



Rocket Media Development A Cardboard Waste Race to Improve the Cognitive Abilities of 4-5 Year Old Children in Kindergarten

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Abstract

The aim of this research is to develop innovative learning media made from cardboard waste, namely *Rocket Race*, to improve the cognitive abilities of children aged 4–5 years in Qur'an Kindergarten Ma'arif Sumber Rejeki. The background of this research is based on the results of observations that show that most children are still in the "Beginning to Develop" or even "Not Yet Developed" category in cognitive aspects, especially indicators of counting, recognizing the concept of numbers, number symbols, and letters. This uses Research and Development (R&D) method with 4D development model (*Define, Design, Develop, and Disseminate*). Subject study are 16 children selected ages 4–5 years with criteria child group A which has not reach optimal development in aspects cognitive. The research instruments included a cognitive development observation sheet and an expert validation questionnaire. Instrument validation was conducted through media and material expert tests, while data analysis was conducted quantitatively descriptively with a percentage of achievement. The results showed that the *Rocket Race media* was declared suitable for use based on media expert validation with an average score of 5 (very suitable category) and material expert validation with a score of 4–5 (suitable category). Limited trials showed that 90% of children were actively involved, 85% showed high enthusiasm, 80% experienced an increase in understanding of numbers, shapes, and colors, and 88% showed good social cooperation. Comparisons before and after media use also showed a significant increase from the categories of "Not Developing" (BB) and "Starting to Develop" (MB) to "Developing as Expected" (BSH). Teachers reported that this media was effective in making learning more interactive and enjoyable, while helping children focus on understanding basic concepts. Thus, the *Rocket Race media* is not only proven to be effective in improving children's cognitive abilities, but also encourages social skills, creativity, and provides environmental educational value through the use of recycled materials. This media is suitable for use as an alternative learning innovation that is environmentally friendly, cheap, and fun in PAUD.

Keywords : *Rocket Race*, Cardboard Waste, Cognitive Ability, Early Childhood, Innovative Learning Media

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INTRODUCTION

Early childhood education serves as the primary foundation for developing thinking skills, which will ultimately underpin their academic, social, and emotional development. Between the ages of 4 and 5, children enter a golden phase, when their brains develop rapidly and are able to absorb stimuli from their surroundings more easily. At this stage, children's learning process is not solely based on formal instruction, but rather is

predominantly driven by imaginative, interactive, and enjoyable play. Therefore, the application of creative, play-oriented learning methods is key to fostering children's cognitive development. (Rupnidah & Suryana, 2022)

Cognitive abilities refer to a set of mental processes necessary for thinking, learning, understanding, and problem-solving. They encompass functions such as attention, memory, perception, and problem-solving, all of which contribute to how children understand the world around them. Cognitive abilities are crucial during childhood development because they form the foundation for academic and social skills. Children with strong cognitive abilities tend to be better able to adapt to new challenges, remember important information, and interact with peers. (Nurlaela & Suyadi, 2021)

The role of cognitive abilities in child development is significant, as they influence not only academic aspects but also social and emotional skills. Through activities that stimulate cognitive abilities, such as educational games and social interactions, children learn to collaborate, communicate, and develop self-confidence. Research shows that appropriate cognitive stimulation can enhance brain development and influence long-term learning abilities. Therefore, developing cognitive abilities from an early age is key to creating competent and adaptive individuals in the future. A child's development should receive serious attention, because during childhood, they are in a golden period that greatly determines the direction of their future life. Development efforts cannot be carried out haphazardly, but rather through various forms of activities, exercises, and targeted learning experiences, so that thinking skills, memory skills, and intelligence in understanding their environment can be properly honed. Therefore, managing a child's development from an early age is not only the responsibility of parents but also requires support from the surrounding environment so that their potential can grow optimally and provide valuable provisions for their future life journey. (Angkur et al., 2023)

The development of a child's thinking ability does not occur in isolation but is influenced by various aspects of their life. One crucial aspect is the intellectual stimulation that arises from the child's relationship with their environment and their involvement in various forms of play. Play activities designed to stimulate creativity have a tangible impact, as children who regularly participate in such games often demonstrate improved thinking skills, speed in understanding new information, and skill in solving problems they encounter. (Fardiah et al., 2019) Play not only improves motor and social skills but also contributes to the development of cognitive aspects such as critical thinking and problem-solving. (Mariani et al., 2024) Play activities that involve elements of exploration and imagination can strengthen children's ability to understand new concepts and apply the knowledge they have learned. (Ginsburg, 2012)

Children who grow up in an atmosphere rich in intellectual stimulation, such as the availability of educational games and warm and constructive social relationships, tend to demonstrate superior academic achievement while at school. (Yildirimer & Özduzu, 2025) This form of stimulation is not only beneficial when they are involved in games, but also occurs in various daily activities that rely on conversation, the exchange of ideas, and collaboration with others. Therefore, the role of parents and educators is crucial in creating a learning environment that can foster children's intellectual potential. This includes providing enjoyable, educational experiences and encouraging active involvement through creative, interactive, and collaborative activities that can enrich their thinking and broaden their horizons.

In line with this, a UNESCO report (2023) confirmed that 40–60% of early childhood in developing countries still face cognitive development barriers due to limited learning stimulation media appropriate to their developmental stage. This condition is also supported by the findings of Apriliyani & Lestari (2022), who stated that children aged 4–5 years who regularly engage in educational media-based play activities show an increase in logical thinking skills up to 35% higher than children who learn using conventional

methods. Another study by Wijaya et al. (2024) found that simple, environmentally-based media, such as recycled materials, can enhance creativity and improve understanding of basic mathematical concepts in early childhood. This fact demonstrates that innovation in learning media is not merely an additional need, but rather an urgent need that must be addressed immediately to encourage optimal cognitive development in children.

Pre-survey data on cognitive abilities of 4–5 year old children in Qur'an Kindergarten Ma'arif Sumber Rejeki shows significant variation. Some children are in the Beginning to Develop (MB) category, but some are still Not Developing (BB) in basic indicators such as number recognition, simple problem solving, and memory. This condition aligns with previous research that found that approximately 60% of early childhood children have below-average cognitive abilities, particularly in problem-solving and verbal skills. This fact indicates an urgent need for more innovative media-based learning interventions to stimulate their cognitive development.

One of the proposed efforts is through the development of creative learning media based on recycled materials, in this case the educational game *Rocket Race*. This media is not only designed to teach children about numbers, shapes, colors, and other cognitive skills, but also to instill sustainability values by utilizing cardboard waste. This kind of innovation is still rarely researched in the context of early childhood education in Indonesia. Most previous studies have emphasized the effectiveness of digital technology-based learning media or new teaching aids, while the potential of using recycled materials is often overlooked. However, media made from waste is not only environmentally friendly but also able to stimulate children's creativity through creative activities. it yourself (DIY) and imaginative exploration.

Thus, there is an important research gap *that needs* to be addressed: how the use of recycled material-based learning media can contribute to the development of cognitive abilities in early childhood. This research seeks to fill this gap by presenting *Rocket Race* is an interactive, collaborative, environmentally friendly, and relevant media alternative for early childhood. The novelty of this research lies in the integration of cognitive learning, creativity, and environmental sustainability through cardboard-based media.

The objectives of this research are: 1) to determine the development of *Rocket media A race* made from cardboard waste to improve the cognitive abilities of 4-5 year old children in the Qur'an Kindergarten Ma'arif Sumber Rejeki, Bandar Mataram District, Central Lampung and 2) to determine the efficiency of implementing *Rocket media A race* made from cardboard waste to improve the cognitive abilities of 4-5 year old children in the Qur'an Kindergarten Ma'arif Source of Wealth, Bandar Mataram District, Central Lampung. The results of this study are expected to provide valuable contributions to the development of various innovative learning strategies in the realm of early childhood education, while also opening up broad space for further research that focuses on the use of recycled materials as learning tools that not only educate, but also stimulate creativity, foster imagination, and support environmental sustainability through fun and meaningful learning activities for children.

METHOD

This research uses the *Research method and Development (R&D)* with the 4D development model (*Define, Design, Develop, and Disseminate*) developed by S. Thigarajan, Dorothy Semmel, and Melvyn I. Semmel. (Sugiyono, 2017) This method was chosen because it is suitable for producing products in the form of innovative learning media and testing their feasibility. The research population was early childhood group B (4–5 years old) at the Qur'an Kindergarten. Ma'arif Sumber Rejeki with 16 children, while the trial sample was determined purposively *by* involving class teachers, material experts, and media experts. In addition, the number of samples for this study was 16 group B children

aged 4–5 years at the Qur'an Kindergarten. Ma'arif Sumber Rejeki, selected based on the criteria of not achieving optimal cognitive development, according to initial observations. The sampling technique was purposive, considering subjects aligned with the research objectives. The trial involved classroom teachers as additional respondents.

In the definition stage, researchers conducted a needs analysis through interviews with teachers and classroom observations to identify the limitations of available learning media. The design stage involved compiling an initial draft of the " *Rocket Race* " media made from cardboard waste, determining the format of the teaching materials, and developing learning objectives. Next, the development stage was carried out through validation by media and material experts to assess the suitability of the content, appearance, and effectiveness of the media. (Rizki & Linuhung, 2017) The selected validators had a minimum qualification of a master's degree in education and research experience in their field. After the validation process, the product was revised based on feedback and then trialed on a limited basis with teachers and children to assess the media's appeal, usefulness, and feasibility. (Sukmawati et al., 2022) The *dissemination* stage was not conducted due to the limited research time available, so the researchers decided to stop the process and focus on stages deemed more feasible to implement optimally within the existing research timeframe. Instrument validation was conducted through assessments by subject matter and media experts who had a minimum qualification of a master's degree in education and research experience in the field of learning media development. To clarify the research stages, the following is a flowchart of media development using the 4D model:

Table 1. R&D Stages of the 4D Model

Stage Study	Main Activities	Output
Define	Analysis needs, teacher interviews, observations class	Identification media issues & needs
Design	<i>Rocket Race</i> media, arranging the format of teaching materials, determining learning objectives	Initial draft product
Develop	Validation by material & media experts, product revision, limited trials on teachers & children	Media that has been revised & assessed its eligibility
Disseminate	Not done due to research time constraints	-

research instruments used in the information gathering process consist of several forms of instruments, including questionnaires prepared to obtain assessments from experts, questionnaires aimed at teachers and students to find out their responses, observation notes used to record behavior and situations in the field, interview guides that function as directions in digging for more structured information from sources, as well as supporting documents collected as additional evidence to strengthen the data obtained. The questionnaire used a four-point Likert scale (1 = less appropriate, 4 = very appropriate) to assess aspects of content, appearance, and usefulness of the media. (Riduwan & Kuncoro, 2014) Qualitative information is collected through notes and opinions provided by validators, direct observations in the field, focused conversations with relevant parties, and supporting archives or documents. Meanwhile, quantitative data is sourced from the figures recorded in the questionnaire. The qualitative data processing process is carried out by reviewing, interpreting, and summarizing various comments and suggestions submitted by validators, educators, and students, then all of this input is used as the main basis for improving and perfecting the product being developed. Conversely, quantitative data processing is carried out by calculating the average of the assessment results obtained

through measurable instruments, so as to provide a numerical picture that supports the results of qualitative observations. The resulting scores are then converted into feasibility categories: 3.26–4.00 = very feasible; 2.51–3.26 = feasible; 1.75–2.51 = quite feasible; and 1.00–1.75 = less feasible. Media is declared feasible to use if it obtains a score of ≥ 2.51 . (Maskur et al., 2017)

To maintain validity and reliability, the researchers used triangulation techniques (observation, interviews, questionnaires, and documentation) and involved more than one expert validator. A limitation of this study lies in the lack of a *dissemination stage*, which prevented the product from being widely tested.

RESEARCH RESULTS AND DISCUSSION

1. Initial Product Development Results

This research was carried out in Kindergarten Quran Ma'arif Sumber Rejeki, located in Mataram, Central Lampung Regency. The focus of this activity was on educators and children aged four to five, grouped in classes A and B. The learning tool produced was the educational game *Rocket The Race*. The race was made from used cardboard, with the design referring to the 4D development stages: *Define*, *Design*, *Develop*, and *Disseminate*. However, the final stage, *Disseminate*, could not be implemented due to the researcher's limited time, so the development process stopped at the *Develop stage*.

a. Define Stage

During the definition phase, interviews with teachers revealed that children struggled to grasp basic concepts of numbers, shapes, and colors due to the conventional media used. Teachers hoped for more interactive, affordable, and safe media that utilized locally available materials. These findings formed the basis for the development of *Rocket media Race* to improve children's cognitive abilities.

b. Design Stage

Rocket Media The Race is designed from used cardboard decorated with bright paint, wool as a track, and rockets as game pieces. The format is designed to be interactive, collaborative, and fun through activities such as counting steps, recognizing numbers, and grouping shapes and colors. The initial design for the *Rocket media The race* is shown in Figure 1.



Figure 1. Initial Design of Rocket Media Race

c. Development Stage (Develop)

1) Media Expert Validation

Validation was carried out by media expert, Yuliatul Rohimah, M.Pd. The assessment results showed that *Rocket media Race* meets cognitive, safety, and practical aspects.

Table 2. Media Expert Validation Results

No	Assessment Indicators	Score
1	Media improves children's symbolic thinking skills	5
2	Media that is easy for children to play	5
3	Safe media used by children	5
4	Media has images stimulating numbers 1-10 counting	5
5	Easy media below	5
6	Media is available symbol letters that are easy for children to understand	5

Category: Worth using

2) Subject Matter Expert Validation

Expert validation of the material was carried out by Ferdian Utama, M.Pd. The results showed that the material presented was relevant, easy to understand, and appropriate for early childhood development.

Table 3. Results of Material Expert Validation

Assessment Aspects	Indicator	Score
Content/Material Quality	Relevant material, easy to understand, covers numbers, shapes, colors	4-5
Learning objectives	Clear objectives, activities support competency achievement	4-5
Feedback & Adaptation	Provide feedback, flexible according to the child's needs	4

Motivation	Attractive, motivating, makes children actively participate	4-5
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Category: Worth using

3) Limited Field Test Validation

The trial was conducted on 15 class A children of the Quran Kindergarten. Ma'arif. Observations showed that 90% of children were actively involved in the games. They appeared enthusiastic, cooperative, and were able to recognize numbers and colors through the activities. Teachers reported that the media significantly assisted the learning process and helped children focus.

Table 4. Rocket Limited Field Test Results Race

Observed Aspects	Results (%)
Active involvement of children	90%
Children's enthusiasm & motivation	85%
Improved understanding of numbers/shapes/colors	80%
Cooperation & social interaction	88%

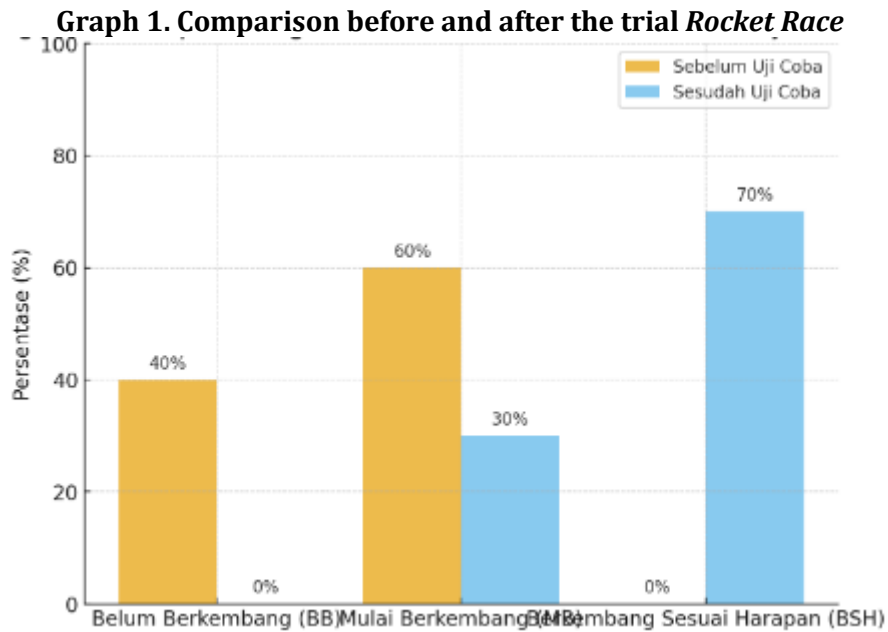
Category: Effectively improve children's cognitive and social skills

Based on the validation and trial results, *Rocket media Races* made from used cardboard are considered suitable and effective for use in learning for children aged 4-5 years. This medium not only enhances cognitive abilities (recognizing numbers, letters, shapes, and colors) but also develops social skills and cooperation, and motivates children to learn in a fun way.

2. Product Trial Results

The results of the product trial "*Rocket Race*" made from cardboard waste at Qur'an Kindergarten Ma'arif Sumber Rejeki presents several important findings regarding the effectiveness of media in improving the cognitive abilities of children aged 4-5 years. Children showed significant improvements in number and shape recognition after using *Rocket media. Race*. Before the trial, some children were still underdeveloped (BB) based on the indicators, whereas after the product trial, the children had begun to develop (MB), and many were even developing as expected (BSH).

Activities involving play with this media help improve children's memory of the concepts taught. Children can recall and repeat information better. Observations during the trial showed that almost all children (90%) were actively involved in activities using *Rocket. Race*. They showed great interest and enthusiasm in participating in the game. The children provided positive feedback about their learning experience. Many stated that they enjoyed it and wanted to play with this media again. Group activities involving *Rocket Race* Encourages children to collaborate. They learn to share tasks and help each other, which contributes to the development of social skills. Here's a comparison chart before and after the trial :



This is a comparison graph of children's cognitive abilities **before** and **after the *Rocket* media trial.** The graph shows that the *Undeveloped (BB)* category dropped drastically from 40% to 0%, while the *Developing as Expected (BSH)* category increased significantly to 70%.

Children showed improvements in their communication skills. They were more active in discussions and expressing their opinions during play. Children involved in activities using *Rocket Race* showed increased self-confidence. They felt proud when they successfully completed the challenges presented in the game. Children were better able to accept failure and try again, which is an important part of emotional development. Teachers reported that the use of *Rocket Race* makes the learning process more dynamic and engaging. They find it easier to convey material to children. Most teachers gave this media a positive assessment, stating that *Rocket Race* is an effective tool to support early childhood learning.

3. Results Revision Product

After conducting initial trials and gathering feedback from children, teachers, and observers, several revisions were made to increase the effectiveness and appeal of the "*Rocket media. Race*" is made from cardboard waste. The following are the details of the revised product results:

1. The media's design was modified to include more bright colors and contrasts to attract children's attention. The material used was coated with flannel for added strength.
2. Some rocket shapes were revised to ensure that all parts were easy for children to hold and use, reducing the risk of injury during play.
3. Instructions on how to use the *Rocket Race media* have been simplified and presented in an easier-to-understand format. The guide includes illustrations to aid comprehension for both children and teachers.
4. New activities are designed with clear steps so children can follow along without confusion. This helps ensure better engagement during the activity.
5. Additional games, such as number or shape recognition competitions, are introduced to diversify the learning experience. This helps maintain children's interest and provides a learning experience.

6. Activities are integrated with the learning themes being taught in class.
7. Provided additional materials, such as dice to make it easier to arrange game *Rocket Race*.

After revisions, the product was retested in the classroom with the same children. Observations showed an increase in children's engagement and understanding of the concepts taught. Children reported that they enjoyed the activities with the revised version of *Rocket more. Race*, and they find it easier to actively participate.

4. Final Product Review

Review of *Rocket's final product The race* using cardboard waste as the material was carried out with the aim of analyzing the effectiveness, sustainability, and impact of using this media on the development of cognitive abilities of children aged 4-5 years in the Qur'an Kindergarten. Ma'arif Sumber Rejeki. Based on trial results, significant improvements were found in children's ability to recognize numbers and letters. This learning medium has been proven to help children connect cognitive concepts with hands-on activities through enjoyable learning experiences, thus strengthening their understanding of the material.

In addition, the activity of throwing dice in the *Rocket game Race* not only trains children in counting, but also provides an opportunity for them to develop motor coordination skills and body movement control, which are crucial for supporting physical development at an early age. This media is designed using bright colors and attractive shapes, successfully capturing children's attention. Observations show that more than 90% of children are actively involved, enthusiastic, and excited during each game session. This positive emotional state plays a crucial role in increasing children's openness to learning, which ultimately impacts overall learning outcomes.

The feedback provided by the children also showed a very positive response. Most of the children stated that they enjoyed the learning process through this medium and even hoped to use it again in the future. Furthermore, there was encouragement from some children to create their own versions of the rocket, which shows that *Rocket Races* not only improve cognitive abilities but also stimulate children's creativity. Therefore, this learning medium can be seen as an effective, sustainable, and enjoyable innovation in supporting early childhood learning.

Group activities involving *Rocket Races* help children learn to work together to complete tasks. They learn to divide roles and help each other, which is crucial for developing social skills. Children involved in group play show improvements in their ability to communicate and interact with one another. Through successfully completing games and activities, children demonstrate increased self-confidence. They feel proud when they successfully complete a given challenge. This sense of self-confidence is important for emotional development, as confident children tend to be more willing to try new things.

Rocket Media Race uses cardboard waste, making it an economical and environmentally friendly choice. This is in line with efforts. The simple media design allows teachers or parents to reproduce and create new variations of *Rocket. Race*. This allows for continued use and can be adapted to suit learning needs.

5. Discussion

Research information was collected through three main techniques: direct classroom observation, targeted conversations with educators, and questionnaires specifically addressed to teachers. Observations were conducted throughout the teaching and learning process, with an emphasis on how students interacted with the available learning resources and how they attempted to complete assigned tasks. Meanwhile, conversations with teachers provided additional insights into changes in children's behavior as they engaged with the media. Subsequently, a daily learning activity plan (RPPH) was developed that integrated *Rocket media. Race* made from cardboard waste in the Qur'an Kindergarten environment Ma'arif Sumber Rejeki, as a comprehensive guide in implementing learning so that the process is more focused and able to facilitate the development of children's abilities optimally.

1) School Identity

This research was conducted at the Ma'arif Sumber Rejeki Qur'an Kindergarten.

2) Theme

This research was conducted on Saturday, April 14, 2025, on children aged 4-5 years at the Qur'an Ma'arif Sumber Rejeki Kindergarten with the theme Animals.

3) Opening (15 minutes)

As for the opening stage, the activities carried out are as follows:

- a. Greetings, prayers before the activity begins.
- b. attendance activities student .
- c. So that learning activities begin with a happy and enjoyable atmosphere, then singing and memorizing activities were carried out as well as move free .

4) Core Activities (45 minutes)

- a. Preparing *Rocket Race* media



Figure 2. Preparing Rocket media Race

- b. Introducing *Rocket Race* media to children



Figure 3. Introducing Rocket Race

- c. Explaining the function *Rocket Race*
- d. Explains how to use *Rocket Race* media
- e. Divide the children into groups

Figure 4. Dividing children into groups



- f. Throw dice
- g. Moving rocket according to the count dice

Figure 5. Rice rocket running on dice count



- h. Before the children reach the finish line, the teachers give assignments to calculate picture rocket according to the given number
- i. The teacher gives a number question how much has been passed the rocket .

Figure 6. Teacher Asks Questions



- 5) Closing (15 minutes)
In the closing activity, the things that are done are as follows :

- a. Q&A about daily activities with an animal theme
- b. Praying home, greetings

The results of the trial implementation show that the application of *Rocket media Race* has a significant impact on improving children's thinking capacity. Through direct involvement in learning activities using this media, children show visible progress in recognizing numbers, distinguishing simple geometric shapes, and connecting basic ideas to everyday experiences. This situation confirms that learning that emphasizes real-life experiences and active interaction produces higher effectiveness than traditional approaches, because children are not merely listeners or observers, but also participate, experiment, and experience the learning process themselves. Therefore, the principle of learning through play activities is truly realized through the use of *Rocket Race*, so that children get ample opportunity to combine curiosity, motor skills, and conceptual understanding in a series of activities that are both fun and educational.

The visual appeal of *Rocket media Race* has also been shown to play a crucial role in fostering children's interest in learning. Its colorful, bright design and unique rocket shape make children interested and eager to participate in each activity. This enthusiasm aligns with previous research findings that suggest engaging learning media can increase children's intrinsic motivation, making them more active, focused, and consistent in completing teacher-assigned tasks.

Rocket Race is not simply a supporting tool, but rather creates a learning experience that is fully engaging and provides a sense of joy for students. Children in its use are not only directed to absorb knowledge alone, but also guided to be able to collaborate in groups, exchange ideas, and practice communication skills with peers. Through these activities, not only is achieved the strengthening of thinking power and reasoning abilities, but also honed social and emotional skills, including the courage to express themselves, the ability to collaborate, and sensitivity to the needs of others around them. In this way, *Rocket Race* functions as a vehicle that supports children's growth in various dimensions of their lives, covering the intellectual, emotional, and social realms in an integrated and comprehensive manner.

Teachers' responses to the implementation of *Rocket media The race* was also very positive. Teachers noted a marked increase in children's active participation in class, including their understanding of the material being taught. According to teachers, *Rocket Race* help conveying basic concepts in a simpler, more interesting, and easier way for young children to understand. This makes the role of teachers is more effective, because the media can become strengthening bridge understanding without causing boredom .

In addition, the learning environment presented through *Rocket Race* provides an atmosphere that supports optimal child growth and development. The atmosphere is fun, non-pressurizing, and provides space for children to experiment freely, fostering confidence in exploring new experiences. This environment plays a crucial role in early childhood education, as a sense of security, calm, and emotional comfort are the primary foundations for successful learning and pave the way for children to develop balanced cognitive, social, and emotional abilities.

Rocket Games Race also serves as a learning tool that encourages children to develop their creativity. By directly participating in the process of designing and assembling miniature rockets using simple, readily available materials, children are not only encouraged to use their imagination but also encouraged to develop new ideas, find different ways to solve problems, and express ideas through concrete forms. This kind of activity gradually fosters critical thinking habits, requires active involvement in collaborating with peers, and trains the ability to communicate clearly. All of these skills are crucial for facing future life challenges, as children not only hone their creativity but also develop the skills needed in their social, educational, and professional environments. Each activity included in *Rocket Race* is designed to provide a meaningful learning experience.

Children not only memorize concepts but also relate them to real-life experiences through play. With active engagement, their understanding deepens, is internalized, and lasts longer.

From the evaluation results, it is known that even though *Rocket media While Race* has many advantages, there are several aspects that need improvement. Teachers provided feedback to simplify instructions and increase activity variety to prevent boredom and keep children motivated. This feedback is crucial for further development of the tool, making it more effective and adaptable to children's needs.

Based on the research results, it is recommended that *Rocket media Race* is routinely used in kindergarten learning activities, particularly in introducing basic cognitive concepts. Integrating this medium into the curriculum is believed to continuously strengthen children's learning processes. With consistent use, children's cognitive, social, and emotional development will be optimal.

Overall, *Rocket media development Races* made from cardboard waste have proven effective as a learning innovation in Qur'an Kindergartens. Ma'arif Sumber Rejeki. This media is not only engaging, creative, and interactive, but also environmentally friendly and supports character education through collaboration and responsibility. With satisfying results, *Rocket Races* can be a leading medium in early childhood education. Through a fun, play-based approach that leverages creativity, children are expected to learn better, faster, and more meaningfully.

CONCLUSION

The results of this study indicate that the development and application of *rocket media* cardboard waste *race at* Qur'an Kindergarten Ma'arif Sumber Rejeki, Bandar Mataram District, Central Lampung, has significant relevance in improving the cognitive abilities of children aged 4–5 years. This media not only successfully provides a fun and interactive learning experience, but also proven effective in stimulating children's ability to recognize numbers, letters, shapes, and colors, while encouraging their involvement in group activities. Furthermore, the use of cardboard waste adds an educational dimension related to environmental sustainability and the creative use of used goods, so the results of this study contribute to strengthening *eco- friendly learning. Education*. These findings demonstrate that simple innovations utilizing local materials can have a significant positive impact on child development while supporting environmental conservation efforts. Therefore, this research is relevant not only to early childhood education practitioners but also to the wider community in developing creative, sustainable, and contextual learning models.

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