optimally supporting their children's learning at home. Numeracy activities conducted at home are often unstructured, creating an urgent need for interactive and engaging learning media. Although parents are involved in daily activities that involve numeracy, such as shopping, the intensity of this involvement remains low. Therefore, there is a pressing need for more structured, interactive, and enjoyable learning tools that can help children better understand numeracy concepts.

The numeracy activity book is titled "*Numeraktif*." This book serves both as a learning medium and as a guide for parents to support their children in learning numeracy. The cover of the developed activity book is presented in Figure 2 below.

Figure 2. Product Cover Page Development

The book includes four activities. These activities cover various numeracy concepts, such as understanding place value using money, simulating shopping experiences, and measuring objects around the house. Each activity concludes with reflection and documentation to foster a collaborative learning experience that strengthens the bond between children and their parents. Through this approach, children are expected to learn in an enjoyable and meaningful way that connects to their daily lives. An overview of the activities in the book is presented in Figure 3 below.

Figure 3. Book Product Visualization

Design Development

The design of the "*Numeraktif*" book underwent a validation process by content and media experts to ensure the feasibility of its content and presentation. The validation was carried out by three academics from Yogyakarta State University—two subject matter experts and one media expert. The results of the feasibility validation are presented in Table 8 below.

Table 8. Validity Validation Results

Domain	Aspect	Total Score by Validator		
		Validator 1	Validator 2	Validator 3
Content	Content Feasibility	34	30	
	Presentation Feasibility	24	22	
	Language Quality	15	13	
Media	Visual Appearance			32
	Usability			27
	Usefulness			30
Total Score		73	65	89
Average Total Score		4,6		4,7
Category		Highly Feasible		Highly Feasible

Based on Table 8 above, the average score from the content experts was 4.6, and from the media expert was 4.7. When converted to the rating scale, the media falls into the "highly feasible" category. Despite this high feasibility, the developer made improvements based on expert feedback, which included adjustments to content, presentation, and language usage to ensure greater relevance and clarity for students. Revisions were implemented to enhance the quality of the book, particularly in making the content and language more accessible and easier to understand for learners.

Practicality Test Results

Product testing was conducted to evaluate the practicality and effectiveness of the *Numeraktif* book in a learning context. The initial field trial involved teachers, parents, and students to obtain a comprehensive assessment. A total of three teachers, three students, and three parents participated in this practicality test. The results of the practicality test are shown in Table 9 below.

Table 9. Practicality Test Results

Respondent	Average Score	Classification
Student 1	4.1	Practical
Student 2	4.5	Very Practical
Student 3	3.9	Practical
Teacher 1	4.3	Very Practical
Teacher 2	4.9	Very Practical
Teacher 3	4.9	Very Practical
Parent 1	4.8	Very Practical
Parent 2	4.7	Very Practical
Parent 3	4.1	Practical

Based on Table 9 above, it is shown that the average practicality score from student respondents is 4.2, which falls into the "Practical" category. The practicality scores from teachers and parents are classified as "Very Practical," with scores of 4.5 and 4.7, respectively. Therefore, when averaged across all subjects, the product can be classified as practical.

Effectiveness Test

The effectiveness test was conducted to evaluate the adaptability of the activity book in improving students' numeracy skills. The subjects used in the effectiveness test were twenty-two students. The success indicator used to measure effectiveness was the percentage of student success in completing the activities provided in the book. This success percentage serves as a primary indicator to assess how well the numeracy activity book supports students in understanding and applying the concepts taught. The analysis results provide a concrete overview of the book's effectiveness and serve as the foundation for making revisions or further development, if necessary. The book contains four total activities, each weighted 25%, resulting in a total score of 100%. The effectiveness test data is presented in Table 10 below.

Table 10. Results of the Effectiveness Test

No	Subject	Activity 1 Completion	Activity 2 Completion	Activity 3 Completion	Activity 4 Completion	Total Completion (%)
1	LP	20%	25%	25%	25%	95%
2	LN	20%	25%	25%	25%	95%
3	JS	20%	20%	25%	25%	90%
4	GM	25%	25%	25%	25%	100%
5	FL	25%	25%	25%	25%	100%
6	EZM	25%	25%	25%	25%	100%
7	AH	20%	20%	15%	20%	75%
8	AS	25%	25%	25%	25%	100%
9	ANK	25%	15%	25%	20%	85%
10	MAP	20%	20%	25%	20%	85%
11	LK	20%	25%	20%	25%	90%
12	NTA	25%	25%	25%	25%	100%
13	SQN	25%	25%	25%	25%	100%
14	SC	25%	25%	25%	25%	100%
15	AF	15%	15%	25%	20%	75%
16	BS	25%	20%	25%	25%	95%
17	GF	20%	25%	25%	25%	95%

No	Subject	Activity 1 Completion	Activity 2 Completion	Activity 3 Completion	Activity 4 Completion	Total Completion (%)
18	AAW	15%	15%	25%	20%	75%
19	FE	25%	25%	25%	20%	95%
20	RA	25%	25%	25%	25%	100%
21	WA	15%	15%	20%	15%	65%
22	VGA	25%	20%	15%	15%	75%
Average		**22.0%**	**22.0%**	**23.6%**	**22.7%**	**90.5%**
Category						**Highly Effective**

Based on Table 10 above, it is shown that the average achievement of all students reached 90.5%, which falls into the "Highly Effective" category. A total of eight students achieved a perfect score of 100%, reflecting the book's ability to effectively facilitate conceptual understanding. However, some students demonstrated lower scores, such as WA with 65%, which may indicate the need for refinement of the book to accommodate varying levels of cognitive ability. The students' percentage of task completion across the four activities in the book is illustrated in detail in Figure 4 below.

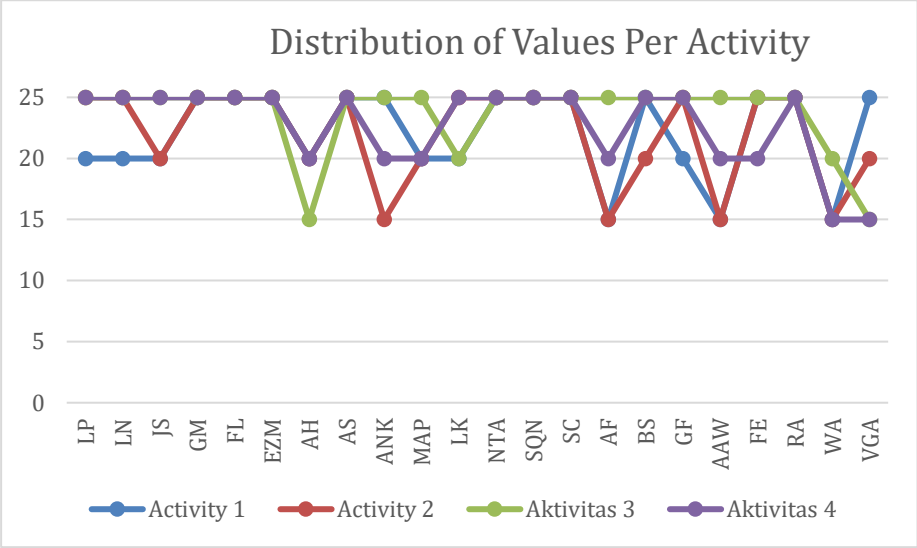

Figure 4. Distribution of Student Scores Across Each Activity

Based on the figure above, Activity 3 shows the highest success rate compared to the other activities, indicating that students tend to better understand or demonstrate greater skill in the material presented in that activity. Activity 3 recorded the highest success rate at 23.6%, while Activities 1 and 2 both had a success

rate of 22.0%. This suggests that the structure of the third activity may be easier to understand or more engaging for students. These findings can serve as a basis for revising the book to ensure that all activities maintain a balanced level of difficulty.

The high average success rate indicates that the numeracy activity book is effective in helping students understand and apply numeracy concepts. There is a slight variation in success rates across the activities, which may reflect differences in the level of difficulty or student engagement with each activity. Given the high level of effectiveness, the book has the potential to be implemented in other classrooms with necessary adaptations. Through this analysis, the operational test results provide a strong foundation to conclude that the numeracy activity book has successfully achieved its developmental objectives.

DISCUSSIONS

The research findings indicate that the numeracy activity book "*Numeraktif*" is highly suitable for use in numeracy instruction for Phase C elementary school students. Based on expert validation results, the book achieved an average final score of 4.6 out of 5, placing it in the "highly appropriate" category. This finding suggests that the content, presentation, language, and the integration of components in the book meet the standards of instructional material quality according to educational experts. This aligns with the view that a product developed in the field of education is considered valid when it satisfies both content validity and construct validity, in accordance with users' needs and instructional goals (Obilor & Miwari, 2022; Patrick et al., 2011; Prananto et al., 2022).

Furthermore, the practicality test, obtained through observations and questionnaires completed by teachers, parents, and students, resulted in an average final score of 4.3, categorized as "practical." This indicates that the book can be easily used by teachers and students in real classroom settings. The assessed aspects included ease of use, clarity of instructions, and suitability of the time required for each activity. The practicality of a teaching material is reflected in how realistically the product can be applied by users in the field without encountering technical or substantive difficulties.

Meanwhile, the effectiveness test showed that the book is highly effective, with students achieving a mastery level of 90.5%, exceeding the commonly established minimum classical mastery threshold of 75%. This success illustrates that the use of *Numeraktif* significantly enhances students' understanding and numeracy skills. This

effectiveness is attributed to the book's emphasis on meaningful and concrete learning materials that optimally support the learning process (Laksmi et al., 2024; Sucahyo et al., 2025).

The application of a democratic parenting approach in the design of the book's activities also contributes to its effectiveness. Through open-ended, dialogic, and choice-respecting tasks, the book creates space for the development of students' autonomy and decision-making abilities within the context of numeracy. Democratic parenting has been positively correlated with children's cognitive development and learning responsibility (Cintya, 2025; Mayangsari et al., 2024a; Shafira et al., 2025). Therefore, the findings of this study affirm that *Numeraktif* is not only feasible and practical but also effective in enhancing students' numeracy skills. This book holds promise as an alternative, contextual learning resource that supports student-centered learning principles, particularly in alignment with the Indonesian National Curriculum, which promotes differentiated instruction tailored to the unique characteristics of each learner.

CONCLUSION

This study successfully developed a numeracy activity book entitled *Numeraktif*, specifically designed for Phase C elementary school students and grounded in the principles of democratic parenting. Expert validation results placed the *Numeraktif* book in the "highly appropriate" category, with an average score of 4.6 on a 5-point scale. This indicates that the book's content, language, design, and structure are well aligned with the developmental characteristics of Phase C learners, and meet both pedagogical and psychological criteria for effective numeracy instruction. Limited trials conducted with teachers and students revealed a high level of practicality. The average practicality score of 4.3 suggests that teachers were able to easily understand and implement the materials in classroom settings without significant difficulties. Furthermore, students exhibited active engagement and enthusiasm in completing the learning activities. Effectiveness testing demonstrated a strong impact on students' numeracy learning outcomes, with a mastery level of 90%—surpassing the commonly accepted classical mastery threshold of 75–80%. These results indicate that the use of *Numeraktif* significantly enhances students' numeracy understanding and skills. In conclusion, the *Numeraktif* activity book is a feasible, practical, and effective instructional medium for numeracy learning in elementary education, particularly for Phase C students. Moreover, the integration of

democratic parenting principles within the learning activities supports the development of learners' active participation, self-confidence, and sense of responsibility, thereby contributing to a more holistic and learner-centered educational experience.

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