

Use of Innovative Educational Play Tools (APE) from Recycled Materials in Learning to Increase the Curiosity of Children Aged 5–7 Years

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DOI : <https://doi.org/10.61796/ejlhss.v2i9.1443>



Sections Info

Article history:

Submitted: June 30, 2025

Final Revised: July 14, 2025

Accepted: July 31, 2025

Published: August 28, 2025

Keywords:

Innovative APE

Recycled materials

Curiosity

ABSTRACT

Objective: This study aims to increase the curiosity of children aged 5–7 years through the use of innovative Educational Play Tools (APE) made from recycled materials.

Method: The method used is Classroom Action Research (CAR) with the Kemmis & McTaggart model, which consists of the stages of planning, action, observation, and reflection. The research subjects were 15 children at KB TK Aisyiyah 25 Wage in the even semester of the 2025/2026 academic year. Data were collected through observation, interviews, and documentation, using an observation sheet on curiosity that includes indicators of asking questions, trying, exploring, and being enthusiastic. Analysis was carried out descriptively, both quantitatively and qualitatively. **Results:** The results showed an increase in children's curiosity from cycle I to cycle II. In cycle I, children who reached the high category were 60% (9 out of 15 children), while in cycle II this increased to 80% (12 out of 15 children). This achievement exceeds the research success indicator, namely at least 75% of children show high curiosity. **Novelty:** The use of innovative APE from recycled materials has proven effective in fostering curiosity in early childhood and provides a creative learning alternative that teachers can apply in the classroom.

INTRODUCTION

Early childhood education is a vital foundation for building the quality of human resources in the future [1], [2], [3], [4]. At the age of 5–7 years, children are in a golden phase of development where curiosity becomes one of the dominant characteristics that drives them to learn [5]. High curiosity encourages children to explore the environment, ask questions, and try new things [6]. Therefore, educators need to present learning that not only delivers material but is also able to stimulate children's curiosity through creative and contextual learning media.

One of the effective media to support early childhood learning is Educational Play Tools (APE) [7]. APE not only functions as a means of play but can also become an important instrument in building children's cognitive, motor, social, and emotional abilities [8]. Previous studies showed that the use of APE can increase children's learning motivation, train critical thinking skills, and strengthen social interaction [9]. However, most APE used in schools are still factory-based products, which tend to be uniform and less stimulating to children's creativity in exploring learning experiences.

Along with the development of studies on educational innovation, special attention has emerged on the use of recycled materials as basic materials for making APE. The use of recycled materials not only has economic and environmentally friendly value but also offers opportunities for teachers to present unique, inexpensive, and easily accessible learning media [8]. Several recent studies revealed that APE based on recycled materials

can foster children's awareness of the importance of protecting the environment while increasing teachers' creativity in creating media that suit children's needs [10].

The state of the art of this study lies in the integration of the concept of education for sustainable development with early childhood learning. If previous studies focused more on the use of factory-made APE or teacher-crafted APE using new materials, this study emphasizes media innovation from recycled materials that are specifically designed to increase children's curiosity. Thus, this research not only contributes to the development of learning strategies but also supports the environmentally friendly education movement.

The novelty of this study lies in the effort to create innovative APE from recycled materials designed according to the needs of children aged 5–7 years and to specifically measure its effect on increasing children's curiosity. This approach differs from previous studies that tended to focus on motor or cognitive aspects alone without giving special attention to the psychological dimension of curiosity. Thus, this research has the potential to open new insights into the role of media based on recycled materials in fostering children's learning character from an early age.

In addition, this study also positions teachers as agents of learning innovation. Through Classroom Action Research (CAR), teachers are not only instructors but also researchers who reflectively evaluate and improve learning practices in the classroom. The use of APE from recycled materials within the CAR framework allows teachers to systematically discover the best strategies for increasing children's curiosity, while integrating values of creativity and environmental awareness in the teaching and learning process.

Based on this background, this research is expected to make a significant contribution to the development of both theory and practice in early childhood education. Practically, this study can provide alternative solutions for early childhood teachers in overcoming limitations in learning media, especially by utilizing recycled materials available in the surroundings. Theoretically, this study enriches the discourse on the relationship between the use of innovative APE based on recycled materials and the increase in children's curiosity. Therefore, this study is worth conducting to support the realization of creative, contextual, environmentally friendly learning that is oriented toward the developmental needs of early childhood.

RESEARCH METHOD

This study uses Classroom Action Research (CAR) with a spiral model developed by Kemmis & McTaggart. This model consists of four main stages, namely: planning, acting, observing, and reflecting. The research cycles were carried out repeatedly until results in accordance with the research objectives were obtained. CAR was chosen because this study does not only aim to find data but also to directly improve learning practices in the classroom. Through CAR, teachers can systematically plan, implement, observe, and reflect on the learning process to produce tangible improvements in enhancing children's learning quality. In the context of this research, CAR was used to

test and evaluate the use of innovative APE from recycled materials in learning, particularly to foster the curiosity of children aged 5–7 years. With this approach, the research results are expected to provide practical benefits for teachers as well as theoretical contributions to the study of early childhood education.

The research subjects were children aged 5–7 years enrolled in the early childhood education institution KB TK Aisyiyah 25 Wage. The number of subjects corresponded to the number of children in one class, namely 15 children. The selection of subjects was based on the consideration that children aged 5–7 years are in a period of rapid cognitive development in which curiosity is a dominant factor influencing their learning process. Therefore, learning that presents innovative media is very important to support children's exploration and learning experiences. The study will be conducted in the current semester of the 2025/2026 academic year in June 2025, adjusted to the classroom learning schedule. With a natural setting in the children's learning environment, this research is expected to reflect real conditions in the field.

This study is declared successful if there is an increase in children's curiosity from cycle to cycle with the criterion that at least 75% of children show high curiosity indicators such as being active in asking questions, trying, exploring, and being enthusiastic.

RESULTS AND DISCUSSION

Results

From cycle I to cycle II there was an increase of 20%, namely from 60% to 80%. This shows that the use of innovative APE from recycled materials has proven effective in increasing the curiosity of children aged 5–7 years. This increase occurred because the media used were more varied, more contextual, and involved children in the process of making and using them. The following are the data results from cycle 1 and cycle 2:

Table 1. Observation Results of Increasing Curiosity of Children Aged 5–7 Years in Cycle I.

No	Child Initials	Curiosity Indicator (Yes/No)
1	Subject 1	Yes
2	Subject 2	No
3	Subject 3	Yes
4	Subject 4	Yes
5	Subject 5	No
6	Subject 6	Yes
7	Subject 7	Yes
8	Subject 8	No
9	Subject 9	Yes
10	Subject 10	Yes

No	Child Initials	Curiosity Indicator (Yes/No)
11	Subject 11	No
12	Subject 12	No
13	Subject 13	Yes
14	Subject 14	No
15	Subject 15	No

In the first cycle, learning was carried out by utilizing innovative APE from recycled materials. The children were introduced to media in the form of simple letter crosswords made from used cardboard and plastic bottle caps, fruit and vegetable grouping, and recognizing colors from bottle caps. The observation results showed that out of 15 children, only 9 children (60%) showed high curiosity indicators, such as actively asking questions, trying various ways of playing, showing full attention, and being enthusiastic in exploring. Some children were still passive, merely following the teacher's directions, and showed little initiative in exploring the media. Thus, the minimum success indicator of 75% was not achieved in this cycle, and the study proceeded to cycle II.

Table 2. Observation Results of Increasing Curiosity of Children Aged 5–7 Years in Cycle II.

No	Child Initials	Curiosity Indicator (Yes/No)
1	Subject 1	Yes
2	Subject 2	Yes
3	Subject 3	Yes
4	Subject 4	Yes
5	Subject 5	Yes
6	Subject 6	Yes
7	Subject 7	Yes
8	Subject 8	No
9	Subject 9	Yes
10	Subject 10	Yes
11	Subject 11	No
12	Subject 12	Yes
13	Subject 13	Yes
14	Subject 14	No
15	Subject 15	Yes

After reflection, the teacher made improvements in the second cycle by providing more interesting variations of APE, such as addition counting games from used flannel fabric, and involving children directly in the process of making simple APE. This approach stimulated children's curiosity more because they were involved from the outset. In this cycle, the number of children who showed high curiosity increased to 12 children, amounting to 80%. Children appeared to ask more questions, experiment with the media, and show enthusiastic expressions. With this achievement, the research success indicator exceeding 75% was achieved in cycle II.

Discussion

The results of the study show an increase in the curiosity of children aged 5–7 years through the use of innovative APE from recycled materials. In cycle I, only 9 children (60%) showed high curiosity indicators, while in cycle II this increased to 12 children (80%). This increase proves that APE based on recycled materials can be an effective learning tool in stimulating children to be more active in asking, trying, exploring, and showing enthusiasm for learning.

In cycle I, some children still appeared passive and were not fully engaged in the learning process. This was due to the novelty of the media, which might still have been unfamiliar to them, as well as the limited variety of games provided. Passive children tended to merely follow the teacher's instructions without the initiative to explore further. Thus, the 60% achievement did not meet the research success indicator set at a minimum of 75%.

Reflection from cycle I provided an overview that teachers need to improve the quality of learning by enriching the variety of APE and involving children in the making process [7]. These improvements proved effective in cycle II, where children became more enthusiastic because they felt direct involvement in creating APE. This involvement fostered a sense of ownership and increased their curiosity about the media used.

In cycle II, the increase in children's curiosity was evident from several indicators, such as the courage to ask about how to use APE, trying various game alternatives, and showing happy expressions when exploring the media [11]. For example, several children were actively looking for new ways to spin wheels made from plastic plates or assemble cardboard puzzles in different combinations. This shows the development of creativity that goes hand in hand with increased curiosity.

This increase is consistent with Piaget's theory of cognitive development, which emphasizes the importance of exploration and direct experience in learning [12]. Children aged 5–7 years are at the concrete operational stage, where they learn through manipulating real objects. The use of APE from recycled materials provides concrete experiences while challenging children to think and discover new things [13]. Thus, learning based on innovative APE supports active learning principles in line with the characteristics of children's development.

In addition to increasing curiosity, the use of APE based on recycled materials also provides added value in learning, namely instilling environmental awareness from an

early age [14]. Children learn that unused items can be transformed into something useful. This is in line with the concept of education for sustainable development, where education not only focuses on academic aspects but also shapes an attitude of caring for the environment [15].

The success of cycle II cannot be separated from the role of the teacher as a facilitator who is able to create an enjoyable learning atmosphere. Teachers who are creative in processing recycled materials into APE are proven to increase children's engagement. This approach confirms that teachers are not only transmitters of content but also innovators in creating meaningful learning experiences.

Overall, the results of the study prove that the use of innovative APE from recycled materials is effective in increasing the curiosity of children aged 5–7 years. From cycle I to cycle II there was an increase of 20%, from 60% to 80%. This shows that the actions taken succeeded in achieving the predetermined success indicators. Thus, this research makes a real contribution to improving classroom learning practices, as well as providing recommendations for teachers to be more creative in utilizing recycled materials as innovative, environmentally friendly learning media.

CONCLUSION

Fundamental Finding : Based on the results of classroom action research on the use of innovative APE from recycled materials in learning to increase the curiosity of children aged 5–7 years, the following conclusions can be drawn: The process of using innovative APE from recycled materials in learning was carried out well through the stages of planning, implementation, observation, and reflection in each cycle. Children were actively involved in learning activities, especially after improvements in cycle II by adding media variations and involving children in making APE. The use of innovative APE from recycled materials has proven effective in increasing the curiosity of children aged 5–7 years. This is evident from changes in children's behavior, such as being more active in asking questions, daring to try, exploring the media, and showing enthusiasm during the learning process. **Implication :** There was an increase in children's curiosity from cycle I to cycle II. In cycle I only 60% of children showed high curiosity, while in cycle II this increased to 80%. Thus, the actions taken achieved the research success indicator, namely a minimum of 75%. Overall, this study successfully answers the research questions posed, namely that the process of using innovative APE from recycled materials can be implemented well, the use of such media is effective in increasing children's curiosity, and the achievement of increased curiosity is in accordance with the research success targets. **Limitation :** Although the study demonstrated significant improvements, the results were limited to a small group of 15 children aged 5–7 years in a single school setting. The conclusions therefore represent findings within a specific context, and generalization to broader populations or different educational environments must be approached with caution. **Future Research :** Future research can expand the scope by involving larger and more diverse samples across various schools to validate the effectiveness of innovative APE from recycled materials. Additional studies could

also examine long-term impacts on children's curiosity and learning outcomes, as well as the potential for integrating other forms of local wisdom or environmentally sustainable practices into the development of educational play tools.

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