**Journal of Computer Science Advancements**, 1(2) - April 2023 92-102


# Development of Traffic Maze Media to Stimulate Problem of 4-5 Years Old Children

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**Article Information:**
Received April 10, 2023
Revised April 19, 2023
Accepted May 1, 2023

**ABSTRACT**

This study aims to produce a valid Traffic Maze learning media to improve the fine motor skills of children aged 4-5 years. This research is a development research with the development model used by Sugiyono. In this study, researchers only used 7 (seven) stages, namely knowing problems and potential, data collection, product design, design validation, design revision, product trials and product manufacturing. The next stage was not carried out due to cost and time constraints. The data collection technique used is a questionnaire, where the questionnaire is validated by material experts, media experts and educators. The type of data generated is quantitative and qualitative data. The average percentage result of the pretest conducted on 3 children is 12.3%, proving that the child's condition is still in the stage of starting to develop. Then the posttest is carried out, namely the condition after the child is given the Traffic Maze media, the average percentage result of this posttest is 31% which proves that the child has changed the condition to develop as expected. So it can be concluded that Traffic Maze media to improve the problem solving ability of children aged 4-5 years has met the criteria for validity.

**Keywords**: *AUD, Traffic Mazze, Problem Solving*

Journal Homepage https://journal.ypidathu.or.id/index.php/jcsa
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How to cite: Aliyah, N., Tabroni, I., Jixiong, C., & Wei, Z. (2023). Development of Traffic Maze Media to Stimulate Problem of 4-5 Years Old Children. *Journal of Computer Science Advancements*, 1(2). 92-102. https://doi.org/10.55849/jsca.v1i2.455
Published by: Yayasan Pendidikan Islam Daarut Thufulah

## INTRODUCTION

In the standard level of achievement of child development, the scope of cognitive development of children aged 4-5 years includes: learning in problem solving, logical thinking, and symbolic thinking (Vial, 2019). The indicator in problem solving is one of the fundamental aspects, especially in early childhood cognitive development (He dkk.,

2019). One of the indicators that must be achieved for children aged 4-5 years is solving simple problems in everyday life in a flexible and socially acceptable way and showing a creative attitude in solving problems (Song dkk., 2020). An effective way to help problem solving for children aged 4-5 years is through play. Through play many things are passed by children in gaining knowledge with the surrounding environment directly.

A major contribution to the development of determining the child's future begins when the child develops problem solving skills with the help of stimulation from the environment around the child (S. Wang dkk., 2019). The development of this ability is closely related to the thinking process in children, especially in the ability of children to remember, find ideas, find new ideas, and children are also able to achieve the desired goals.

DeLoache, Miller, & Pierroutsakos state that this problem solving ability is actually the center of thought, in this ability there are several components which include goals in doing something, thinking in dealing with obstacles to achieve goals, using one or more strategies to solve a problem, applying knowledge sources and evaluating results in an effort to solve the problem.

There are six indicators used in this study, and have been adapted from expert opinions. The following are the indicators used in this study, namely 1) observing objects around (Penconek dkk., 2021); 2) mentioning objects around the child along with their functions; 3) retelling information obtained from the surrounding environment; 4) pairing objects according to their function and shape; 5) giving alleged reasons for the occurrence of an event; 6) creating something according to their own ideas related to various problem solving.

The fact in the field based on the results of preliminary observations states that some children still cannot conjecture the reason for an event experienced, pair objects according to their function and shape and then in terms of using objects according to the function of the object there are still children who cannot do it (Caniëls dkk., 2019). As a result of this, in the process of learning, children tend to show an attitude in the form of always asking the teacher for help in solving problems on tasks before trying to do it themselves (Pfattheicher dkk., 2022). Children still tend to be passive in learning and still rely on help from teachers or adults around children.

Explains that the impact arising from the child's inability to relate new information to previously experienced events will cause the child to depend on the adults around the child (Peng dkk., 2020). Generally, problem solving ability is part of a continuous thinking process, so it requires independence and activeness from children to get new experiences and information (Jiang dkk., 2019). Activeness and independence are needed in the development of problem solving skills in children, so that children are able to find solutions to problems encountered by behaving actively in exploration activities (Salminen dkk., 2020). Direct involvement of children in learning and by inviting children to discuss how children solve problems and view a problem is important.

Based on the background above, the authors need to examine the development of problem solving skills through Traffic Maze learning media for 4-5 year old children in Purwakarta Regency.

## LITERATURE REVIEW

### Problem Solving Ability of 4-5 Year Old Children

Problem solving is the discovery of steps to overcome existing gaps. Meanwhile, the problem-solving process itself is a human activity in applying previously obtained concepts and rules (Hu dkk., 2019). Problem solving emphasizes the effective use of the scientific process by children to conduct an investigation of a particular object or event that occurs in the surrounding environment.

According to Paulia in problem solving skills are the ability to think in finding solutions to solve a problem by gathering facts, analyzing information, designing alternative solutions, and choosing the most appropriate problem solving. Such skills are one element of the cognitive development aspect which includes problem solving, decision making, critical thinking, and creative thinking (Van Doren dkk., 2019). The indicators in problem solving skills in early childhood are 1) observation / observation skills, 2) data and information collection skills (colleting), 3) information processing skills (communicating), and 4) information communication skills (Syaodih, et al: 2019).

The importance of familiarizing and teaching problems for early childhood is also explained by Britz in Suryati (2019) that problem solving is the main foundation of learning in early childhood, children's ability to solve problems should continue to be valued, encouraged, given support because problem solving will occur in their daily lives (F. Wang dkk., 2019). Furthermore, it is said that the importance of familiarizing early childhood in solving problems can train children's ability to think about themselves and others, and can encourage them to develop their understanding in the wider community.

Teachers have an important role in improving problem-solving skills in early childhood. When teachers pose a problem, they should present the problem to children and discuss the solution with them so that children are more aware of the importance of the problem-solving process.

### Traffic Maze Media

According to the Big Indonesian Dictionary (KBBI) a maze or labyrinth is a place full of roads and passages with twists and turns and confusion. Through the maze, children will be provoked to be able to think creatively in solving simple problems, namely finding a way out of the picture that has been written on the maze. This is in line with Kurniawan's opinion who explained that in the maze game a student must determine the path that must be passed in the maze section to arrive at the final destination. Maze is a game with narrow, winding, and turning roads, or dead-end roads or roads that have obstacles.

Maze is a type of puzzle-type educational game in the form of lanes that branch out intricately in order to find the right route to reach a goal that serves to train the eye and hand coordination of students who play this maze game.

Research that has been conducted (Safira & Fidesrinur, 2018) related to maze is emphasized, namely a game that emphasizes strategic training to find a way out. The emphasis of the maze used in the study is geometry shapes in accordance with the learning objectives to be achieved and the learning is an effort to solve the problems faced by children related to the introduction of geometry shapes that have not been optimal. Increasing the ability to solve problems is also corroborated in the results of research conducted by children need a variety of learning media and also innovate in accordance with the learning objectives to be achieved. This will enrich the child's experience.

Based on the opinions of the experts above, the authors can conclude that the maze game is a game of finding a way out by passing through winding and branching roads that aim to develop all aspects of early childhood development, especially in cognitive aspects with the criteria for problem solving ability. The type of maze game can be modified according to the objectives to be achieved.

While Traffic or highway is a land path on the surface of the earth made by humans with shapes, sizes and types of construction so that it can be used to channel traffic of people, animals and vehicles that transport goods from one place to another easily and quickly.

This Traffic Maze media aims to introduce traffic rules when passing on the highway to early childhood. Habituation to traffic order needs to be instilled in the community to produce disciplined and orderly citizens. A disciplined society is not created by itself. The formation of a disciplined society requires continuous effort. This consistent and continuous effort requires habituation that will become the culture of the community. And habituation will become a culture if it is instilled from an early age (Purwanto, 2017).

The product framework that can be described is about what distinguishes the research to be conducted by the author from previous research is that the development of Traffic maze media refers to order-based learning when passing traffic on the highway where the images included later are icons commonly found on the highway such as traffic lights, no parking signs, winding road signs, Zebra crossings, etc. with the aim that children will recognize how orderly when passing traffic. The main tools and materials needed in making this traffic maze media are cardboard, printable pictures of highways, origami paper, glue, scissors, ice cream sticks, magnets, duct tape and markers. Children can play this Traffic Maze by placing various vehicles that have been provided according to the path and directing the vehicle to the destination listed on the information.

## RESEARCH METHODOLOGY

The form of this research is research and development (R&D). This study uses qualitative and quantitative data types, where the qualitative data is in the form of responses and suggestions from validators on the validation of Traffic Maze media, and the quantitative data is in the form of validation sheet assessment scores by validators to assess the maze trap game media.So development research (R&D) is research that is used to produce certain products, and these products can be tested for effectiveness.

The data collection technique in this study was a questionnaire. Questionnaire is a data collection method that is done by giving a set of questions to respondents. This questionnaire is used to measure indicators related to Traffic Maze media. The data collection instrument in this study is a validation sheet, which is validated by material experts, media experts and educators, as well as limited trials by children.

The development used in this study is to use the R&D development procedure according to Borg and Gall which consists of 10 stages of research (Sugiyono, 2013). The stages put forward by Borg and Gall are shown in the following figure:

### Potential and Problems

This research and development is motivated by the potential and problems, the potential in research and development is the very rapid development of early childhood learning media, especially Traffic Maze media. Problems identified in early childhood institutions as observations made at PAUD Assholihin Purwakarta district have the results of children's development in the ability to solve problems is still very low. Then related to the learning media used, there is no maze that introduces traffic rules, because the Children's Activity Sheet (LKA) is still used in doing the maze. This is a known problem because educators have not made much of their own media and still depend on existing props as well as the dominance of using LKA as a child activity.

### Data Collection

In this process, stages are carried out in the form of linking the research objectives of the formulation of known problems by looking for relevant reference sources that will strengthen the findings of the research conducted. In addition, researchers conducted observation and learning activities carried out with maze at the intended PAUD institution (Low dkk., 2019). This information is very useful for researchers to organize the needs and also the right design in overcoming these problems. Especially the concept that will be compiled by exploring this information so that the media developed really has the benefit to be used by the institution.

### Product Design

The design process is tailored to the needs, especially the expected developmental achievement goal is the ability to solve problems in designing pictures where the content is associated with icons or traffic signs that are still basic (Chen dkk., 2019). To motivate children to bring up more critical thinking through the design of the images that will be displayed, the child's thinking process will be improved. in gaining experience and knowledge from the activities carried out will be faster.

The steps that researchers take in designing this product are looking for images related to signs that are commonly found on the highway, such as signs of no parking, zebra crossing and others (Gao dkk., 2021). Then design the maze model by entering the image design with an attractive color composition and in accordance with the characteristics of early childhood (Yang dkk., 2019). The resulting product will be made from used cardboard material that has been cut out with a size of 40 cm x 40 cm according to the image design and also the child's body.

**Design Validation**

At this stage after the initial product is finished, then validate it to a team of experts consisting of material experts and media experts as follows:

1. Material experts review aspects of material study in the form of material feasibility
2. Media experts review, elements of suitability and ease of use of the media.

**Design Revision**

This step is an improvement in the design of the hijaiyyah maze media based on the input provided by material experts and media experts. This improvement is very likely to be done more than once so that a main Traffic Maze can be obtained which is ready for wider testing.

**Product Trial**

In the field of education, product design can be tested directly, after validation and revision (Hassan dkk., 2021). Testing is carried out with the aim of obtaining information on whether the product is effective and feasible to use (Bai dkk., 2021). The steps taken to test the Traffic Maze product are: 1). Directing how to play maze to children aged 4-5 years using Traffic maze media, 2). Children listen, 3). Researchers do recalling to children about the contents of the maze media.

**Final Product**

This step is a refinement of the Traffic Maze media that is being developed. Refinement of Traffic Maze media is very necessary for more accurate media developed based on input or results of feasibility tests on a small scale (Yang dkk., 2019). At this stage, we have obtained a Traffic maze media whose effectiveness level can be accounted for. The results of the final Traffic maze media improvement have a reliable generalization value.

## RESULT AND DISCUSSION

This research was conducted to produce a valid traffic maze media to improve the problem solving ability of children aged 4-5 years (Albrecht & Chin, 2020). The media and materials used to support the validation of this media include:

1. Cardboard
2. White cardboard paper
3. Glue
4. Magnet
5. Markers

6. Crayons
7. Printable pictures of cars, motorcycles and bicycles.
8. Clear duct tape
9. Ice cream sticks

For how to make this traffic maze media, first cut out the cardboard into a size of 30 cm x 40 cm, secondly coat the top of the cardboard that has been cut out with white cardboard paper (Golden & Gajendran, 2019), third draw highways, houses, trees, schools, traffic signs and write START at the end of the road using markers and crayons on cardboard that has been coated with white cardboard, fourth after the highway image is made by pulling then duct tape the surface of the image with clear duct tape so that the image is not easily crossed out or torn, Fifth (Vial, 2019), print a picture of a vehicle that matches the size of the highway that has been drawn then laminate it so that the image of the vehicle is not easily damaged, sixth attach a magnet to each bottom of the vehicle image that has been laminated using strong glue, and the last attach a magnet to the end of the ice cream stick using strong glue.

## RESEARCH RESULTS

This research test was conducted on 3 children aged 4-5 years in the Purwakarta area. The first test was conducted at the beginning before the children were given Traffic Maze media (Arora dkk., 2019). The results of the pretest on these 3 children are as follows:

Table 1. Pretest Results

| No | Name | Value |
|---|---|---|
| 1. | NSS | 14 |
| 2. | SQV | 11 |
| 3. | KIB | 13 |

$$Me = \frac{\sum xi}{n}$$

$$Me = \frac{14+11+12}{3}$$

$$Me = 12{,}3\%$$

Keterangan :
*Me* = Nilai Rata-rata
$\sum$xi = Jumlah nilai setiap komponen aspek
$n$ = Jumlah Siswa

Table 1 shows the value of each child who has been tested using a questionnaire that has been prepared which is certainly related to the problem solving indicators of children aged 4-5 years (Zhang & Jin, 2020). The score obtained by NSS is 14, SQV is 11 and KIB's score is 13. The average result of the pretest conducted on NSS, SQV and KIB is 12.3% (Wu dkk., 2020). With these results, it can show that these 3 children are still in the stage of starting to develop in problem solving skills.

Table 2. Posttest results

| No | Name | Value |
|---|---|---|

| | | |
|---|---|---|
| 1. | NSS | 31 |
| 2. | SQV | 27 |
| 3. | KIB | 35 |

$$Me = \frac{\sum xi}{n}$$

$$Me = \frac{31+27+35}{3}$$

$$Me = 31\%$$

Keterangan :
*Me* = Nilai Rata-rata
$\sum xi$ = Jumlah nilai setiap komponen aspek
$n$ = Jumlah Siswa

Table 2 above shows the results of the posttest conducted on 3 children aged 4-5 years. This posttest is a situation after the child is given Traffic Maze media. Table 2 explains that NSS got a result of 31, SQV got a score of 27 and KIB got a score of 35. For the average result of the scores of NSS, SQV and KIB this child is 31%. These results can explain that the condition of the 3 children after being given the Traffic Maze media changed to Developing As Expected. That way this Traffic Maze media has very valid criteria to be given to children aged 4-5 years in developing problem solving skills. From the results of the trials conducted, it can be concluded that the use of Traffic Maze media in learning makes children enthusiastic and feel happy. Traffic Maze media is very influential in improving children's problem solving skills, where children can find ways to solve the problems they face, can use objects as symbolic games and recognize simple concepts.

In the pretest situation involving 3 children, the scores were 14, 11 and 13 with an average percentage of 12.3% with the conclusion that the condition of the children was still starting to develop in problem solving skills. This encouraged researchers to test the products that had been made with the aim of improving the ability of these 3 children to solve various problems. Supported by several studies which state that problems should be introduced early because it will be more challenging to the learning process, involving many attempts to solve problems as the main goal (Thomas, Ellen, Megan, Elizabeth & Linda, 1993).

Furthermore, the Posttest was carried out on the 3 children, the posttest is a condition where the child has been given Traffic Maze media. In this posttest, the scores of each child were 31, 27 and 35 with an average percentage of 31% with the conclusion that the child's condition after being given the Traffic Mze media changed to Developing As Expected. This proves that Traffic Maze media is valid for use and has fulfilled the principles of implementing early childhood learning, namely oriented to the needs of children, learning in accordance with child development, can learn through play, increase children's social interactions, develop children's multiple intelligences, stimulate creativity and innovation and create a conducive environment (in Suyadi, 2013).There are several studies that are in line with the results of maze media development research conducted by Fajar Luqman (2014) entitled Development of Electronic Maze Games to Improve Cognitive Skills in Children 5-6 Years of Age.

Based on the results of data analysis on cognitive abilities in solving problems during the initial observation (pre test) and observation after treatment (post test) using electronic maze games, the average value of the pre test results is 6.85 and the average post test results is 9.80. 0. The results of the calculation with the level test obtained t count = 0 is smaller than t table = 52 and the results of the decision making are: Ha is accepted because t count < t table (0 t table (0>52).

In addition, the results of research by Nia Lestyorini (2015) entitled Development of magnetized maze media in cognitive learning for Group B children in kindergarten. The results of the research on the success of the development of magnetized maze media are: (1) 95% of learning becomes more efficient and effective, (2) 100% of children are interested in magnetic maze media. The overall percentage result obtained is 97.5%, thus the percentage category results, which are between 80%-100%, are categorized as very valid and can be used.

Three-Dimensional Maze Game on Gross Motor Skills Group B at Tk Pgri I Jogorogo Ngawi. The results of data analysis of small group trials of 8 children in group B at TK PGRI I Jogorogo Ngawi obtained an assessment of 95% of children easily doing three-dimensional maze game activities, 100% of children feel safe doing three-dimensional maze game activities, 100% of children feel happy doing three-dimensional maze game activities, and in the physical aspect of motoric obtained 96.87% of children can do all the activities in the three-dimensional maze game properly and correctly. 3. The results of data analysis of large group trials of 27 children in group B at PGRI I Jogorogo Ngawi Kindergarten obtained an assessment of 99.45% of children easily doing three-dimensional maze game activities, 99.45% of children feel safe doing three-dimensional maze game activities, 100% of children feel happy doing three-dimensional maze game activities, and in the physical motor aspect obtained 88.64% of children can do all activities in three-dimensional maze games properly and correctly.

The relevance of the three studies above are both types of development research. Based on the validation results obtained and supported by existing research, the development of traffic maze media to improve the problem solving ability of children aged 4-5 years has met the validity criteria.

## CONCLUSION

The conclusion that can be described is that this traffic maze media product has met the criteria of validity so that it can be used as an alternative learning tool to improve the problem solving ability of children aged 4-5 years.

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