E-ISSN: 2962-6110
P-ISSN: 2964-7843
JSRET
jsret.knpub.com
Journal of Scientific Research, Education, and Technology


# Development of GoGeo Learning Media to Increase the Ability of Geometry Knowledge of Early Children in TK Negeri Pedesaan

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**ABSTRACT**

This research aims to develop GoGeo media as a learning medium to improve the ability of early childhood in understanding geometry, resulting in GoGeo media that is suitable for study by Group A students or children aged 4-5 years. This research adopts a modified 4D R&D model according to the needs of researchers and is carried out in one trial, namely a small-scale field trial. The subjects of this study were 10 students of Group A at TK Negeri Pedesaan Kota Serang. The feasibility of GoGeo media is based on the results of validation by three media experts, principals and teachers, as well as Group A students as trial subjects. Data were collected using instruments in the form of questionnaires, interviews, observations and documents. Data analysis used qualitative data analysis and quantitative data analysis. The results showed that the developed GoGeo media after a series of experiments and expert validation was considered good and very good. This is supported by the assessment of media experts obtaining scores of 81.33 points, 92 points, and 90.67 points in the good and very good categories, assessment of principals and teachers with an average score of 5 included in the very good category, small-scale trials getting the BSH and BSB categories. The results of the child's response test to the GoGeo media were 82 points out of 90 with a passing rate of 91.11%. So it can be concluded that the GoGeo media is "Very Good" and the feasibility criteria is "Feasible". Thus, there is an increase in the ability to recognize geometry in children of Group A at the Countryside Kindergarten in Serang City after using the GoGeo learning media. Based on the results of the study, it can be concluded that the GoGeo media is suitable for use in learning geometry recognition for Group A children at TK Negeri Pedesaan Kota Serang

***Keywords:*** *GoGeo Media, Geometry, Geometry Recognition Capabilities*

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## INTRODUCTION

Early childhood development is part of total human development, which includes physical, motor, cognitive, language, and social-emotional development. Development resulting from learning factors can occur in a variety of environmental situations where there is interaction between the child and others and the surrounding natural environment (Khairi, 2018). Piaget believed that the importance of developing children's potential is that

what they see, hear, and feel affects the development of their perceptual abilities, as well as their ability to retell events, reason, understand symbols, and problem-solving skills. (Sujiono, 2013).

Recognizing shapes, studying buildings, and isolating common images such as triangles, squares, rectangles, and circles are the beginning of building geometry concepts in early childhood. In addition, as a child's initial foundation in understanding geometry, children can learn the language commonly used to express positions, such as up, down, left, right, front, back and other concepts (Abdussakir, 2012; Argaswari, 2018; Sutama & Suharta, 2014).

According to (Puig et al., 2022), geometry needs to be learned for the following reasons: (1) geometry helps children have a full appreciation of their world, (2) exploration in geometry can help develop problem solving skills, (3) geometry plays a major role in other areas of mathematics, (4) geometry is used by many people in their daily lives, (5) geometry is enigmatic and fun. Next (Abdussakir, 2012) stated that the purpose of learning geometry is so that students, (1) gain confidence in their mathematical abilities, (2) become good problem solvers, (3) can communicate mathematically, and (4) can reason mathematically.

In teaching activities, teachers use the support of teaching aids or learning media to stimulate student interest in learning, foster children's ability to understand geometric shapes, and optimize children's geometry development. But in practice, the use of media by teachers to introduce geometry learning to children is not enough. Although the use of this can explain the concept of geometry to children and introduce children to certain geometric shapes (Abdussakir, 2012).

Based on initial observations in rural kindergartens in Serang City, educators usually use lecture or conversation learning methods when introducing geometry concepts, as well as using the blackboard or existing worksheets. In addition, when introducing geometry concepts, teachers often teach only by using worksheets provided by the school and giving examples of activities such as cutting, pasting, making collages, and matching geometric shapes. In addition, children also learn about geometry through extracurricular drawing activities at school. It is rare for educators to develop learning activities where children use learning media to introduce geometric shapes. As a result, children are easily bored and saturated when learning, and the learning process becomes less useful, such as children busy playing alone, children telling stories to friends, and others.

The introduction of geometry in children is still not well developed due to the low utilization of learning media as a learning support tool. Teachers feel more comfortable using activity sheets for children used during classroom learning and the lack of game infrastructure provided by the school (Preeti, 2014). Many teachers already know that the use of media in the learning process can be beneficial and media can provide new things to children, but not all teachers know how to apply it properly, so sometimes the presence of media actually becomes a distraction in the learning process rather than helping children in the learning process (Supa et al., 2022). For this reason, one of the skills that must be possessed by the best teacher (Great teacher) is mastery in learning media by making varied

and innovative learning media (Orlando, 2013). So it is very important for teachers to master the making of learning media and its use during the early childhood learning process.

**GoGeo Learning Media**

GoGeo media is a media in the form of educational game tools or learning support tools for self-study or math learning instructions using media, especially the introduction of geometric shapes that aim to develop children's ability to recognize geometry. GoGeo media is like puzzle media, but researchers modify it by adding number symbols and introducing the concept of color and value numbers. The benefit of presenting GoGeo to children is to arouse children's curiosity in a fun way and train children's motor, mathematical, mental and emotional abilities and skills.

GoGeo media was created as an effective media to introduce geometric shapes according to child development in a fun way, such as introducing children to various colors, numbers, geometric shapes, and number concepts. The geometry concepts introduced to early childhood include triangles, rectangles, and circles, while for the introduction of numbers, numbers start from 1 to 10. The colors introduced are primary colors suitable for early childhood group A. This includes activities. Interesting games can attract children's attention and motivation to learn, so that cognitive abilities such as identifying geometric shapes, colors, numbers and values can be developed optimally. In addition, the media can train children's fine motor skills, such as matching colors or geometric shapes based on predetermined values. GoGeo media includes activities such as geometric shape puzzle games matching images with images on a geometry board, but what distinguishes GoGeo media from puzzle media is the introduction of the concept of numbers in GoGeo media. So, in addition to children playing or matching puzzles, this media also challenges children to match geometric shape puzzles based on the numbers given.

The purpose of GoGeo media is to facilitate children in learning to recognize geometric shapes in a fun way. GoGeo Media is a solution in introducing geometric shapes to children, media is needed that can facilitate children in recognizing geometric shapes, attract children's attention during learning, and make learning fun so as to improve children's understanding of geometry.

Steps to use the media in the form of educational game tools GoGeo, are as follows:

1) Present Gogeo media in the form of a board where the board already has geometry shapes,
2) Empty the board of geometry-shaped objects, make sure there are no geometry objects on the GoGeo board,
3) Then match the geometry object with the image on the GoGeo board according to the number of numbers that have been determined,
4) After it has been matched with the image on the GoGeo board and in accordance with the number of numbers, then the child can mention the shape of the geometry image.

## RESEARCH METHODS

This research is a type of Research and Development (RnD). The educational research and development model adopted the 4-D (Four-D) development model. The Four-D model can generally be viewed as a model for instructional development. According to Triyanto, the Four-D development model can be adapted into 4D, namely Define, Design, Develop, and Dissemination. (Trianto, 2007).

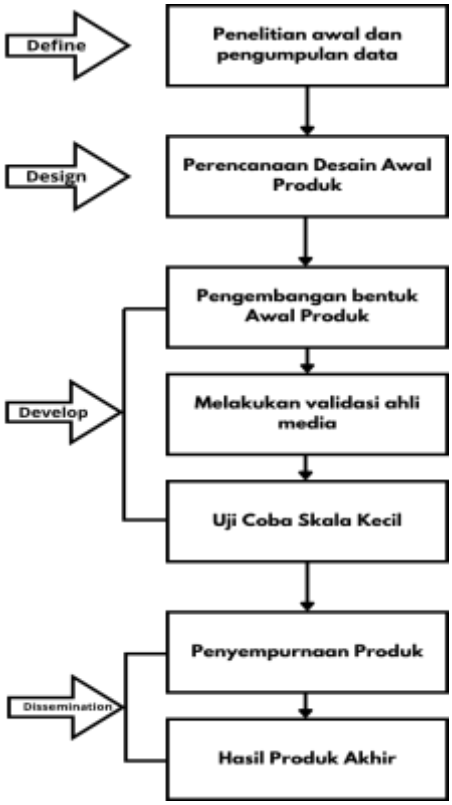


**Figure 1: Modified Four-D Development Stages**

## RESULTS AND DISCUSSION

1. Define

   To obtain information and an overview of the activities carried out as well as the conditions and obstacles faced by teachers or students, especially in the development of GoGeo media, initial data collection was carried out in this media research and development. When conducting direct observation (observation) and interviews with kindergarten supervisors or classroom teachers, various problems can be found during the learning process.

   Researcher observations were made directly into the classroom during the learning process. The interview subjects of this research were kindergarten supervisors and class A teachers of rural public kindergartens in Serang City, asking about the learning process, obstacles to the teaching and learning process, learning media, and student

characteristics in the learning process. Some problems after conducting observations and interviews with group A children at TKN Pedesaan in Serang City, namely:

a. Every child has a diverse personality
b. Learning media is still very limited
c. GoGeo media in the form of APE is not yet available in kindergarten
d. Teachers are very difficult in teaching material to children about numbers, geometric shapes, and colors.

2. Design

The researcher developed a media product, namely GoGeo media which is an educational game tool designed to solve existing problems to recognize geometric shapes, recognize numbers and write numbers (drawn by themselves).

3. Development

Initially, the initial design of the GoGeo media product made by the developer was using thick cardboard. But after being shown to the media expert lecturer, he suggested making it from wooden boards that are safe and durable for use by early childhood. In making GoGeo media made with wood, this is done by ordering to a furniture place in the Serang City area, due to the limited expertise and tools used to produce media owned by researchers. The making of GoGeo media educational game tools is ordered according to the design design that has been made by the researcher, starting from the size and shape of the desired puzzle so that the media made is getting better and feasible when used later.

4. Media Expert Validation

The initial GoGeo media that has been made, will then be assessed and validated by media experts. For GoGeo media validation carried out by media expert lecturers, experts from the PAUD Study Program of Panca Sakti University Bekasi, Open University and Bina Bangsa University Serang, the results of the assessment and validation given by media experts on GoGeo media, are as follows:

**Table 1. Media Expert Validation Results**

| Aspect | No | Indicator | Validator | | |
|---|---|---|---|---|---|
| | | | **1** | **2** | **3** |
| **Physical** | 1 | Safety of materials used | 3 | 4 | 5 |
| | 2 | The durability of GoGeo media materials | 4 | 5 | 4 |
| | 3 | Appropriateness of GoGeo media size | 3 | 4 | 5 |
| | 4 | Attractiveness of packaging design | 4 | 5 | 5 |
| **Image** | 5 | Image clarity | 5 | 5 | 5 |
| | 6 | Image suitability with the material and characteristics of Group A kindergarten children | 4 | 5 | 5 |
| **Color** | 7 | Color suitability with Group A kindergarten children | 4 | 4 | 4 |
| | 8 | Appropriateness of color composition, image and writing | 4 | 4 | 4 |
| **Writing** | 9 | Appropriateness of the size of the number writing | 5 | 5 | 4 |
| | 10 | The suitability of the type of number font used | 4 | 5 | 4 |
| | 11 | Clarity of media title writing on packaging | 3 | 3 | 3 |
| | 12 | Clarity of number writing color on GoGeo media | 4 | 5 | 5 |
| **Usage** | 13 | The suitability of the game with the characteristics of Group A kindergarten children | 5 | 5 | 5 |
| | 14 | Practicality of media (easy to store and move) | 5 | 5 | 5 |
| | 15 | The accuracy of the media in developing children's abilities | 4 | 5 | 5 |
| | | **Total** | 61 | 69 | 68 |
| | | **Persentage** | 81.33 | 92.00 | 90.67 |
| | | **Category** | **B** | **SB** | **SB** |

Judging from the assessment of GoGeo media by three media experts, the total score of 5 aspects and 15 indicators is 61 points, 69 points, and 68 points, and the average score is 81.33 points, 92 points, and 90.67 points, respectively. In 5 aspects of physical evaluation, images, colors, writing and use are included in the "good" category according to validator 1 and the "very good" category according to validators 2 and 3, so GoGeo media is very feasible to use in group A children.

5. Small Scale Field Trial

Based on the results of the small-scale field trial, the experiment was conducted on 10 children by filling out the instrument with the help of researchers. In this small-scale

field trial, we obtained the results of children's geometry recognition ability through GoGeo media, namely:

**Table 2: Results of Small Scale Field Trial Assessment of Children's Geometry Recognition Ability**

| Student Code | Elements to be Assessed | | | | | | | | | Category |
|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | |
| **AUD-01** | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | BSB |
| **AUD-02** | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | BSB |
| **AUD-03** | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | BSB |
| **AUD-04** | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | BSH |
| **AUD-05** | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | BSH |
| **AUD-06** | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | BSB |
| **AUD-07** | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | BSB |
| **AUD-08** | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | BSB |
| **AUD-09** | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | BSH |
| **AUD-10** | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | BSB |

Value Description:
(1) : BB (Undeveloped)
(2) : MB (Starting to Develop)
(3) : BSH (Developing According to Expectations)
(4) : BSB (Very Well Developed)

Description of the element being assessed:

1) The child can name the geometric shapes through the pictures shown correctly and clearly.
2) The child can remember geometry shapes that have many shapes.
3) The child can mention the characteristics of the geometric shapes.
4) The child is able to name geometric shapes from objects around the child.
5) The child can mention the number of geometric shapes taken.
6) The child can classify geometric shapes according to their shape.
7) The child is able to match the geometry shape according to the geometry puzzle.
8) The child is able to collect geometry shaped objects.
9) The child can follow the rules of the game

**Table 3. Child Response Results**

| Student Code | Elements to be Assessed | | | | | | | | | Category |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| **AUD-01** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-02** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-03** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-04** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 6 |
| **AUD-05** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 7 |
| **AUD-06** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-07** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-08** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **AUD-09** | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 6 |
| **AUD-10** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9 |
| **Number of Child Responses** | | | | | | | | | | **82** |
| **Percentage** | | | | | | | | | | **91.11%** |

Value Description:
(1) : Like
(0) : Dislike
Description of the element being assessed:

1) Color attractiveness
2) Image Attractiveness
3) Clarity of Images on GoGeo Media
4) Clarity of writing numbers on GoGeo media
5) Ease of playing geometry puzzles on GoGeo media
6) Ease of playing number puzzles on GoGeo media
7) Ease of matching geometric shapes and numbers on GoGeo media
8) Overall attractiveness of GoGeo media
9) Ease of playing GoGeo media according to the rules

Based on the results of small-scale field trials, it can be concluded that the ability to recognize the geometry of children aged 4-5 years or group A students in TKN Pedesaan of Serang City has looked good. Judging from table 3, the geometry recognition ability of children is at the BSH (Berkembang Sesuai Harapan) and BSB (Berkembang Sangat Baik) stages.

Based on Table 3, the results of the responses given by students on the results of the child response test to GoGeo media are 82 points out of 90 with a pass rate of 91.11%. So it can be concluded that GoGeo media is "Very Good" and the eligibility criteria are "Feasible".

This research was conducted to develop GoGeo learning media from wooden materials that can improve the ability of early childhood in recognizing basic geometric

shapes. GoGeo media is designed and made by taking into account the characteristics of children and learning principles that are suitable for PAUD.

Based on field trials on 10 children in group A of TKN Pedesaan of Serang City, the results showed that the wooden GoGeo media is feasible to use to improve children's ability to name and classify geometric shapes such as circles, triangles, quadrilaterals and so on.

In addition, children are also very enthusiastic and interested in learning geometry using wooden GoGeo media. They can learn while playing and exploring directly with the media. The results of this study indicate that wooden GoGeo media is feasible and effective to use to introduce basic concepts of geometry in early childhood.

In addition, students' responses to wooden GoGeo media are very positive. A total of 91.11% of students stated that this media is very interesting and makes it easier for them to learn geometry. GoGeo media is felt to be more concrete and realistic than just studying flat shapes on the blackboard or textbook.

## CONCLUSION

GoGeo media is produced using the 4D model R&D stage research and development model modified according to the needs of researchers. Through several trials of GoGeo media development through validation tests by experts, GoGeo Learning Media was declared "Very Good", Children in group A TK Negeri Pedesaan Kota Serang got a "Very Good" category in the introduction of geometric shapes and number recognition.

GoGeo media was developed to improve the ability of geometry recognition of children in TKN Pedesaan Serang City, namely by using GoGeo media can improve the ability of geometry recognition of children in group TKN Pedesaan Serang City. This is in accordance with observations of children in small field trials. By using GoGeo media, children's geometry recognition abilities increased at the BSH (Berkembang Sesuai Harapan) and BSB (Berkembang Sangat Baik) stages, and student responses to wooden GoGeo media were very positive. A total of 91.11% of students stated that this media is very interesting and makes it easier for them to learn geometry.

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