IJOEM

Indonesian Journal of Elearning and Multimedia
https://ejournal.1001tutorial.com/index.php/ijoem

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Development of Multimedia-Based "Busy Book" Learning Media to Improve Cognitive and Language Abilities in Early Childhood

Wiwit Indyani[1], Nina Kurniah[2]

[1,2]Universitas Bengkulu
Bengkulu, Indonesia
✉ Indyaniwiwit@gmail.com *

Article Information:
Received August 21, 2024
Revised October 09, 2024
Accepted October 15, 2024

Keywords:
Busy Book; Cognitive; Language; Learning Media; Multimedia

Abstract

This study aimed to provide multimedia-based busy book learning resources to enhance the language and cognitive abilities of young children attending Bengkulu City's Lembayung Indah Kindergarten. Both books and multimedia-based busy books are the end products of this research project. Potential and problems, data collection, initial product design, expert validation, design revision, small group trials, product revision I, large group trials, product revision II, and final product are the ten steps that make up this research, which is a development research (Research & Development) using the Borg and Gall model. 36 youngsters made up the sample used in this study, which was selected at random. Children's abilities tests, open interviews, and observation were the methods used to get the data. T tests, percentages, and scores were employed in this study's data analysis. Based on the study's findings, the creation of multimedia-based busy book materials was deemed both practical and successful in enhancing the language and cognitive abilities of young children in group B of Lembayung Indah Kindergarten in Bengkulu City.

A. Introduction

Early Childhood Education is a golden age for human development or often called the golden age (Trenggonowati & Kulsum, 2018). At this time the human brain experiences the fastest development throughout its life (Gilmore et al., 2018). This is said because children have different characteristics depending on their age, so that in educating early childhood requires special efforts to help the development and growth of children. Special efforts in early childhood education should reflect the concept of learning through play (Nurdin, 2021). Therefore, early childhood educators need to know various ways to design and collect learning materials that are interesting for the child's developmental area through the concept of learning through play. This is in accordance with the characteristics of early childhood who participate in various environmental explorations, so that playing activities are one of the learning activities. Currently, early childhood is identical with joy, pleasure and happiness.

Based on the provisions in Law Number 20 of 2003 concerning the National Education System, Early Childhood Education is regulated in Article 28 paragraph 1 which states that "Early Childhood Education is provided for children from birth to six years and is not a prerequisite for attending basic education." (Mustika, 2021).

Early Childhood Education is a development endeavor for children from birth to age six, according to National Education System Chapter I Article 1 Paragraph 14. It is carried out by offering educational stimulation to support physical and spiritual growth and development so that children are prepared to enter further education (Rachman, 2019). Accordingly, Permendikbud No. 137 of 2014, which contains the

How to Cite : Indyani, W., & Kurniah, N. (2024). Development of Multimedia Based Busy Book Learning Media to Improve Cognitive and Language Abilities in Early Childhood. *IJOEM Indonesian Journal of E-Learning and Multimedia*, *3*(3), 100–109. https://doi.org/10.58723/ijoem.v3i3.291
ISSN : 2830-2885
Published by : Asosiasi Profesi Multimedia Indonesia

National Standards for Early Childhood Education, specifies that children can meet certain requirements for abilities in all areas of development and growth.

Based on several opinions above, early childhood is an individual who is experiencing rapid development aged between 0-6 years. At that age, it isa very important time for children during growth and development in various aspects (Rai & Tiwari, 2018).

According to STPPA Permendikbud No. 137 of 2014, the development of early childhood cognitive abilities is broken down into three main areas: first, learning problems, which includes understanding basic concepts in daily life, recognizing based on function, understanding the concept of many and few, using objects as symbolic games, creating something based on their own ideas related to all forms of problem solving, symptoms of curiosity in observing objects, recognizing patterns of an activity and realizing the importance of time, and understanding position in the family, space, and social environment. Second, logical thinking, which includes classifying objects according to their size, shape, color, and function; identifying the influence of cause and effect on their own; classifying objects that are similar to one another or that are the same or paired with two variations; identifying and repeating patterns (such as ABC-ABC and AB-AB); and classifying objects according to four variations of both size and color. Third, symbolic thinking, which includes counting objects from one to ten, understanding the notion of numbers, and identifying different facets of children's development holistically, does not happen independently and is influenced by a variety of internal and external variables (Ardiana, 2022; Lubis et al., 2021). Cognitive ability is intelligence, namely the ability to learn, think, absorb new information and ideas, understand the environment, and use memory to solve problems (Firman & Anhusadar, 2022). Cognitive abilities are the processes through which an individual engages with a situation, analyzes it, assesses and takes into account his or her capacity to resolve the child's issues, and the growth of the brain and central nervous system.

Language is a communication tool for analyzing human experience, differently in each society, in units that contain semantic content and sound expression, namely monems (Miftahillah, 2020; Rifaldi et al., 2024). In language has a skill to speak and must always be trained because it is an important part of the growth of children's language. Language skills are useful for the process of thinking, expressing, and communicating including skills in communicating seriously, compiling information, thinking, and solving problems. Children's language skills make humans able to understand emotional and mental interactions (Noble et al., 2019). Overall, there are two types of language skills in each child, namely self-talk and talking to others. When children interact with friends or their environment, social language and speaking skills emerge. This development is divided into five forms: 1) information adjustment, where there is an exchange of ideas or seeking common goals; 2) criticism, is the child's evaluation of the efforts or behavior of others; 3) orders, requests, and threats; 4) questions; and 5) answers.

Based on the above understanding, it can be concluded that language skills in children can include speaking, writing, gestures, body communication, and other aspects. This is a useful tool for understanding communicating and collaborating with others. By speaking, humans can have an understanding of themselves, other individuals, and the people around them. To understand the creator of the universe and position themselves as cultured beings.

Developing children's cognitive and language abilities, for an educator must be able to create a pleasant learning atmosphere, so that while the child is following the learning the child always feels happy so that the child does not get bored to follow the learning activities. Creating a pleasant learning atmosphere is one way that can help in developing cognitive and language abilities in early childhood, namely by using learning media (Suryana et al., 2022). The learning media used is designed to be fun so that it can stimulate the thoughts, feelings, interests, and attention of students to follow the learning activities. Learning media that is suitable for early childhood is by using creative, innovative media and supported by multimedia technology-based learning (Agustina et al., 2023).

Initial observations at Lembayung Indah Kindergarten revealed that the teachers' chosen learning system was still insufficient for helping the kids improve their language and cognitive abilities. The learning process was still conventional, where the interaction between teachers and children was limited to explaining, listening and working on children's worksheets. There was still a lack of use of multimedia-based media in the learning process, which made the learning process less interesting and made children's cognitive and language skills less stimulated and ultimately made children bored with learning.

Based on the problems in the school, the researcher intends to develop multimedia-based busy book media. This multimedia-based busy book is a learning book made of flannel and equipped with video images. This multimedia-based busy book is expected to be able to stimulate children's development according to their

stages. The busy book learning media created is made of flannel and contains activities according to the child's developmental stage, adjusted to the needs and learning themes that will be given to the child. This busy book media was chosen because it can stimulate curiosity through the interaction of its activities. Several studies have shown that busy book media is successful in improving children's abilities. This busy book media was chosen because it is interactive and can stimulate curiosity (Ita & Dhiu, 2021). Several studies have shown that busy book media is effective in developing various children's abilities.

This busy book media can stimulate children's development according to their developmental stage (Febrianti et al., 2023; Masteni & Azizah, 2023). The busy book media designed by this researcher is made of flannel and contains activities that are suitable for the child's developmental stage, according to the needs and learning themes that will be taught to the child. This busy book media was chosen because it can stimulate curiosity with its interactive nature. The busy book media designed by this researcher is multimedia-based and is adjusted to the activities and repackaged in the form of learning videos that contain the points in the busy book media.

Based on the problems above, the author wants to use multimedia-based busy book media which is also combined with videos that contain learning that will be studied in the busy book. In connection with this, the author is motivated to conduct research and development with the title "Development of Multimedia-Based "Busy Book" Learning Media to Improve Cognitive and Language Skills in Early Childhood"

B. Research Methods

This study uses the Research and Development (R&D) development method. According to Assyauqi (2020) this development model consists of 10 development steps.

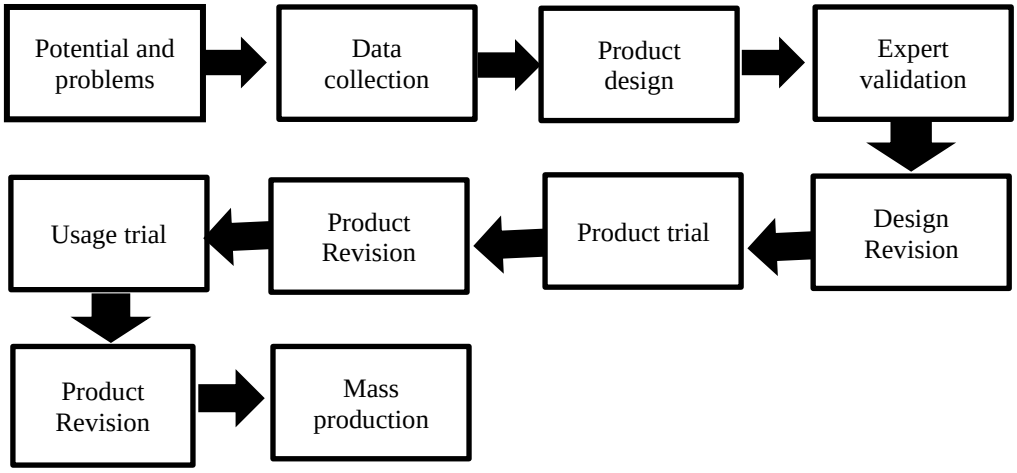

Figure 1. Development Steps

The research instruments include observation, interviews, tests, validation sheets from media experts and material experts on teaching material media, and assessment instruments for limited trials and large-scale trials on students.

Validation by media experts and material experts was carried out by assessing the busy book media. The expert team is a product validation team, namelymedia*busy book* to improve children's cognitive and language skills. The media developed andalso validate the instrument that will be used as an instrument to determine the feasibility of the busy book media being developed.

Calculation of the feasibility of product trials using an assessment scale according to Sugiyono (2016) the assessment scale uses four answer categories, including: very feasible (4), feasible (3), not feasible (2), and very not feasible (1). The average value of each variable can be determined by the class interval of each assessment scale. Saftari (2019:23) How to determine the Likert scale interval using the following formula:

$$Rs = \frac{\mathrm{m} - \mathrm{n}}{\mathrm{b}}$$

Information:
Rs : scale range at scale interval
m : high score on the scale
n : low score on the scale
b : number of classes/categories on the scale

Table 1. Media Eligibility Criteria Based on Average

Criteria	Interval
Very Worth It	3.26-4
Worthy	2.51-3.25
Not feasible	1.76-2.5
Totally unworthy	1-1.75

Then, the questionnaire data was analyzed by calculating the average score (x) using the average formula:

$$\bar{X} = \frac{\sum x}{N}$$

Information :
x̄ : average score
∑x : total score
N : Number of instrument items

Table 2. Media Eligibility Criteria Based on Percentage

Category	Interval
0-80%	Very worthy
61%<P<80%	Worthy
41%<P<60%	Quite decent
20%<P<40%	Not feasible
P<20%	Totally unworthy

To find out that the use of busy book media can improve children's cognitive and language, it is necessary to analyze the data in this study using t-count. The calculation of the t-test paired samples test uses the Statistical Package for the Social Sciences (SPSS) application. With a manual formula such as:

$$t = (S*sqrt(1/n1)+(1/n2)))(x^1 - x^2)$$

Information:
t : t-test score
x^1 : sample mean 1
x^2 : average up to 2
S : standard deviation
n1 : number of samples 1
n2 : number of samples 2

After calculating the t-statistic value, the critical value of t can be found from the t-student distribution table with degrees of freedom df=n-1 and a predetermined level of significance. If the t-statistic value is greater than the critical value of t, then the null hypothesis can be rejected and it can be concluded that there is a significant difference between the two related samples.

C. Results and Discussion

Analysis of trial resultssmall group of 10 children. The following are the results before the busy book media was tested which was carried out during the observation with a value of 20.00 or 67% was reported. While the value obtained after using the Busy Book media was 29.10 or 77%. The increase after using the Busy Book media was 10%. From the limited scale trial, the results obtained were an increase in children's cognitive and language abilities. So the media is worthy of further trials. It can be seen in the following graph:

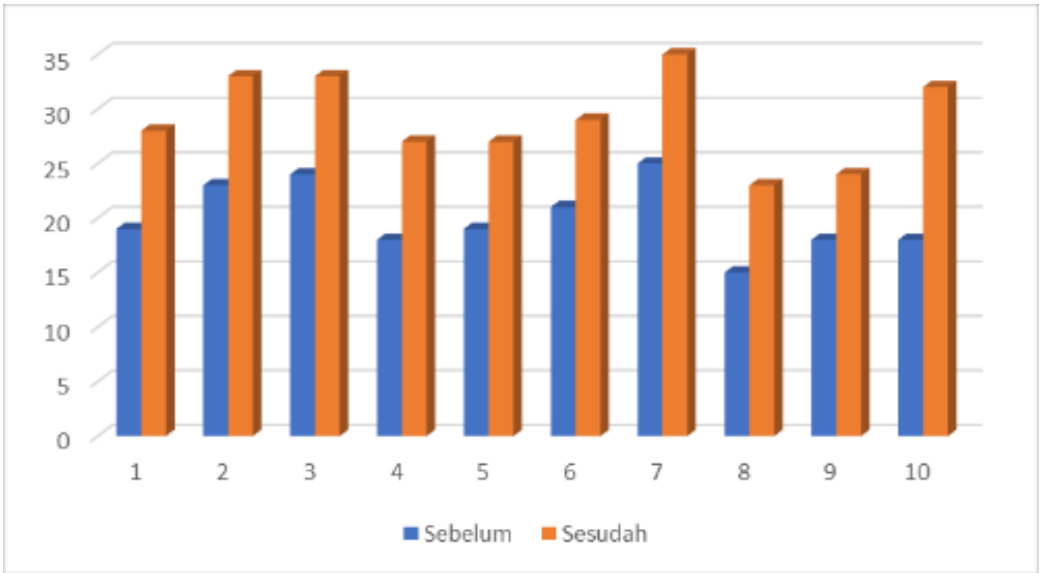

Figure 2. Limited Graph of Children's Assessment Before and After Using Busy Book Media Materials

Based on the results of the normality test on a limited scale trial as follows:

Table 3. Results of Tests of Normality Group B1

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sebelum	.224	10	.168	.930	10	.453
Sesudah	.164	10	.200*	.946	10	.616

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Based on the results of the data values above, it is known that the research data is significant for all data >0.05 which means normal. The results of the T test are as follows:

Table 4. Results of Paired Samples Test Group B1

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Sebelum - Sesudah	-9.100	2.079	.657	-10.587	-7.613	-13.842	9	.000

Based on the calculated t results obtained from SPSS of -13.842 with df 9. When compared with the t table ($\alpha = 0.05$, df = 14) of1.833. If – t table ≤ t-count ≤ t-table then h0 is accepted and vice versa.

Based on the results of this calculation - 1.833 ≤ 13.842 - ≤ 1.833 which is the largest t-count of the t-table then h0: there is no increase in cognitive and language abilities and h1: there is an increase in children's cognitive language abilities in TK Lembayung Indah is accepted. From the t data above, it turns out that H0 is rejected and H1 is accepted. It can be concluded that there is a significant increase from the Busy Book media in the learning process.

The overall results of the limited scale test can be concluded that the multimedia-based Busy Book media to improve children's cognitive and language abilities has reached the category of very suitable for use in learning at Lembayung Indah Kindergarten.

As forResults of large-scale trialsgroup B2 with 11 children. The media was tested before and after using the media, the score was 19.09 if it was presented as 70%. While the score obtained after using the Busy Book media was 29.73 if it was presented as 82%. The increase after using the Busy Book media was 12%.

Based on a large-scale trial in group B2, there was an increase that the Busy Book media was very effective to use. It can be seen in the following graph:

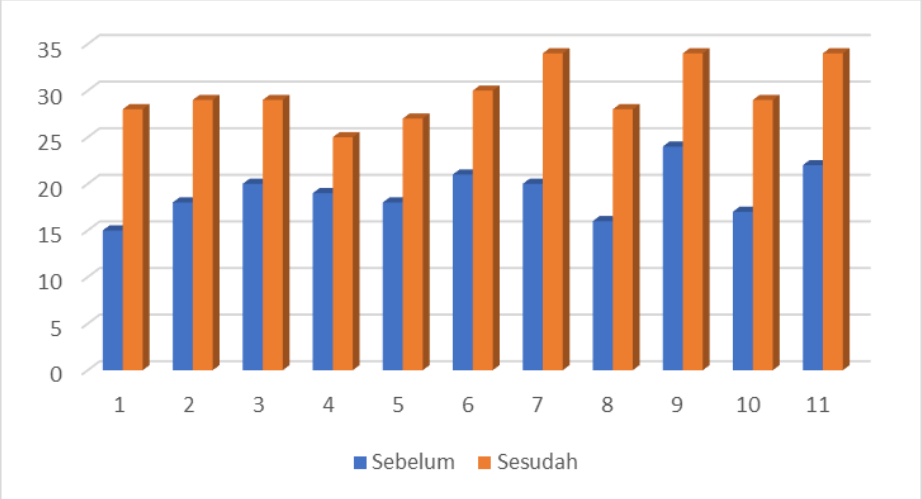

Figure 3. Results of the broad scale of child assessment before and after in group B2

The results of the normality test in the large-scale trial of group B2 are as follows:

Table 5. Results of the Test of Normality Group B2

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sebelum	.114	11	.200*	.985	11	.989
Sesudah	.231	11	.104	.879	11	.102

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Based on the results of the data values above, it is known that the research data is significant for all data > 0.05 which means normal. The results of the t-test on the large-scale trial of group B2 are as follows:

Table 6. Paired Samples Test Results in Group B2

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Sebelum - Sesudah	-10.636	2.292	.691	-12.176	-9.096	-15.389	10	.000

From the calculated t results obtained from SPSS, it is -15.399 with df 10. When compared with the t table ($\alpha = 0.05$, df = 14) it is1.812. If – t table ≤ t-count ≤ t-table then h0 is accepted and vice versa. From the results of this calculation – 1.812 ≤ -15.399 ≤ 1.812 where t-count is greater than t-table then h0: there is no increase in children's cognitive and language abilities and H1: there is an increase in children's cognitive abilities in TK Lembayung Indah, Bengkulu City is accepted. From the results above, it turns out that h0 is

rejected and h1 is accepted. It can be concluded that children have a significant increase from Busy Book media in the learning process.

The results of the large-scale group B3 with 15 children. The Busy Book media was tested before and after using the Busy Book media, the value obtained was 16.93 if it was presented as 65%. While the value obtained after using the Busy Book media was 23.07 if it was presented as 87%. The increase after using the Busy Book media was 22%.

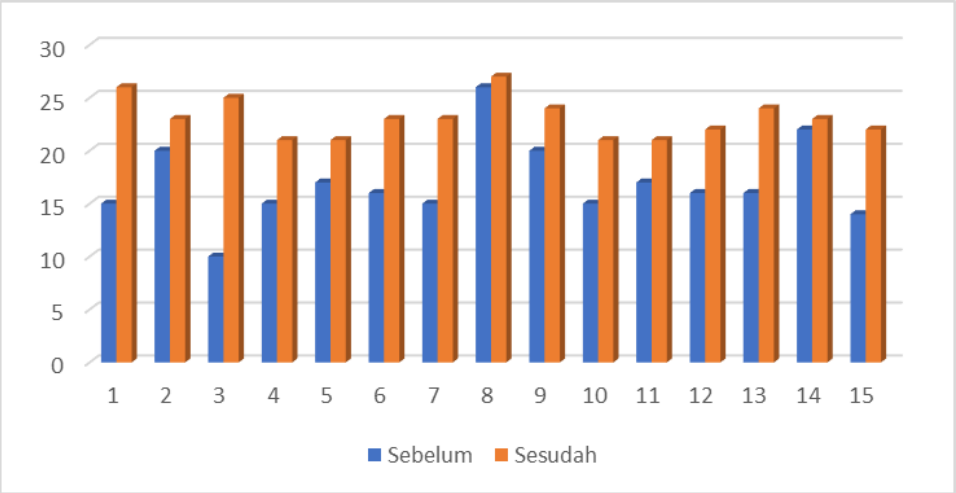

Figure 4. Results of the broad scale of child assessment before and after in group B3

The results of the normality test in the large-scale trial of group B3 are as follows:

Table 7. Results of the Test of Normality Group B3

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sebelum	.226	15	.037	.909	15	.133
Sesudah	.181	15	.200*	.907	15	.123

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Based on the results of the data values aboveIt is known that the research data is significant for all data > 0.05 which means normal. The t-test on the large-scale trial of group B3 is as follows:

Table 8. Paired Samples Test Results in Group B3

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Sebelum - Sesudah	-6.133	3.681	.951	-8.172	-4.095	-6.453	14	.000

From the calculated t results obtained from SPSS, it is -6.453 with df 14. When compared with the t table ($\alpha = 0.05$, df = 14) it is1.761. If – t table ≤ t-count ≤ t-table then h0 is accepted and vice versa.

From the results of this calculation - 1.761 ≤ -6.453 ≤ 1.761 which is the t-count greater than the t-table then h0: there is no increase in children's cognitive and language abilities and H1: there is an increase in children's cognitive and language abilities at Lembayung Indah Kindergarten, Bengkulu City is accepted. It can be concluded that there is an increase in children's cognitive and language abilities that have reached a very effective category for further use in learning.

Based on the results of research and development, it can be concluded that multimedia-based Busy Book media can effectively improve cognitive and language abilities of early childhood. This busy book media is very useful for teachers because so far teachers have never used this media to improve cognitive and language abilities of early childhood. Azhar (2017: 58) said that learning media is everything that can be used to convey messages, stimulate students' thoughts, feelings, attention, and willingness so that it can encourage the learning process.

In addition, by using media in the form of flannel books equipped with multimedia-based activities in the learning process, the learning activities will be interesting and fun for children so that during the learning process, children do not feel bored. When teachers use busy book media, it makes it easier for teachers to convey the material being taught so that children can understand and understand the purpose of the learning more easily. This Busy Book media can be used by teachers and children because there is a usage guide that combines learning activities with interesting images according to the theme being taught and is equipped with activities to determine cognitive and language abilities in children.

According to a study titled Development of Busy Book Learning Media to Improve Cognitive Abilities of Children Aged 5-6 Years (Widiastuti, 2022: 235-251), Busy Book media can enhance cognitive abilities in children between the ages of 5 and 6. Accordingly, Busy Book media can help children between the ages of 5 and 6 develop their language skills (Ningsih, 2023: 331-341).

1. The suitability of multimedia-based Busy Book mediato increasecognitive and language abilities in early childhood. Based on the results of research and development, this Busy Book media is suitable for use after going through 10 stages of development using the Borg and Gall method. The Busy Book media that was developed can improve cognitive and language abilities. Through this busy book media, teachers can stimulate children by introducing colors, shapes, sizes and language abilities that each child has. In agreement with this, according to Anissa (2022) that the Busy Book media is able to help in children's cognitive development can be done by playing symbolically through the help of the Busy Book media which is designed with the introduction of the concept of numbers through objects.
2. The multimedia-based busy book media that was developed was effective in use as seen from the results of the T-test. The busy book media that has been developed directly can help children in understanding the theme material that will be delivered because it is equipped with images that are in accordance with the learning topic.

In line with this, Zainal's research (2021) states that through Busy Book media, it can help children apply cognitive concepts, including in recognizing numbers, recognizing the concept of size, the concept of shape and color. Designing an attractive Busy Book media can be done by designing Busy Books according to the learning needs that will be taught.

D. Conclusion

The development of teaching material media that is developed is suitable for increasing concentration carried out at PAUD Negeri Pembina 1, Bengkulu City. It can be concluded based on the research results obtained from the Busy Book media to improve cognitive and language abilities of early childhood children, it can be concluded as follows:

1. The development of multimedia-based busy book media can improve the cognitive and language abilities of early childhood. The development of this media can be accessed with a YouTube link and a word wall application.
2. The development of multimedia-based busy book media can improve cognitive and language skills. It can be concluded that this busy book media is declared feasible as a learning media that can help improve children's cognitive and language skills because it meets the aspects of needs, material feasibility, appearance, and language. This busy book media is designed with two displays, namely with an application and a flannel book form that has two sub-themes, namely the theme of fruit plants and vegetable plants.
3. This Busy Book media was skillfully created to assist teachers in providing learning materials that are simple for kids to comprehend. During the learning process, the classroom environment becomes enjoyable, and it can inspire kids' critical thinking to actively participate in class.

E. Acknowledgment

We express our deepest appreciation to the Principal and all teachers of Lembayung Indah Kindergarten, Bengkulu City who have given permission for this research to be carried out.

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