

The Influence of Book Creators on the Literacy and Numeracy Skills of Children Aged 5-6 Years

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Abstract

This study aims to determine the effect of the use of Book Creator digital media on the literacy and numeracy skills of children aged 5–6 years. The study used a quasi-experimental method with a pretest-posttest nonequivalent control group design. The study subjects consisted of 30 children who were divided into an experimental group (n=15) and a control group (n=15). The experimental group learned using the Book Creator "Naya and Niko's Adventure to the Cheerful Village" for three meetings, while the control group used conventional learning. Literacy and numeracy ability data were collected using checklist observation sheets and analyzed through Shapiro-Wilk, Levene, Independent Sample t-Test, Mann-Whitney U Test, and N-Gain percentage. The results showed that there was a significant difference between the experimental group and the control group in literacy ($p = 0.007$) and numeracy ($p = 0.017$) skills. N-Gain analysis showed an increase in literacy ability in the experimental group by 38.48% and numeracy by 55.73%, higher than in the control group. These findings show that the use of Book Creator has a positive effect on the literacy and numeracy skills of children aged 5–6 years, with a higher effectiveness on numeracy skills. Media Book Creator can be an interactive digital learning alternative and in accordance with the characteristics of early childhood learning.

1. Introduction

Early childhood education has a very important position in realizing the basis of child development, covering cognitive, social, emotional, motor, language, moral, and artistic aspects. At this stage, the development of literacy and numeracy skills is the main focus because literacy and numeracy are the foundation for the next learning process. Literacy is not related to reading and writing but how children understand information, while numeracy includes the ability to recognize and use basic mathematical concepts in daily life. In line with Rahim (2025) Literacy and numeracy are the basis of all learning. Writing and reading skills encourage children to understand instructions, express thoughts, and read textbooks. Meanwhile, numeracy allows children to understand the mathematical concepts that they will face in various aspects of life. Learning in early childhood is known as playing chili sauce that is fun, interactive, concrete, meaningful, and child-centered.

Field experience gained during the 2025-2026 odd-semester education professional strengthening program activities at one of the kindergartens in Purwakarta, Indonesia shows that literacy and numeracy learning is still dominated by the use of conventional media. This condition has the potential to reduce children's involvement in learning activities so that the stimulation of literacy and numeracy skills cannot be carried out optimally and learning tends to attract less attention from children, children quickly feel bored. In line with research by Gea and Zega (2025) said that in practice, there are preschools that use conventional learning methods such as lectures, stories or memorization. So that the learning method is very monotonous and less interactive which makes children easily bored, less visible in the learning process and difficulties in developing children's critical thinking skills and creativity.

Another problem faced is the rapid development of digital media. The rapid development of digital media has an impact on the world of education. Learning using digital media can be accessed using smartphone and tablet devices. Many platforms or applications can be used for learning media. However, there are still many that cannot be used for learning media, because there are still many applications that focus more on entertainment without good educational value. From this mistake, it provides a challenge for teachers and parents to be smarter in choosing digital learning media. In line with Destiawati and Dhika (2024) said that digital media in learning is a challenge and opportunity to develop digital learning media that is not only interesting but educational, important in literacy and numeracy.

From the above problems, it can be known that early childhood learning must be interesting, interactive, and meaningful in accordance with the characteristics of early childhood. It is necessary to innovate learning

media that is able to involve children while supporting the development of literacy and numeracy skills. Book creator is one of the digital media that has the potential to be used to meet these needs.

Literacy and numeracy skills are basic competencies that need to be developed from an early age because they are the foundation for the success of learning at the next level of education. Literacy not only includes the ability to read and write, but also the ability to understand, communicate, and use information in various contexts, while numeracy is related to knowledge and skills such as: (a) using various numbers and symbols that have a relationship with basic mathematics, the purpose of which is to solving practical problems scope of the problem context, (b) analyzing information in various forms (graphs, tables, charts, and other forms), and then interpreting the results of the analysis (Dewi, 2024; Puspitasari & Watini, 2022). Various studies show that literacy and numeracy skills have a significant relationship with mathematical problem solving, cognitive development, and academic achievement at the next level of education (Rahim 2023; Sari et al. 2026; Putri et al. 2024). This is the main concern in this ability in the implementation of early childhood education.

However, the development of literacy and numeracy in early childhood education institutions faces various challenges. Learning that still uses conventional media in the form of worksheets, letter cards, or printed books that are less able to provide an interesting and interactive learning experience. Meanwhile, children aged 5-6 years are in the pre-operative stage so that it is easier to understand concepts through concrete, multisensory, and visual experiences of Piaget (Dalimunte & Rambe 2023). The use of less varied media can reduce children's participation in learning so that it has a less optimal impact on literacy and numeracy stimuli (Destiawati & Dhika 2024; Sungwa 2025).

The development of digital technology is an opportunity for learning media that is more interactive and in accordance with the characteristics of early childhood learning. With interactive media of digital stories that combine conversation and facial expressions, supporting children to learn to recognize emotions (Khairunnisa, Pembangunan, and Budi 2025). One of the media that can be used is Book Creator, which is a software that is very useful in making digital-based interactive learning modules. By using Book Creator, teachers can create engaging and dynamic digital books by combining text, images, audio, video, and other interactive elements (Husnah 2025). According to the research conducted by (Rini, Syarifah, and Maranatha 2024) Benefits book creator in early childhood learning, that is, learning is more effective, interesting, and increases learning motivation. In addition, students' interest in learning can be increased further because of additional data, photos, videos, images, audio, and other more interesting features.

A number of previous studies have examined the use of digital technology in early childhood learning. Research (Atikah, Asmawati, & Ekawati 2023) It shows that phonetics-based digital books developed through the Book Creator application are effective in improving the English reading ability of children aged 5-6 years. Another study found that the use of digital books can improve early childhood science skills (Oktavia et al. 2024). In addition, the use of game-based digital applications has also been proven to improve preschoolers' numeracy skills (Nurlaela, Suzanti, & Widjayatri 2024). Longitudinal research conducted by Soto-Calvo et al. (2020) shows that literacy experiences that focus on letter and sound recognition contribute to the development of numeracy, calculation, and number symbol recognition. The findings show that literacy stimulation from an early age has a positive impact on children's numeracy development.

However, most previous research has focused on the development of one aspect of a child's ability separately, such as reading literacy, science literacy, or numeracy. Research on the use of book creators generally still focuses on improving reading skills or developing certain media (Atikah, 2023; Hasnah, 2025). Meanwhile, research that integrates literacy and numeracy skills development in one digital learning medium is still relatively limited, especially in children aged 5-6 years. This condition shows that there is a research gap that needs to be studied further.

This research lies in the use of Book Creator as a digital learning medium designed to integrate literacy and numeracy stimulation in one learning activity. In contrast to previous studies that only focused on one aspect of development, this study tested the effectiveness of Book Creator in improving both basic abilities simultaneously in children aged 5-6 years. This approach is in line with research that emphasizes the importance of integrating 21st century skills and digital literacy from early childhood education (Ogegbo & Aina 2022).

Based on this description, this study aims to analyze the influence of the use of the Book Creator application on the literacy and numeracy skills of children aged 5-6 years. The results of the research are expected to make an empirical contribution to the effectiveness of digital learning media in developing basic early childhood skills and become a reference for early childhood education teachers in designing innovative, interactive, and appropriate learning in accordance with the development of educational technology.

2. Method

2.1. Research Design

This study uses a quasi-experimental design in the form of pre-test – post-test non-equivalent control group design to examine the effectiveness of book creators by comparing the literacy and numeracy abilities of children aged 5-6 years in the book creator group with conventional groups. In this study, the independent variable used the book creator and the control variables, namely literacy and numeracy ability, can be seen in Table 1.

Table 1. Quasi-Experimental Design

Classes	Pre-test	Treatment	Post-test
B2	O1	X1	O2
B3	O1	X2	O2

Information:

B2: Experimental group (book creator)

B3: Control group (Conventional)

O1: Pre-test (literacy and numeracy ability test)

O2: Post-test (literacy and numeracy ability test)

X1: Book Creator (180 minutes 3 meetings)

X2: Conventional (180 minutes 3 meetings)

2.2. Research Subjects

The subjects of this study initially consisted of 18 children in the experimental group (B2) and 18 children in the control group (B3). However, there are some children who do not follow all stages of research, either pre-test, treatment, or post-test. So data analysis is only carried out on complete data. Accordingly, the final sample used in this study consisted of 15 children in the experimental group (B2) and 15 children in the control group (B3). As a validity of the equality of the initial ability of the two groups before being given treatment, an analysis of the pre-test scores was conducted. The results of the analysis showed that the average literacy ability value in the experimental group was 23.60 while in the control group it was 23.87. Meanwhile, the average value of numeracy ability in the experimental group was 27.13 and the control group was 27.67. The relatively small difference in average pre-test scores showed that the initial ability of the two groups tended to be equal before the implementation of treatment.

2.3. Research Procedure

2.3.1. Strategic Book Creator Learning Design

Before the implementation of the research, the researcher first prepared a Book Creator-assisted learning design that was adjusted to the Learning Outcomes (CP) of the Foundation Phase of the Independent Curriculum. The preparation of the design is carried out systematically through the stages of curriculum analysis, determination of literacy and numeracy ability indicators, media development, instrument and media validation, revision, and learning implementation. The series of stages aims to ensure that the media developed is in accordance with the characteristics of children aged 5–6 years and is suitable for use in the learning process. The flow of the preparation of the Book Creator learning design is presented in Figure 1

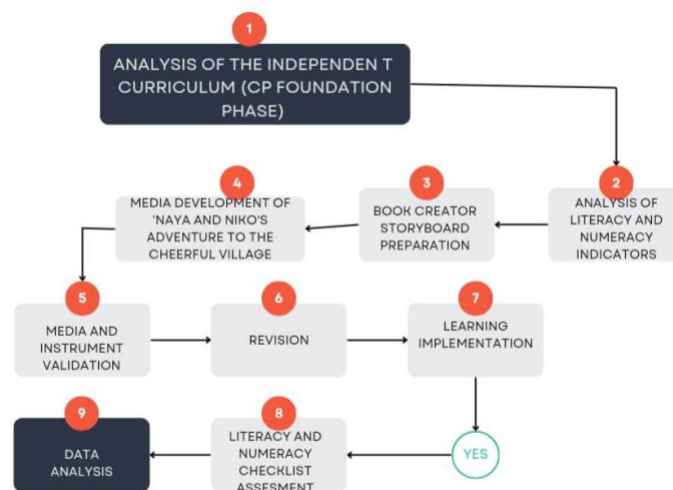


Figure 1. Book Creator Learning Design

The book creator's learning design entitled Naya and Niko's Adventure to Ceria Village was prepared based on the Learning Outcomes (CP) of the foundation phase of the independent curriculum (Badan Standar, Kurikulum, dan Asesmen Pendidikan [BSKAP], 2024). The development of learning activities refers to literacy aspects that whiten understanding language, expressing language, and literacy. Meanwhile, numeracy aspects include algebra, numbers, geometry, measurement, and data analysis. As well as literacy and numeracy ability indicators for children aged 5-6 years (Novrani, Caturwulandari, Purwestri, Annisa, & Faridah, 2021). The media book creator is packaged in the form of an interactive story consisting of 14 pages. Each page contains activities designed to provide a contextual and enjoyable learning experience through counting, observing, recognizing patterns, recognizing letters, asking questions, grouping data, and continuing stories. These activities are adjusted to the characteristics of early childhood development and are directed at achieving literacy and numeracy skills in an integrated manner.

The implementation of learning was carried out for three meetings with a duration of 60 minutes in each meeting. The first meeting was focused on developing the ability to understand language, recognize numbers, and sequences. The second meeting focused on the development of the ability to recognize patterns, simple measurements, geometry, and early literacy, the third meeting focused on numeracy skills, simple data analysis, and the ability to express language through storytelling activities. Learning is carried out in groups by utilizing digital television as a medium for viewing book creators, while teachers play the role of facilitators who guide children during the activity.

This learning design is prepared to ensure that each activity in the book creator is in line with the learning objectives, learning outcomes of the independent curriculum, and indicators of research instruments used for children's literacy and numeracy skills. The learning design of the Book Creator Naya and Niko's Adventure to Cheerful Village in the Table 2.

Based on Table 2, Book creator learning, learning using book creator Naya and Niko's Adventure to Ceria Village was carried out in three meetings which included the development of literacy and numeracy skills for children aged 5-6 years. Learning activities are designed in stages according to the learning outcomes of the foundation phase of the independent curriculum. In the first meeting, the activity focused on understanding language and the introduction of the concept of numbers and sequences. The second meeting focused on developing the ability to recognize patterns, simple measurements, geometry and early literacy. Furthermore, the third meeting focused on the ability to calculate, simple data analysis, and the ability to express language through storytelling activities.

All activities in the book creator are arranged contextually through the story of Naya and Niko's Adventure to Cheerful Village so that children can have a meaningful learning experience. In addition, the activity is designed in accordance with the research instrument's indicators to support the measurement of children's literacy and numeracy abilities after treatment.

Table 2. Book Creator Learning

Meeting	Page	Learning Activities	Learning objectives	CP Foundation Phase of Independent Curriculum	Aspect	Instrument Indicators
1	1. Rules of Play Instructions	Children listen to the rules of the game	Understand and follow instructions	Listening and understanding information and following the rules	Understanding Language	Understand instructions together; Understand the rules of the game
1	2. Get Ready to Go	Observe and describe activities	Understanding information through stories	Communicating ideas and understanding information	Understanding Language	Repeating complex sentences; Understanding the content of the story
1	3. Supplies in the Bag	Counting apples and grouping them	Understanding the concept of numbers	Understanding the concept of numbers and quantity	Numbers, Algebra	Grouping objects; Counting objects
1	4. Stepping Together	Determining the sequence of steps	Understanding the concept of sequence	Thinking logically through sequences	Number	Mentioning the sequence of numbers
1	5. Colorful House	Counting houses by color	Calculate and express results	Using simple mathematical concepts	Numbers, Expressing Language	Counting objects; Answering questions; Expressing ideas
2	6. Patterns in the Garden	Observing and continuing the flower pattern	Recognizing simple patterns	Recognizing and developing patterns	Algebra	Simple pattern; Expressing ideas
2	7. Playing on the Swing	Measuring the swing width with footsteps	Non-standard units of measurement	Understanding the concept of measurement	Measurement	Non-standard measurement
2	8. Shapes Around Us	Identifying geometric shapes	Recognizing shapes and spatial relationships	Recognizing shape, space and position	Geometry	Basic forms; Position and spatial relationships
2	9. Guess the Letter	Saying initial letters and sounds	Recognizing letter symbols	Early literacy	Literacy	Saying letter symbols; The initial sound of a letter
2	10. My name	Writing your own name	Writing names independently	Early literacy through writing	Literacy	Writing and reading one's own name
3	11. Chickens in the Yard	Counting the number of chickens	Calculate and explain the results	Using the concept of numbers	Numbers, Expressing Language	Counting; Comparing quantities; Expressing ideas
3	12. Favorite Fruit	Grouping favorite fruit data	Collecting and grouping data	Using simple information and data	Data analysis	Collecting data/information
3	13. Favorite Fruits (Diagram)	Answer questions based on diagrams	Reading and interpreting data	Using data to solve problems	Data analysis	Answering based on data
3	14. Continued Story	Continuing the story and recording sound	Expressing ideas coherently	Communicate verbally with a variety of vocabulary	Expressing Language	Continuing the story; Expressing ideas; Complete simple sentences

2.3.2. Experimental Instruction Procedure

This research was conducted in the second semester of the second year in May 2026. Literacy and numeracy skills were tested first on a final sample of 30 children. After verifying the normality and homogeneity test, 15 children from the experimental group and 15 children from the control group were verified. The experiment was conducted for 180 minutes over three sessions. The experimental group used book creator media learning. Meanwhile, the control group. Using conventional learning. After the experiment, the influence of literacy and numeracy was analyzed by comparing the pre-test and post-test scores between the experimental group and the control group.

2.4. Research and Data Analysis Tools

This study uses an instrument in the form of a checklist sheet to measure the literacy and numeracy ability of children aged 5-6 years. The instrument is compiled based on literacy and numeracy indicators which refer to the Literacy Development Pocket Book for Children Aged 5-6 Years and the Numeracy Development Pocket Book for Children Aged 5-6 Years and adjusted to the learning outcomes of the foundation phase of the independent curriculum (BSKAP, 2024). Literacy skills include understanding language, expressing language, and literacy. Meanwhile, numeracy skills include aspects of algebra, numbers, geometry, measurement, and data analysis.

The assessment was carried out using a scale of four levels of development, namely score 1 (not yet developing), score 2 (starting to develop), score 3 (developing as expected), and score 4 (developing very well). Data collection is carried out through observation after all learning activities are completed. The data obtained was analyzed quantitatively using the help of the SPSS program. Data analysis began with a normality test using the Shapiro-Wilk test and a homogeneity test using the Levene test to test the feasibility of using parametric statistics. Furthermore, hypothesis testing is carried out using an Independent Sample t-test if the data is normally distributed and homogeneous. If any of the conditions are not met, use the Mann-Whitney U Test. In addition, N-Gain percentage analysis was used to determine the level of improvement in children's literacy and numeracy skills after being given treatment.

3. Results and Discussion

The data normality test was carried out as a requirement for hypothesis testing on children's literacy and numeracy abilities in the experimental group and control group. The normality test aims to find out whether the literacy and numeracy ability data in both groups are normally distributed so that they are eligible for parametric statistical analysis. From the results of the Shapiro-Wilk normality test, all research data were normally distributed (Sig. > 0.05), except for the pre-test numeracy data of the control group that was not normally distributed with a significance value of 0.021 (Sig. < 0.05). The results of the statistical calculation of the normality test are presented in Table 3.

Table 3. Statistics of Normality Tests for Literacy and Numeracy Ability Pre-Test and Post-Test Scores in the Experimental and Control Groups

Variable	Group	Stages	N	Shapiro-Wilk	Sig.	Variable
Literacy	Experiment	Pre-Test	15	0.966	0.795	Literacy
Literacy	Experiment	Post-Test	15	0.949	0.511	Literacy
Literacy	Control	Pre-Test	15	0.945	0.447	Literacy
Literacy	Control	Post-Test	15	0.944	0.433	Literacy
Numeracy	Experiment	Pre-Test	15	0.902	0.103	Numeracy
Numeracy	Experiment	Post-Test	15	0.909	0.132	Numeracy
Numeracy	Control	Pre-Test	15	0.856	0.021	Numeracy
Numeracy	Control	Post-Test	15	0.911	0.138	Numeracy

Before testing the hypothesis, a homogeneity test was first carried out to determine the similarity of variance between the experimental group and the control group. The results of the homogeneity test using Levene's Test showed that the data of the pre-test literacy (Sig. 0.758), pre-test numeracy (Sig. 0.866), post-test literacy (Sig. 0.669), and post-test numeracy (Sig. 0.557) had a significance value greater than 0.05. These results show that the variance of data between the experimental group and the control group is homogeneous. So that it meets one of the assumptions for further analysis, it can be seen in Table 4.

Table 4. Homogeneity Test Results for the Variance of Literacy and Numeracy Abilities in the Experimental and Control Groups

Variable	Levene Statistic	df1	df2	Sig.	Interpretation
Pre-Test Literacy	0.097	1	28	0.758	Homogeneous
Post-test Literacy	0.187	1	28	0.669	Homogeneous
Pre-Test Numeracy	0.029	1	28	0.866	Homogeneous
Post-test Numeracy	0.319	1	28	0.577	Homogeneous

After meeting the homogeneity assumption, hypothesis testing is performed. Literacy ability data was analyzed using the Independent Sample t-Test because it met the assumptions of normality and homogeneity. Meanwhile, numeracy ability data was analyzed using the Mann-Whitney U Test because there was data that was not normally distributed.

The results of the independent t-test showed a significant value of 0.007 (< 0.05) indicating a significant difference between the experimental group and the control group. The average literacy ability in the experimental group of 29.80 was higher than the control group of 24.27. These findings show that the use of media book creators has a better influence on children's literacy skills compared to conventional learning, which can be seen in Table 5.

Table 5. Independent Test Sample t-Test Literacy Ability

Group	N	Mean + SD	t	p
Control	15	24.27 + 5.01		
Experiment	15	29.80 + 5.34	-2.929	0.007

The results of the Mann-Whitney U test showed an Asymp value. Sig (2-tailed) is 0.017 (0.05). So there was a significant difference between the experimental group and the control group. The mean rank value of the experimental group of 19.33 was higher than that of the control group of 11.67. These results show that children who participate in learning using media book creators have better numeracy skills than children who participate in conventional learning, the results can be seen in Table 6.

Table 6. Mann-Whitney U Test Numeracy Ability

Group	N	Mean Rank	Asymp. Sig (2-tailed)
Control	15	11.67	
Experiment	15	19.33	0.017

Furthermore, an N-Gain percentage test was carried out to determine the level of improvement in children's literacy and numeracy abilities after being given treatment. Percentage N-Gain analysis was used to measure the activity of book creators in improving their abilities in the experimental group and the control group. The results of the N-Gain percentage analysis showed that the literacy and numeracy skills of children aged 5-6 years in the experimental group experienced a higher increase than the control group. The average N-Gain percentage of literacy ability increased higher than the control group. The average N-Gain of literacy ability in the experimental group was 38.48%, while the control group only reached 2.34%. In numeracy ability, the experimental group obtained an average N-Gain of 55.73%, while the control group was 14.89%. These results showed that the treatment given made a better contribution to improving literacy and numeracy skills compared to learning in the control group. Based on the effectiveness of the N-Gain percentage, the literacy ability in the experimental group was in the ineffective category, while numeracy ability was in the category of quite effective. Meanwhile, the ability of the control group in literacy and numeracy ability is in the ineffective category.

The findings of the study show that the use of book creators has a positive influence on the literacy and numeracy skills of children aged 5-6 years. This influence is not only shown by the results of statistical tests, but can be explained by the characteristics of book creators as interactive multimedia learning media. Book creators integrate text, games, audio, illustrations, videos, and interactive activities in one medium so that children get a richer learning experience compared to conventional learning. The integration of these various forms of information allows children to learn through more than one learning modality at the same time so as to increase attention, engagement, and understanding of the material understood. This is in line with the Cognitive Theory of Multimedia Learning (CTML) developed by Mayer, which explains that learning will be more effective when information is presented in the form of words and images in an integrated manner than using text or verbal explanations. According to this theory, the learning process takes place through two information processing channels, namely the visual channel and the verbal channel. The two channels work together to help learners have relevant information, organize it into meaningful knowledge structures, and then integrate it with pre-existing knowledge. Thus, multimedia media is able to increase meaningful learning because it optimizes students' cognitive postures.

These characters are in accordance with the features that book creators have that allow teachers to present stories, images, sounds, videos, and interactive exercises in one digital book. The multimodal presentation of the material makes it easier for children to maintain attention during learning, reduce unnecessary cognitive load, and can increase learning motivation. In this study, the activities contained in the book creator through the story of Naya and Niko's Adventure to Cheerful Village so that children not only listen to the teacher's explanation, but also observe illustrations, answer questions, listen to narratives, count objects, recognize patterns, and continue the story.

However, these findings show that learning using book creators is more effective in improving numeracy skills than literacy skills. The increase in numeracy skills is suspected to be due to the activities in book creators providing more concrete learning experiences through counting, grouping, comparing, determining sequence, and recognizing patterns. These activities are presented in the form of visuals, audio, and interactive games so that it makes it easier for children to understand the concept of numeracy directly. Based on the results of N-Gain, numeracy skills are in a higher category than literacy skills, which shows that Book Creator media has a stronger influence on children's numeracy development. This can happen because the concept of numeracy in early childhood is generally easier to observe and practice through concrete objects, images, and manipulative activities available in interactive digital media. According to (Babaker et al., 2019) Early childhood in preoperative years is easier to learn through concrete experiences and visual representations. Therefore, the characteristics of book creators who are rich in image-based numeracy activities and interactions have an impact on literacy skills which require a more complex process of language understanding, vocabulary, and the preparation of meanings.

Table 7 presents the comparison of N-Gain scores for literacy and numeracy abilities in the experimental and control groups. Based on the effectiveness of the N-Gain percentage, the literacy ability in the experimental group was in the ineffective category, while numeracy ability was in the category of quite effective. Meanwhile, the ability of the control group in literacy and numeracy ability is in the ineffective category. These findings show that learning using book creators is more effective in improving numeracy skills than literacy skills.

Table 7. Comparison N_Gain Literacy Ability and Numeracy Ability in the Experimental and Control Groups

Variable	Ex-%	Kon%	Difference %	Category
Literacy	38.48	2.34	36.14	Low
Numeracy	55.73	14.89	40.84	moderate

3.1. Research Implications of Literacy and Numeracy Skills

The findings of this study provide practical, theoretical, and educational implications for the development of early childhood learning. Practically, the results of the study show that book creators can be used as an alternative digital learning media that is able to integrate literacy and numeracy activities in an interactive learning series. Early childhood education teachers can take advantage of text, image, video, audio, and interactive activity features on book creators to create a more interesting, contextual, and appropriate learning experience for children aged 5-6 years.

Theoretically, the results of the study support the Cognitive Theory of Multimedia Learning (CTML) which states that the presentation of information through a combination of visual and verbal can improve the meaningful learning process. The finding that the increase in numeracy is higher than literacy also shows that the effectiveness of digital media is influenced by the characteristics of the competencies developed. Numeracy activities that are concrete, visual, and manipulative are easier to facilitate through book creators than literacy skills that require mastery of vocabulary, language understanding, and the ability to build meaning.

In the context of education, the results of the study provide empirical evidence that the integration of digital media such as book creators can support the implementation of the independent curriculum, especially in the development of early childhood literacy and numeracy foundation skills. Therefore, the results of this research can be a reference for teachers, schools, and learning media developers in designing digital learning that is more innovative and in accordance with the needs of 21st century students.

3.2. Research Limitations of Literacy and Numeracy Ability

This study has several limitations that need to be considered in interpreting the research results. First, the sample size is relatively small, involving only 30 children from one Early Childhood Education institution, so the generalization of research results to the wider population is still limited. Second, the treatment was only carried out for three meetings so that it could not develop the impact of the use of book creators in the long term on the development of children's literacy and numeracy. Third, the measurement of learning outcomes is carried out using a children's development observation sheet on a 4-point Likert scale so that it still depends on the observer assessment process even though the instrument has gone through the validation stage. In addition, this study only tests the effectiveness of book creators on literacy and numeracy skills without considering other factors, such as learning environment support or teachers' competence in implementing digital media. Therefore, further research is recommended to involve a larger sample, based on a longer learning duration, and develop more diverse literacy activities in order to obtain a more comprehensive picture of the effectiveness of book creators.

4. Conclusion

Based on the results of the study, it can be concluded that the use of book creator media has a positive effect on the literacy and numeracy skills of children aged 5-6 years so that the research goal of analyzing the influence of the media has been achieved. These findings show that book creator-based learning is able to provide a more interactive, contextual, and appropriate learning experience in accordance with the characteristics of early childhood development, with a tendency to have a stronger influence on numeracy skills than literacy. This study provides empirical evidence that the integration of literacy and numeracy in one digital learning medium can be an alternative to learning innovations in early childhood education institutions as well as providing a study on the use of digital technology in supporting the implementation of an independent curriculum. Therefore, the use of book creators is recommended as one of the learning media that can be used by early childhood teachers, while further research needs to develop more diverse literacy activities and test its application in a broader learning context.

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All authors contributed equally to this paper. All authors have read and approved the final manuscript.

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Data Availability

The datasets generated during and/ or analyzed during the current study are available from the corresponding author on reasonable request.

Declaration on AI Use

The authors declare that no artificial intelligence (AI) or AI-assisted tools were used in the preparation of this manuscript.

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