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Development of Creative House Educational Game Tools to Develop Cognitive Aspects in Children Aged 5-6 Years

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Abstract

This study aims to develop and test the effectiveness of Creative House Educational Play Tools (APE) in improving the cognitive abilities of children aged 5–6 years. The method used is Research and Development (R&D) with the Borg and Gall model which is simplified into seven stages, including potential and problem analysis, data collection, product design, expert validation, revision, limited trial, and final revision. The subjects of the study were 12 children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya with saturated sampling techniques, and involved teachers, school principals, media experts, and material experts as validators. The results of the study showed that APE Rumah Kreatif is feasible and effective in improving children's cognitive abilities, shown by a significant increase from the category of Not Yet Developed to Start Developing, Developing as Expected, to Developing Very Well after the use of media. In addition, children become more active, enthusiastic, and able to understand symbolic concepts better through play activities. Thus, APE Rumah Kreatif is proven to be an innovative learning medium that is able to create active, interactive, and fun learning and contribute to the development of early childhood cognitive abilities based on play-based learning.

Keywords: *Educational Play Tools, Cognitive Ability, Early Childhood, Learning Media, Creative Home*

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INTRODUCTION

Early childhood is an individual who is in a very crucial developmental phase in human life, because at this stage there is very rapid growth both physically and psychologically. These developments include cognitive, linguistic, social-emotional, moral, and motor aspects that are interrelated and require appropriate stimulation. This period is often referred to as the *golden age* because the development of the child's brain reaches about 80% of its total capacity, so the quality of stimulation provided will greatly determine the quality of the child's development in the future. Therefore, early childhood education must be designed systematically and in accordance with the characteristics of child development in order to provide an optimal learning experience. Learning that is not in accordance with the child's developmental stage can hinder the potential that they have from an early age. This is in line with the opinion of Komari and Aslan who stated that proper stimulation at an early age plays an important role in optimizing children's overall potential (Komari & Aslan, 2025).

Stimulation of development in early childhood is an important aspect that cannot be ignored because it is directly related to children's readiness to face the next level of education. Children need concrete, contextual, and fun learning experiences to be able to develop their thinking skills optimally. In practice, there is still a tendency to learn that emphasizes the academic aspect excessively so as to reduce the essence of learning through play. This phenomenon is also expressed by Salsabilah Oktaviani et al. who stated that academic pressure in early childhood can hinder children's natural development and reduce interest in learning (Oktaviani et al., 2025). Therefore, a more humane learning approach is needed and in accordance with the characteristics of early childhood. One effective approach is *play-based learning*. This approach allows the child to learn actively without pressure.

Play is a very important activity in early childhood life because through play children can learn to know the environment, develop creativity, and improve cognitive and social abilities naturally. Play activities provide opportunities for children to explore, imagine, and build knowledge through hands-on experience. In addition, play can also improve children's logical thinking, problem-solving, and concentration skills. This is reinforced by research by Intan Nurhusnaina et al. who stated that play has a significant role in improving social and cognitive abilities in early childhood (Nurhusnaina et al., 2024). Thus, play serves not only as an entertainment activity, but also as a primary means of early childhood learning. Therefore, the integration between play and learning is very important in early childhood education.

One of the media that can support play while learning activities is Educational Game Tools (APE). APE is a learning media specifically designed to help children develop various aspects of development optimally. The use of APE allows children to learn actively through object manipulation, exploration, and direct interaction with the learning environment. According to Agustia, APE is a game tool designed to provide a meaningful learning experience for early childhood (Agustia, 2023). In addition, the use of APE can also increase children's motivation to learn and interest in learning activities. This is supported by Fasha and Hibana who state that the proper use of APE can improve the quality of early childhood learning (Fasha & Hibana, 2023). Thus, APE has a strategic role in creating effective and enjoyable learning.

However, the implementation of the use of APE in early childhood education institutions still faces various obstacles, such as limited numbers, lack of variety, and not optimal media design that suits the needs of children's development. This condition is also found in RA Miftahut Tholibin Sukadana Jaya, where the available APE is still general and has not been specifically designed to develop the cognitive aspects of children. Based on the results of initial observations, the learning process is still dominated by conventional methods such as lectures and worksheets, so it does not provide a meaningful learning experience for children. This has an impact on children's low cognitive abilities, especially in logical-mathematical aspects such as recognizing patterns, grouping objects, and simple calculations. Presurvey data shows that most children are still in the undeveloped category and are starting to develop (Presurvey Data, 2025). This condition shows that there is a gap between development expectations and real conditions on the ground.

In line with the standards for early childhood development contained in the Permendikbud on Child Development Achievement Level Standards (STPPA), children aged 5-6 years should be able to recognize numbers, group objects, and understand simple mathematical concepts. However, the reality on the ground shows that these achievements are not optimal. This shows the need for innovation in learning media that can stimulate children's cognitive abilities more effectively. Previous research has shown that the use of APE based on concrete games is able to significantly improve children's numeracy and logical thinking skills (Husaini et al., 2025). In addition, manipulative media has also been shown to be effective in increasing children's concentration and learning motivation

(Ariyanti & Muslimi, 2025). Thus, the development of innovative learning media is an urgent need.

Several previous studies have examined the effectiveness of the use of APE in improving early childhood cognitive abilities. Research by Sulistina et al. shows that APE based on maze games is able to improve children's problem-solving and concentration skills (Sulistina et al., 2025). Rahmawati's research also shows that APE PAHIBU is effective in improving children's classification and pattern recognition skills (Rahmawati, 2023). In addition, research by Leli Fertiliana Dea et al. revealed that number card media can improve early childhood symbolic thinking skills (Dea et al., 2023). However, these studies are still limited to one type of media and have not integrated various cognitive aspects in a single comprehensive learning medium. Therefore, it is necessary to develop a more innovative and integrative ATE.

Based on the study, there is a research *gap*, namely the lack of development of APE that integrates various components of cognitive learning in one interesting and contextual medium. The novelty in this study lies in the development of APE "Creative House" which is designed in a three-dimensional form and combines various learning activities such as the recognition of numbers, letters, patterns, and classifications in one medium. This media is designed based on *a play-based learning* approach that allows children to learn actively, exploratory, and fun (Hasdiana & Naini, 2025). In addition, this media also pays attention to safety aspects, visual appeal, and suitability for the child's developmental stage. Thus, this research is expected to make a new contribution to the development of early childhood learning media.

This study aims to develop and test the effectiveness of Creative House Educational Toys in developing the cognitive aspects of children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya. The variables studied included the development of APE media as an independent variable and children's cognitive ability as a bound variable. The method used in this study is research and development with the stages of design, validation, trial, and evaluation of products. It is hoped that through this research, feasible, effective, and widely used learning media can be produced in early childhood learning. In addition, this research is also expected to contribute to the development of early childhood education, especially in the field of educational game-based learning media.

METHODS

This study uses a Research and Development (R&D) approach which aims to develop and test the feasibility and effectiveness of Creative House Educational Play Tools (APE) in developing the cognitive aspects of children aged 5–6 years. This method was chosen because it is able to produce products while testing its use in the context of real learning. The development model used refers to Borg and Gall adapted by Sugiyono, but is limited to seven stages, namely identification of potentials and problems, data collection, product design, design validation, design revision, limited trial, and final product revision (Sugiyono, 2017; Sugiyono, 2021). The research was carried out at RA Miftahut Tholibin Sukadana Jaya for the 2025/2026 Academic Year with a population of 12 children aged 5-6 years, so the sampling technique used was saturated sampling. In addition, this research also involves teachers and principals as informants, as well as material experts and media experts as validators who are purposively selected based on their competencies (Margono, 2022). The research instruments included observation sheets, Likert scale questionnaires, interview guidelines, and documentation. Observation was carried out on a non-participant basis to observe children's cognitive development directly (Arikunto, 2018), while questionnaires were used to assess the feasibility of media by validators with the categories of very feasible, feasible, quite feasible, and less feasible. Interviews are conducted in a semi-structured manner to explore information on learning needs, and documentation is used to supplement the research data.

The research procedure begins with a needs analysis through observation and interviews, followed by the design and creation of a Creative House APE that integrates elements of numbers, patterns, and classifications. The product is then validated by material experts and media experts to assess the feasibility of content and design, then revised based on the input provided before the trial is limited to children. The data analysis technique uses a combination of qualitative and quantitative, where qualitative data is analyzed descriptively from observation, interviews, and documentation, while quantitative data from the questionnaire is analyzed using a Likert scale by calculating the average score to determine the feasibility level of the product (Prasetyo & Wibowo, 2020). The product is declared feasible if it obtains a score of ≥ 2.51, while the analysis of children's cognitive development refers to the categories of BB, MB, BSH, and BSB based on the PAUD assessment guidelines (Ministry of Education and Culture, 2015). The validity of the data was maintained through triangulation of sources and methods as well as expert validation, while the reliability of the instrument was tested through the consistency of measurement results (Lestari & Yudhanegara, 2020). Although this study has limitations on the relatively small sample count and limited trials, it still makes it possible to produce viable products and make a practical contribution to the development of early childhood learning media.

RESULTS AND DISCUSSION

Product Development Results

Potential and Problems

Based on the results of observations at RA Miftahut Tholibin Sukadana Jaya, the cognitive abilities of children aged 5-6 years are still not optimally developed, especially in recognizing number symbols, matching numbers with the number of objects, grouping by shape and color, and understanding patterns and simple calculations. This condition is influenced by the limitations of the use of varied learning media, where the learning process is still dominated by conventional methods such as teacher explanations and worksheets so that children are less actively involved. In fact, early childhood is easier to understand concepts through play activities that use concrete and interesting media. Therefore, it is necessary to develop Educational Game Tools (APE) that are able to optimally stimulate children's cognitive abilities. One of the alternatives that can be developed is the Creative House APE, which is a three-dimensional house-shaped media that is visual and manipulative, equipped with various activities such as shape puzzles, number cards, pattern games, and object classification according to the child's developmental stage. In addition, this media is easy to make from simple and safe materials, so it has the potential to be an effective solution in improving early childhood cognitive abilities at RA Miftahut Tholibin Sukadana Jaya.

Data Collection

Data collection in this study was carried out through observation, interview, and documentation techniques to obtain a comprehensive picture of the cognitive development of children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya. Observation is carried out directly in the classroom to assess the child's ability to recognize numbers, match number symbols, group objects, and understand patterns, as well as observe the process of using Creative House Educational Game Tools (APE) in learning. Interviews were conducted with school principals and teachers to explore information related to school profiles, the condition of infrastructure facilities, children's cognitive abilities, and obstacles faced in learning. Meanwhile, documentation is used to complete data in the form of school profiles, the number of students, and learning activities that take place. The combination of these three techniques aims to improve the accuracy of data through triangulation so that the research results become more valid and trustworthy.

Product Design

The product design in this study is in the form of Creative House Educational Game Tools (APE) which is designed to develop the cognitive aspects of children aged 5–6 years through an interesting learning while playing concept and in accordance with children's characteristics. This media is made in the form of a three-dimensional house that is familiar, colorful, and uses safe materials and sizes that are suitable for children, so it is easy to use in learning activities. APE Creative House is equipped with various game components such as the recognition of numbers, shapes, colors, as well as matching and grouping activities that aim to stimulate logical thinking skills and understanding of concrete concepts. The design is also adjusted to the needs of children's cognitive development and the learning theme at RA Miftahut Tholibin Sukadana Jaya so that it can be used optimally. Thus, this media is expected to be able to increase children's active involvement in the learning process as well as become an innovative alternative in early childhood learning.

Design Validation

The design validation in this study was carried out to assess the feasibility of the Creative House Educational Game Tools (APE) before being used in learning, through assessments by media experts and material experts using instruments that have been prepared. Media experts assess the aspects of appearance, color attractiveness, size, symbol clarity, and material safety, while material experts assess the suitability of the content with children's cognitive development, conceptual accuracy, and suitability with the level of early childhood development. The validation results showed that APE Rumah Kreatif obtained an average score of 3.60 from media experts and 4.00 from material experts, both of which were included in the very feasible category. This shows that the media developed has met the feasibility criteria both in terms of design and material, so that it can be used in learning to optimally stimulate the cognitive abilities of children aged 5-6 years.

Design Revision

The design revision was carried out after a validation process by media experts and material experts to correct weaknesses and improve the APE Creative House product. Based on suggestions from media experts, the improvements made include the addition of the writing "APE Creative House", the addition of vowel and consonant letters cards as well as flashcards with pictures and writings that can be pasted, as well as the addition of variations of images such as animals or fruits along with their number and symbols. All of these suggestions have been accommodated by researchers in improving products so that media becomes more attractive, varied, and in accordance with the needs of children's development. After revision, the product was not revalidated because it had obtained a very feasible category from the validators, so it was immediately continued to the trial stage for students.

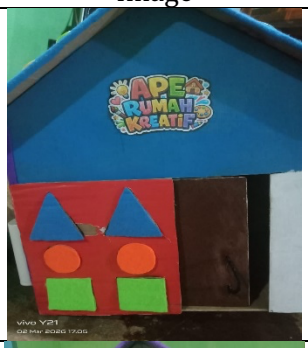
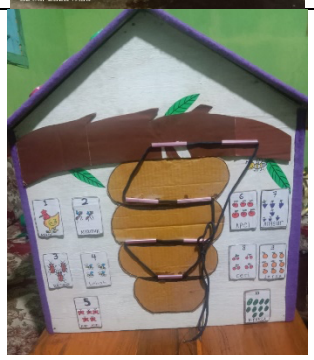
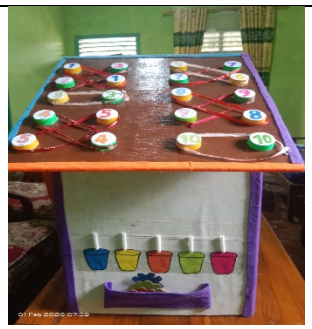
Product Trials

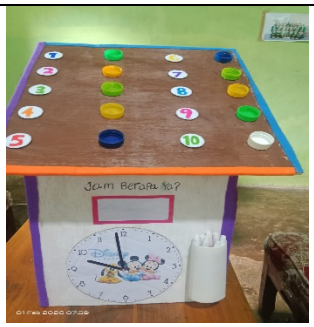
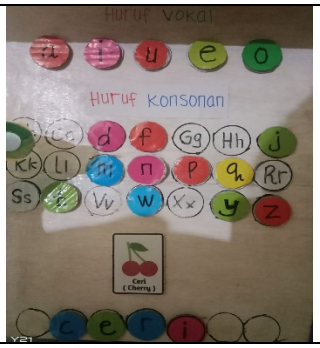
The results of product trials show that the use of Creative House Educational Game Tools (APE) is able to improve the cognitive abilities of children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya. In the initial condition, out of 12 children, 6 children were in the Starting Development (MB) category and 6 children were in the Not Developing (BB) category, without any children who reached the Developing As Expected (BSH) or Very Good (BSB) categories. After the implementation of APE Rumah Kreatif in learning, there was a significant increase, where there were no more children in the BB category, 6 children were in the MB category, 5 children reached the BSH category, and 1 child reached the BSB category. In addition, children look more enthusiastic, active, and easily understand the concept of numbers, match numbers, and recognize patterns and shapes through concrete and fun play activities. Thus, APE Rumah Kreatif has proven to be effective as a learning medium in stimulating and developing early childhood cognitive abilities.

Product Revision Results

The results of the product revision show that the Creative House Educational Game Tool (APE) has been perfected based on the results of observations, teacher input, and test results on children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya. Before use, the media has been validated by media experts and material experts with results in the category of very feasible both in terms of design, safety, and suitability of the material with children's cognitive development. After the trial, the media showed a positive response, where the child became more active, enthusiastic, and able to recognize numbers, match objects, and group shapes and colors better. The development process is carried out through systematic stages starting from needs analysis to final evaluation to produce a viable and effective product. Thus, APE Rumah Kreatif is stated to be very suitable for use as an interesting and educational learning medium in developing the cognitive aspects of early childhood.

Table 1. APE Creative Home Final Products

No.	Design Section	Image
1.	Front	
2.	Back	
3.	Right Side	

4.	Left side roof section	
5.	Vowels and Consonants	

The results of the revision of the APE Creative House product show that the application of the principles of research-based media development and learning through play is effective in improving the cognitive abilities of children aged 5–6 years. The revision carried out after expert validation and trial focuses on improving aspects of the design, materials, and game activities to better suit the characteristics of the child's development. These improvements make children more enthusiastic, active, and easier to understand the concepts of numbers, shapes, colors, and patterns in a concrete way. These findings reinforce that play-based learning is able to optimally increase children's cognitive engagement and stimulation. Thus, APE Rumah Kreatif was declared feasible and effective to be used as an educational learning medium at RA Miftahut Tholibin Sukadana Jaya.

Discussion

The development of the Creative House APE at RA Miftahut Tholibin Sukadana Jaya was carried out after the media was declared very feasible by media experts and material experts, which was then implemented through the Daily Learning Implementation Plan (RPPH) on March 4 and 6, 2026 with the theme "Plants" with the subtheme "Fruit Plants" for children aged 5–6 years. The learning activity began with a 15-minute opening in the form of greetings, prayers, attendance, and songs with Islamic nuances, followed by the core activity for 60 minutes by introducing the Creative House APE, explaining the function, exemplifying the use, dividing groups, and giving children the opportunity to play while learning independently with the guidance of the teacher through triggering questions to stimulate symbolic thinking skills. Furthermore, the activity was closed for 15 minutes through questions and answers and prayers, so that learning takes place in a structured, active, and fun manner and is able to support the development of children's cognitive abilities.

Preparing for APE Creative House, introducing to children

Based on the results of observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, before learning activities begin, the researcher prepares the APE Creative House, conditions the children, opens with greetings and prayers, then introduces the media and how to use it so that children look enthusiastic and interested in learning while playing. This activity was also supported by the results of interviews with principals and teachers

who emphasized the importance of habituating greetings, prayers, and introduction to media before learning so that children are more prepared and focused. Thus, the preparation and introduction of APE Creative House proved to be important to increase children's readiness, motivation, and enthusiasm in participating in learning.

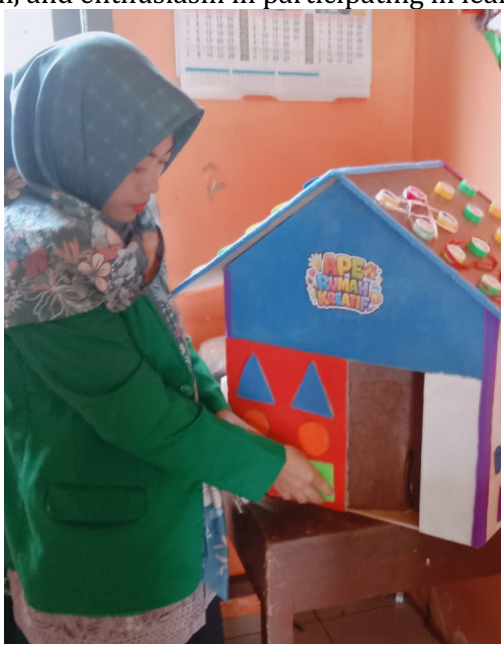


Figure 1. Researchers prepare APE

Explaining the functions of the Creative House APE

The researcher explained the functions and how to use the Creative House APE to children before using it by showing the parts, so that the child understands how to play and looks enthusiastic because the media is interesting and colorful. This is reinforced by the teacher's interview who stated that an initial explanation is important so that children do not have difficulties when playing. Thus, the explanation of the functions of APE helps to improve children's understanding, learning interests, and cognitive development.

Figure 2. Explain the functions of APE

Exemplify the use of APE Creative House

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, the researcher gave a direct example of how to use the Creative House APE to children so that

they understand the steps to play correctly, which was also reinforced by the teacher's interview that giving examples is very important before children try on their own. This demonstration helps children understand more easily, reduce confusion, and increase their learning activity. Thus, the method of exemplifying the use of APE is effective in supporting play-based learning and improving children's understanding.

Figure 4. Exemplifying Usage

Split groups

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, after the researcher explained and exemplified the Creative House APE, children were divided into small groups so that all children had the opportunity to try the media directly, which was also reinforced by the teacher's interview that the division of groups made it easier for children to understand learning. This activity makes children more active, easy to interact, and learn from each other in groups. Thus, group division effectively increases children's participation, interaction, and cognitive abilities through play-based learning.

Figure 5. Children divided into groups

Giving children the opportunity to play independently, teachers only guide when necessary so that children explore

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, after the child understood the use of the Creative House APE, the researcher provided the opportunity to play independently with the necessary guidance from the teacher so that the child could explore the media freely, which was also reinforced by the teacher's interview that the child needed to be given a direct learning experience. This activity makes children

more active and creative in using media. Thus, playing independently with APE Rumah Kreatif is effective in developing children's cognitive abilities, independence, and creativity.

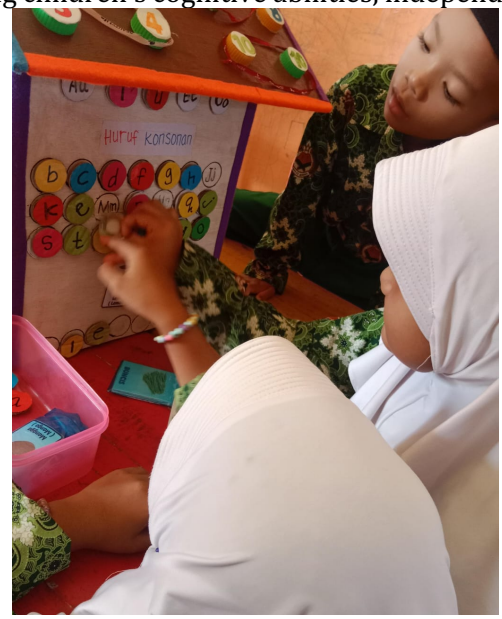


Figure 6. Children are given the opportunity to play independently

Observing children playing using APE Rumah Kreatif

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, children were able to use APE Rumah Kreatif well, looked active and enthusiastic in taking turns participating in games, which was also strengthened by teacher interviews that learning went smoothly and children could complete activities well. These observations show that these media are effective in improving children's participation and cognitive abilities. Thus, APE Rumah Kreatif supports active learning through hands-on experiences and play.

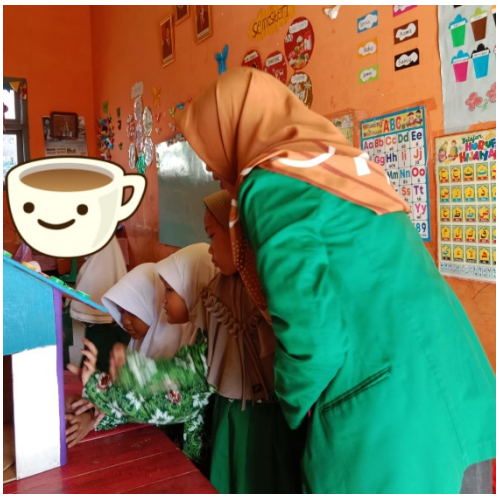


Figure 7. Watching children play

Asking the question of what shape is similar to the roof of this house and stimulating symbolic thinking

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, the researcher provided triggering questions such as the shape of the roof of the house to stimulate children's symbolic thinking when playing APE Rumah Kreatif, as well as limiting

play time to about 3 minutes so that activities are more orderly and all children get a chance, which was also strengthened by the teacher's interview that the question of the lighter and time restriction help the effectiveness of learning. This activity makes children more active in recognizing and connecting shapes with objects around them. Thus, the trigger questions are effective in improving children's cognitive and symbolic thinking skills.

Figure 8. Asking a lighter question

This activity is carried out until all children get a turn to play using APE Creative House.

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, APE Creative House play activities are carried out in turns until all children have the opportunity, which is also reinforced by teacher interviews that every child must get the same opportunity to learn through media. This rotation system makes learning more equitable, orderly, and effective. Thus, this activity helps to equalize the learning experience and cognitive development of children through educational games.

Figure 9. Every child gets a chance to play

The activity was completed and ended with a prayer

Based on observations on March 4, 2026 at RA Miftahut Tholibin Sukadana Jaya, learning activities with APE Creative House ended with a joint prayer followed by children in an orderly manner, as also conveyed by the teacher that prayer is always done as a form of gratitude and habituation of good values from an early age. This activity is the conclusion of meaningful learning. Thus, joint prayer supports the formation of children's attitudes of discipline and spiritual values.

The use of Creative House Educational Toys (APE) has been proven to be effective in developing the cognitive abilities of children aged 5–6 years at RA Miftahut Tholibin Sukadana Jaya. Before the use of media, the results of observations showed that children's cognitive abilities were still low, as seen from the number of children who were not able to recognize number symbols, match objects, and understand simple concepts. After the implementation of APE Rumah Kreatif in learning activities, there was a significant increase, where children became more active, enthusiastic, and able to recognize numbers, match numbers, and understand simple symbols through play activities. Overall, there has been a shift in the development category from the dominant Not Yet Developed (BB) to Starting to Develop (MB), Developing According to Expectations (BSH), and there are even children who reach the Very Good Developing (BSB) category, as seen in the recapitulation of Table 4.8, so it can be concluded that this media is effective in improving early childhood cognitive abilities.

In addition, comparative research at RA Ar Raheem Sukadana Jaya also strengthened these results. Before the use of APE Rumah Kreatif, most children were still in the BB and MB categories with low cognitive abilities, such as difficulty pronouncing the symbols of numbers 1–10, matching numbers with objects, and recognizing vowels and consonants. However, after the implementation of the Creative House APE, there was a significant increase, where there were no more children in the BB category, and some children had reached the BSH category and even BSB, as listed in Table 4.9. In addition to improving cognitive abilities, children also become more active, focused, and dare to participate in learning, so that the learning atmosphere becomes more lively and fun. This shows that APE Rumah Kreatif not only improves the cognitive aspect, but also the motivation and involvement of children's learning.

The results of this study are in line with the findings of M. Husain, Q., et al., who stated that the use of APE based on educational games can improve children's understanding of numeracy concepts through a fun multisensory approach. In addition, the research of F. Ariyanti and Z. I. Muslimi confirms that concrete manipulative media is effective in increasing the focus and motivation of early childhood learning. This finding is also strengthened by the research of R. Sulistina et al. and D. Rahmawati who show that innovative learning media can improve children's symbolic thinking skills, memory, and concentration. Thus, APE Rumah Kreatif which combines elements of numeracy and early literacy in the form of three-dimensional house games has proven to be effective and in accordance with the principles of early childhood learning, namely learning while playing.

CONCLUSION

Based on the results of research and development of Educational Toys (APE) for the Creative House at RA Miftahut Tholibin Sukadana Jaya for the 2025/2026 Academic Year, it can be concluded that the media developed through the stages of problem analysis, design, expert validation, trial, and revision has been proven to be feasible and effective in improving the cognitive abilities of children aged 5–6 years. The use of APE Creative House has a real impact on the development of children's ability to recognize numbers, match number symbols, group objects, and understand simple patterns through structured, active, and play-based learning activities. The learning process, which begins with an introduction to media, an explanation of functions, a demonstration of use, group division, to the opportunity to play independently with the guidance of the teacher, as well as the provision of triggering questions and a turn-based system, is able to create a more interactive, meaningful, and fun learning atmosphere for children. Furthermore, these findings show that APE Rumah Kreatif not only improves cognitive aspects, but also strengthens children's involvement in the learning process and encourages symbolic thinking skills more optimally. This effectiveness is also seen in the results of comparisons at two research sites, namely RA Miftahut Tholibin Sukadana Jaya and RA Ar Raheem Sukadana Jaya, both of

which show an improvement in children's cognitive abilities after the use of media. Thus, APE Rumah Kreatif can be seen as an alternative learning media that is relevant and important in supporting the implementation of early childhood learning that emphasizes the principle of learning through play, as well as making a real contribution to improving the quality of the learning process in PAUD institutions.

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