



Development of Plywood Media into a Magic Drawer to Improve the Cognitive of Children Aged 4-5 Years at Birrul Walidain Kindergarten Gondangrejo Pekalongan East Lampung

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Abstract

Birrul Walidain Gondangrejo Kindergarten, East Lampung, is an early childhood education institution that seeks to develop all aspects of child development, especially children's cognitive abilities through the use of concrete and interactive learning media. To optimize learning, it is necessary to add media with a new model so that the available teaching media is more maximal and varied. In this study, the "Magic Drawer" media was developed, where the term "magic" philosophically refers to a media that is able to foster curiosity, provide an interesting learning experience, and present educational surprises that stimulate the thinking skills of children aged 4-5 years. This research aims to develop plywood media into a "Magic Drawer" and find out its effectiveness in improving the cognitive abilities of children aged 4-5 years. The method used is Research and Development (R&D) with a 4D (Define, Design, Develop, Disseminate) model. Data collection techniques include observation, interviews, and documentation. The results of validation by material experts and media experts show that the "Magic Drawer" media is very suitable for use in early childhood learning. Trials limited to children aged 4-5 years showed an increase in cognitive abilities, such as recognizing colors, shapes, numbers, and the ability to group and think logically. Based on the results of quantitative and qualitative data analysis, the "Magic Drawer" media is effective and interesting to use in learning activities. Thus, plywood-based learning media developed into a "Magic Drawer" can be used as an alternative educational media to support the optimal improvement of children's cognitive abilities

Keywords: 4-5 year olds, Cognitive, Magic Drawers, Plywood Media

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INTRODUCTION

Learning media has an important role in helping teachers convey material effectively so that the learning process becomes more interactive and fun. The creative use of media can help children understand abstract concepts, develop critical and creative thinking skills, and deepen their understanding of the material presented (Sudirman, 2014). Based on the results of observations at Birrul Walidain Kindergarten, the use of simple materials that are easy to obtain can be an innovative solution to stimulate children's cognitive development economically while instilling concern for the environment. One of the alternatives that can

be developed is the use of plywood as an environmentally friendly and functional learning medium. The media innovation in the form of the Magic Drawer is designed to stimulate the cognitive abilities of children aged 4-5 years through active and fun play activities. The results of the pre-survey show that teachers need more interesting and meaningful learning media, especially for materials that require visual representation such as geometry, object grouping, letters, numbers, colors, and art (Aisyah, 2017).

The Magic Drawer Media is designed with an attractive appearance, bright colors, and interactive shapes that can increase children's attention and motivation to learn. Each drawer is equipped with a themed picture as a clue to guess the contents inside, thus encouraging children to think actively and exploratory. With the guidance of teachers through *the scaffolding* approach in the proximal development zone (ZPD), this media is expected to increase curiosity and help children understand concepts more deeply (Vygotsky, 1978). The use of this media also provides concrete experience for children in recognizing, distinguishing, and classifying objects according to categories. These activities not only help with concept understanding, but also train fine motor skills, concentration, patience, and language skills for children (Saudia & Wardani, 2022). This is in line with the characteristics of 4-5 year olds who are at an important stage of cognitive development, where they begin to understand basic concepts such as color, shape, and size through direct experience (Khadijah & Amelia, 2021).

In addition, the development of children's cognitive abilities also has a foundation in Islamic values. In the Qur'an, Surah Al-Baqarah verse 31 explains that Allah SWT taught the Prophet Adam AS the names of objects as the basis for the ability to think, know, and understand the environment. This shows that learning carried out through concrete object recognition will make it easier for children to understand knowledge. Therefore, the development of early childhood cognitive abilities requires learning media that is concrete and manipulative (Rozana et al., 2020).

The use of learning media in the field is still not optimal. At Birrul Walidain Kindergarten, children aged 4-5 years still need the right stimulation to develop cognitive abilities such as remembering numbers, colors, shapes, and grouping objects. Based on the results of pre-survey interviews, the use of learning media in the classroom needs new innovations, so that existing learning media become more optimal. Teachers say that children become more enthusiastic when learning using more innovative and interactive learning media, because the use of concrete media is able to increase children's focus and interest in learning (Humaida, 2025).

Based on these problems, the development of trplek media into Magic Drawers is one of the alternatives that is expected to increase the focus and interest of children aged 4-5 years more optimally. The data from the observation of children's cognitive abilities at Birrul Walidain Gondangrejo Kindergarten, Pekalongan, East Lampung, aged 4-5 years are as follows:

Table 1. Pre-Survey Data on Cognitive Ability

No	Name	Development Achievement Indicators					Ket.
		1	2	3	4	5	
1.	Abidzar Al Ghifari E.	BB	BB	MB	BB	BB	BB
2.	Eid al-Fitr Ramadan	BB	BB	BB	BB	BB	BB
3.	Balqis Ufaira Sulaiman	BB	BB	BB	BB	MB	BB
4.	Daffa Naufal El Rafif	BSH	MB	BB	BSH	BSH	BSH
5.	Zeline Hikary Mahesa	BB	MB	BB	BB	BB	BB
6.	Farhan Risqy Prasetyo	BB	BB	BB	MB	BB	BB
7.	JJ Jio Narendra's son	BB	BB	BB	BB	MB	BB

8.	Luckita Zunna	BB	MB	BB	BB	BB	BB
9.	Muhammad Ansa Zayd	MB	MB	MB	MB	MB	MB
10.	Nahla Saqueena Humaira	BB	BB	BB	MB	BB	BB
11.	Rafqi Deeba El-yahsya	BB	BB	BB	BB	MB	BB
12.	Salwa Dwi Hanifah	BB	MB	MB	MB	MB	MB

Source : Data from the Documentation of the Cognitive Ability Value of Children of Kindergarten Birrul Walidain YPP Minhajuth Thullab Lampung 02 Gondang Rejo, Pekalongan District, East Lampung Regency, August 27, 2025

Based on the results of the analysis of indicators in three categories, namely Not Yet Developing Cognitively for 4-5 year olds at Birrul Walidain Kindergarten, it can be seen that there is a variation in abilities divided into categories, namely Not Yet Developed (BB), Starting to Develop (MB), and Developing According to Expectations (BSH). Of the total 12 children, there is 1 child who is already in the Developing According to Expectations (BSH) category, namely *Daffa*. A total of 2 children are in the Starting Development (MB) category, namely *Ansa and Salwa*, while the other 9 children are still in the Undeveloped (BB) category, namely *Abidzar, Silfa, Balqis, Zeline, Farhan, Jeje, Zuna, Nahla, and Rafqi*. These results show that some children still need stimulation and cognitive guidance in order to achieve the Developing Expectation (BSH) category.

Jean Piaget explains that early childhood learns through direct interaction with concrete objects, while Vygotsky emphasizes the importance of *scaffolding* in the *Proximal Developmental Zone (ZPD)*, and Bruner proposes the enactive, iconic, and symbolic stages in the thought process (Nur Laily Zakiyah & Akhmad Iqbal, 2025). In line with this theory, the Magic Drawer game supports the cognitive development of children aged 4-5 years in a fun way through concrete activities and teacher guidance. Given the limited facilities in some institutions, the use of simple materials such as plywood can be an alternative learning media that is creative, economical, and innovative.

This research focuses on the development of plywood-based learning media in the form of Magic Drawers which is designed to stimulate early childhood cognitive abilities. This media is used through guessing, grouping, and recognizing objects based on colors, shapes, and symbols, so that they can train logical thinking skills, memory, and simple problem-solving. The use of bright colors in drawers and instruction cards is expected to provide attractive visual stimuli and increase children's attention and concentration in the learning process. With this background, this study aims to develop and test the effectiveness of Magic Drawer learning media in improving the cognitive abilities of children aged 4-5 years at Birrul Walidain Gondangrejo Kindergarten, Pekalongan, East Lampung. The use of this media is expected to be an innovative, simple, and effective learning solution in supporting early childhood cognitive development.

METHOD

The development model in this study adapts Borg & Gall's simplified measures to fit the context of early childhood education. In general, the stages carried out include needs analysis, planning, initial product development, limited trials, product revisions, to produce final products that are ready to be used in learning. According to Borg & Gall, research and development (R&D) is a systematic process to produce educational products while testing their effectiveness through the stages of planning, testing, and revision until a product is suitable and effective to use.

In this study, the development of plywood media into a Magic drawer refers to the 4D (*Define, Design, Develop, Disseminate*) development model introduced by *S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel*. This model was chosen because it is systematic

and relevant in developing learning media that is in accordance with the characteristics of early childhood.

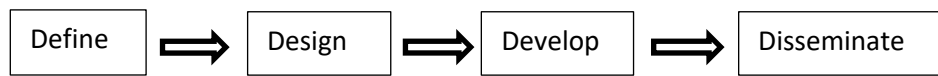


Figure 1. 4D Model Steps

RESULTS AND DISCUSSION

Initial Product Development Results

This research was conducted at Birrul Walidain Gondangrejo Kindergarten, Pekalongan, East Lampung as a location for the development of learning media. In this study, researchers developed a plywood-based media in the form of Magic Drawers to stimulate the cognitive abilities of children aged 4–5 years. This media is designed in the form of a simple drawer with a bright color display and is equipped with learning cards that contain the concept of numbers, colors, and shapes. Through this media, children carry out activities of entering, taking out, and matching objects according to the learning category. The activity aims to train logical thinking skills, get to know basic concepts, improve memory, and develop simple problem-solving skills in children. In this study, the development of Magic Drawer media was carried out using R&D (*Research and Development*) research and development methods with a simplified Borg & Gall model, including the stages of needs analysis, planning, product development, testing, revision, and refinement of the final product.



Figure 2. Initial product (Plywood Media)



Figure 3. Development Results (Magic Drawer)

Product Revision Results

The product revision was carried out based on the results of validation by media experts and material experts on the plywood-based media "Magic Drawer" in an effort to improve the cognitive abilities of children aged 4-5 years at Birrul Walidain Gondangrejo Kindergarten, Pekalongan, East Lampung. The validation results showed that the media obtained a good category in terms of materials, safety, and ease of use, as well as a *very good category* in terms of design and attractiveness. In terms of material, media is considered to

be in the good to *very good* category because it is relevant to the goals of early childhood cognitive development.

Based on validator input, the revision is focused on simplifying and sharpening the visual of the drawing card to make it easier for children to recognize. After revision, the Magic Drawer media was declared suitable for use in the product trial stage.



Figure 4. Product After Revision

Final Product Review

The final product of this research is in the form of a "Magic Drawer" learning media made of plywood which has gone through the validation stage by media experts and material experts, and revised according to the validator's recommendations. This media was developed as a concrete learning tool that aims to stimulate the cognitive abilities of children aged 4–5 years at Birrul Walidain Gondangrejo Kindergarten, Pekalongan, East Lampung. Based on the results of the validator assessment and the product improvement process, Laci Ajaib media obtained a *good category* and was declared suitable for use in early childhood learning. This medium is designed to facilitate the introduction of the concepts of numbers, colors, and shapes, as well as develop simple classification and problem-solving skills through structured and meaningful play activities.

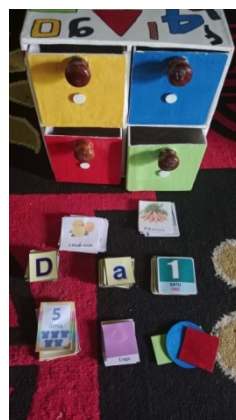


Figure 5. Final Products

Product Trial Results

The trial was carried out on 12 children at Birrul Walidain Kindergarten Gondangrejo Pekalongan, East Lampung to find out the children's response to the use of Magic Drawer media.

Children's Cognitive Abilities Before Using Magic Drawer Media

Based on the results of initial observations made on Monday, February 2, 2025, before the use of plywood media became the Magic Drawer, the cognitive abilities of early childhood aged 4-5 years at Birrul Walidain Gondangrejo Kindergarten are still not optimally developed. This can be seen from the following data:

Table 2. Presurvey Data on Early Childhood Cognitive Ability Age 4-5 Years at Birrul Walidain Kindergarten

No	Name	L/P	Development Achievement					Ket.
			Indicators					
			1	2	3	4	5	
1	Abidzar Al Ghifari E.	L	BB	BB	MB	BB	BB	BB
2	Eid al-Fitr Ramadan	L	BB	BB	BB	BB	BB	BB
3	Balqis Ufaira Sulaiman	P	MB	BB	BB	MB	MB	MB
4	Daffa Naufal El Rafif	L	BB	MB	BB	BB	BB	BB
5	Zeline Hikary Mahesa	P	MB	BB	BB	BB	BB	BB
6	Farhan Risqy Prasetyo	L	BB	BB	MB	BB	BB	BB
7	JJ Jio Narendra's son	L	BB	BB	BB	MB	BB	BB
8	Luckita Zuna	P	BB	BB	BB	BB	MB	BB
9	Muhammad Ansa Zayd	L	BB	MB	MB	MB	MB	MB
10	Nahla Saqueena Humaira	P	BB	BB	MB	BB	BB	BB
11	Rafqi Deebe El-Yahsya	L	BB	MB	BB	MB	MB	MB
12	Salwa Dwi Hanifa	P	MB	BB	MB	MB	MB	MB

Source: Data on the Results of Documentation of Children's Cognitive Ability Scores of Kindergarten Birrul Walidain Gondangrejo, Pekalongan District, East Lampung Regency Gondangrejo, 02 February 2026

Early Childhood Cognitive Ability Indicators:

1. Getting to know the base colors
2. Getting to know simple shapes (Circles, Triangles, and Squares)
3. Getting to know the numbers 1-10
4. Match colors based on color and shape
5. Groups objects by category (Fruits, Animals, Vegetables, etc.)

Description:

BB = Not yet developed

MB = Start Growing

BSH = Growing Up With Expectations

BSB = Develop Very Well

Based on the data in the table, the cognitive abilities of children aged 4-5 years at Birrul Walidain Kindergarten are still in the category of not developing optimally. Of the total 12 children, as many as 8 children are in the *Not Developing* category and 4 children are in the *Starting to Develop* category, and there are no children who have reached the *Developing As Expected* or *Very Well Developing* categories.

The findings indicate that the learning stimulation that was applied previously has not been effective in developing children's cognitive abilities, so the use of more concrete, varied, and interesting learning media is needed to support the learning process optimally.

Children's Cognitive Abilities After Using Magic Drawer Media

The results of the study showed that after the implementation of learning using plywood-based media "Magic Drawer", there was an increase in the cognitive ability of children aged 4–5 years. Children show a higher level of enthusiasm in participating in learning activities, as well as experiencing an increase in recognizing the concept of numbers, grouping, and counting objects simply

Based on the results of post-media observation carried out on February 02-06, 2026, most of the children have reached the category of *Developing As Expected to Develop Very Good*. These findings indicate that the use of Magic Drawer media is effective in stimulating and developing the cognitive abilities of children aged 4-5 years.

Cognitive abilities of children aged 4–5 years at Birrul Walidain Gondangrejo Kindergarten have reached the category of *Developing As Expected*. Of the 12 children, there were 1 child in the *Starting Development* category, 7 children in *the Developing as Expected* category, and 4 children in *the Very Good Development* category, and no more children were found in the *Not Developing* category. These results show a significant increase after the use of Magic Drawer learning media. Therefore, this media has the potential to be implemented at the age level and other educational units as an alternative learning media that is effective in supporting the cognitive development of children aged 4-5 years.

Discussion

Children Play Using Magic Drawer Media With the Assistance of Teachers and Researchers

Based on the results of observations, after getting to know the contents of each drawer, children carried out play activities using the Magic Drawer media with the assistance of teachers and researchers. Children open drawers, take cards or objects, then group and match them according to categories, such as fruits, vegetables, geometric shapes, and numbers. This activity stimulates thinking skills, concept recognition, and the completion of simple tasks in a directed manner. Image documentation is used as supporting evidence for observational results, which shows children's activity in recognizing the numbers 1–10 and matching objects based on color and shape as indicators of cognitive development.



Figure 6. Guess the contents of the drawer



Figure 7. Opening the Drawer



Figure 8. View Drawer Contents

Researchers Ask Questions After Playing Magic Drawer Media

Based on the results of observations, interviews, and documentation, after playing activities using the Magic Drawer media, the researcher accompanied by the teacher asked questions related to materials such as fruits, vegetables, geometric shapes, and numbers. This activity helps improve children's cognitive abilities and makes them more enthusiastic and active in learning. The image documentation is used as supporting evidence for the observation results. The documentation shows that the researcher asks questions to children after the play activity, to find out the child's understanding of the material that has been learned.



Figure 9. Teacher Asks Questions

The Effectiveness of Using Magic Drawer Media Made of Plywood to Improve Cognitive Ability in Early Childhood Aged 4-5 Years

Based on the results of the trial, the effectiveness of Magic Drawer media in improving the cognitive abilities of children aged 4-5 years was shown through a shift in developmental achievement from the Undeveloped (BB) category, namely children who have not shown ability indicators; Begin to Develop (MB), i.e. children begin to show abilities with help; Developing According to Expectations (BSH), that is, children are able to do independently according to indicators; to Developing Very Well (BSB), which is that children are able to do independently and consistently. The increase from BB and MB to BSH and BSB shows that the media used is effective in stimulating the cognitive development of children aged 4-5 years.

These findings are in line with the research of Assyifa, F. N., Rohita, and Nurfadilah who showed that interactive media improves children's focus and thinking skills, as well as Kasiyati who proved the effectiveness of concrete media in improving classification and memory. In addition, Wardana, V. et al. and Purnamasari emphasized that concrete activities, play, and social interaction play an important role in children's cognitive development according to Piaget and Vygotsky's theory. Rahmawati also showed that plywood media is effective and safe to use, while Sri Widayati, et al. prove that innovative

media are able to improve cognitive skills, especially in recognizing numbers. Thus, the results of this study confirm that Magic Drawer media is effective as a concrete, interactive, and innovative learning medium in improving the cognitive abilities of children aged 4–5 years.

CONCLUSION

The results of this study are as follows: The development of plywood media into a Magic Drawer at Birrul Walidain Gondangrejo Kindergarten, East Lampung is carried out through several steps, namely: 1) Preparing the Magic Drawer media, 2) Introducing and explaining the function and how to use media to children, 3) Dividing children into several small groups, 4) Children open drawers and take cards/objects randomly (fruits, vegetables, geometry, and numbers), 5) Children group and arrange objects according to categories or teachers' instructions, and 6) Researchers provide questions after play activities according to the learning material. The effectiveness of the use of Magic Drawer media showed an improvement in the cognitive abilities of children aged 4–5 years. After the use of media, most children reached the category of Developing As Expected and Developing Very Good, and no more children were found in the Undeveloped category. Thus, the Magic Drawer media has been declared effective in improving children's cognitive abilities.

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