



# Analysis of Scientific Educational Game Tools Implementation for Early Childhood Students in West Nusa Tenggara

Baik Nilawati Astini<sup>1</sup>, Gunawan<sup>2</sup>, Ni Luh Putu Nina Sriwarthini<sup>1\*</sup>

<sup>1</sup> Early Childhood Education Department, Mataram, Indonesia; University of Mataram, Indonesia

<sup>2</sup> Physics Education Department, University of Mataram Mataram, Indonesia

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Corresponding Author:

Ni Luh Putu Nina Sriwarthini

[ninasriwarthini@unram.ac.id](mailto:ninasriwarthini@unram.ac.id)

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**Abstract:** This qualitative descriptive study aims to determine the implementation of scientific educational game tools for early childhood in West Nusa Tenggara. Samples were taken using a simple random method from 3 districts in West Nusa Tenggara, which are North Lombok, East Lombok, and West Sumbawa. Data were collected using a questionnaire form. The research data were analyzed using a qualitative descriptive method. The results of this research illustrate the implementation of scientific educational game tools for early childhood in the West Nusa Tenggara province. Based on the data obtained, as many as 14 scientific educational game tools have been found and are suitable for science learning in early childhood. There are 11 types of indoor scientific educational game tools that can be used to stimulate science learning in early childhood and as many as 3 types of outdoor scientific educational game tools that can be used to stimulate science learning in early childhood. The implementation of scientific educational game tools that are in accordance with the science concept is only 28% and was categorized as low. This shows that the teacher's understanding and competency in teaching science with the help of scientific educational game tools is still limited.

**Keywords:** Early Childhood; Educational game tools; Scientific

## Introduction

The early childhood stage is the most important and fundamental period throughout the span of growth and development of human life. This period is commonly referred to as the golden period or golden age because at that time the child experienced very rapid growth and development and was irreplaceable in the future (Raihana, 2020). In this case, the provision of stimulus is very influential to determine the next development. One of the stimulations that can be given to early childhood is through educational games (Roza et al., 2019).

Early childhood education is a basic foundation for the development of human attitudes and behavior and has a massive influence on the quality of Human resources for every nation (Ayuni & Setiawati, 2019). The development of good human resources begins with the development of good quality Early Childhood

Education services. In early childhood, an individual who is from 0-8 years old experiences a period of rapid development and has the potential to learn faster supported by accelerated brain capacity, and has unique characteristics

Learning through playing is a very effective teaching and learning technique for early childhood. Some psychologists say that playing is very influential in the development of a child's soul. (Rahmawati et al., 2018), said that playing can provide opportunities for a child, students, and students to explore, discover, express feelings, be creative, and learn in a fun way. Providing opportunities for children to play is a form of attention to the development of aspects of child development.

(Pyle, 2018), stated that integrating playing activities in the classroom is very important for the development of children's literacy. Through playing, children will be active in exploring knowledge that is

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stimulated during interactions with their friends. This can be seen from the way children communicate their knowledge both expressively and repressively, and from the written assignments they make.

Learning through playing does not always have to use game equipment that must be purchased, using materials around us to make a game or a tool to play is more fun for children. According to (Widayati et al., 2020), an educational game tools (APE) are anything that can be used as equipment for playing that contains educational values that can develop all children's abilities, APE can be anything that is around the environment for example, brooms, plates, glasses, spoons, etc. But what is meant here is APE that is self-made from materials that are no longer used or materials that are easy to get around. In line with the research that has been conducted by Rita Kurnia and Zulkifli N., (2016) who found that the use of APE using local materials was quite effective in the moderate category to improve the language skills of children aged 5-6 years in Early Childhood Education. This shows that the use of natural materials that are around is an alternative that can be used as a medium and source of early childhood learning.

A game tool can be called an educational game tool if : has educational value, is safe to use for children according to their age, has a shape or color that attracts children's interest, is simple, durable, and has a size that fits the age of the child. Appropriate and appropriate educational game tools will be able to create a playing environment for children by providing a sense of security, interest, and fun to improve the quality of learning for children (Hasanah, 2019).

Science for early childhood is a science that is aimed at early childhood and how to understand science from a child's point of view. Currently, science is an important thing to introduce in early childhood. This is a matter because science can invite children to think critically and creatively, and that science can train children to solve problems or find solutions. The science which is introduced from an early age will encourage them to become children who are rich in inspiration, to be creative, and rich in initiative and can develop a logical mindset in children (Izzuddin, 2019).

Scientific literacy skills in children can be stimulated with educational game tools because educational game tools can help to increase every aspect of child development. In accordance with the opinion of (Ndeot et al., 2019) which states that educational game tools are tools that are deliberately designed specifically to develop aspects of child development. So, basically, educational game tools are game tools that are designed for the learning needs of early childhood.

According to Mursalin & Setiaji, (2021), science learning in early childhood is one of the activities that

can develop every aspect of children. Science learning trains children's ability to recognize various phenomena of objects and phenomena of events. Implementing simple science learning in early childhood can be done by using Educational Game Tools (APE). Scientific ability is an ability related to various experiments or with certain methods in order to approach it logically and still consider the stages of children's thinking. One way to increase children's thinking stages logically is through simple science learning using educational games.

Rahmi, (2019) found that science activities for children can actually improve critical thinking skills in early childhood, and can also introduce children to basic science process skills. The main components of basic science process skills are observing, comparing, classifying, measuring, and communicating. (Setiawati et al., 2019), said that it is important to instill science learning from an early age with aims in accordance with the nature of science, such as curiosity, processes, products, and applications/attitudes for early childhood.

But in reality, results conducted by (Sriwarthini et al., 2022), found that the implementation of the scientific approach in kindergarten at Mataram is still relatively low, in terms of the emergence of science process skills, which are on average below 3. The main obstacle to the low implementation of the scientific approach in kindergartens is due to a lack of teachers training in advance to develop varied learning activities and scientifically based learning.

Not only scientific approach, scientific educational game tools also are rarely implemented in early childhood learning. According to research conducted by (Ulfadilah et al., 2021), early childhood activities carried out at school often use only fine motor skills such as writing, drawing, coloring, and picking up objects. Schools pay little attention to the use of game media, especially game media in the field of science which aims to introduce children to science. This happens because of the lack of utilization of existing game media or the teacher's lack of insight into scientific game media that must be used in accordance with the learning or the theme of the sub-theme being given.

Astini and Nupus, (2019) also conducted research for developing environment-based educational game tools (APE) for scientific learning on environmental themes because in north Lombok was found lack of scientific educational game tools used in early childhood learning. The purpose of this study was to analyze the Implementation of Scientific Educational game tools for early childhood students in west Nusa Tenggara. Through this research, it is hoped that it will be able to find out various Scientific Educational Game Tools that can be used in developing science learning in early

childhood students and most of the scientific educational game tools found are in accordance with the science concept. The results of this research are expected to be used as evaluation material in the process of science education lecturers in tertiary institutions in advance to produce professional graduates in the field of education in the future.

**Method**

This research is qualitative descriptive research, using a survey method that aims to determine the implementation of scientific educational game tools for early childhood students in West Nusa Tenggara. The samples of this study were early childhood schools in west Nusa Tenggara that were selected by simple random sampling and totaled 22 schools from North Lombok, East Lombok, and West Sumbawa. Data were collected using a questionnaire form, interviews, and documentation. The research data were analyzed using a qualitative descriptive method.

**Result and Discussion**

This research was conducted in West Nusa Tenggara Province. From 120 kindergartens, a random sample was taken of 20% of the population (120 kindergartens) to 24 kindergartens in East Lombok,

North Lombok, and West Sumbawa districts (Sugiyono, 2019). Pringgabaya Sub-District, East Lombok Regency, eight Kindergartens were taken including the State Kindergarten in Pringgabaya District, Tunas Baru Kindergarten, Aisyiah Bustanul Atfal Pohgading Kindergarten, NW Al Ikhlas Kindergarten, Pringgabaya 02 State Kindergarten, PKK Pringgabaya Kindergarten, Aisyah Bustanul Atfhal Labuhan Lombok Kindergarten, and PKK Al Ikhlas Labuhan Lombok Kindergarten. From North Lombok Regency there were eight schools that were selected as targets of this research, namely Dewi Kayangan State Kindergarten, Permata Hidayah Kindergarten, Al-Hikmah Santong Kindergarten, Bina Lestari Preschool, Kasih Bunda Kindergarten, Melati Kindergarten, Harapan Bunda Kindergarten, and Preschool Mulia Hati. For East Lombok Regency, eight kindergartens are selected including Pembina State Kindergarten, Tunas Baru Kindergarten, Aisyiah Bustanul Atfhal Pohgading Kindergarten, NW Al Ikhlas Kindergarten, Pringgabaya 02 State Kindergarten, PKK Pringgabaya Kindergarten, PKK Al Ikhlas Labuhan Lombok Kindergarten, and Aisyiah Bustanul Atfhal Labuhan Lombok Kindergarten. The data was obtained using questionnaires that have been distributed, interviews, and observations. The results found that all of the schools had scientific educational game tools in good condition for use.

**Table 1.** Identification of Educational Game Tools for Early Childhood Students in West Nusa Tenggara

Types of Educational Game Tools	Name of Educational Game Tools	Utilization			Properness
		Frequently	Rarely	Proper	Not Proper
Indoor	Color Experiment	✓		✓	
	Plant Growth Experiment		✓	✓	
	Floating - Sink Experiment		✓	✓	
	Tin Phone		✓	✓	
	Compass		✓	✓	
	Inflatable ballon	✓		✓	
	Animal miniature	✓		✓	
	Plant puzzle	✓		✓	
	Animal puzzle	✓		✓	
	Human Body part puzzle	✓		✓	
	Volcano Experiment		✓	✓	
Outdoor	Seesaw	✓		✓	
	Swing	✓		✓	
	Slide	✓		✓	

**Notes:**

Frequently : If it is used more than 3 times a week  
 Rarely : If it is used 1 - 2 times a week

Based on table 1, it is known that all scientific educational game tools were dominated by indoor scientific educational game tools. There were 11 types of indoor scientific educational game tools spread across 24 kindergartens in the province of West Nusa Tenggara. All of the scientific educational game tools are found in

still classified as proper for use in early science learning activities for early childhood students. Of all the scientific educational game tools that have been found, most (6 types) of scientific educational game tools are often used in learning activities (the frequency of use is more than 3 times a week). Other educational game tools

are rarely used, such as the plant growth experiment game tools, floating-sink experiment game tools, Tin phone game tools, Compass, and volcano experiment game tools. This happen because the teachers in the selected schools have difficulties adjusting the theme to the scientific-educational game tools, a lack of understanding of the scientific concepts behind the use of the scientific educational game tools, several experiments using the scientific educational game tools that require more precision and supervision in implementing them into the learning activities and require more time for the implementation of experiments from these scientific educational game tools.

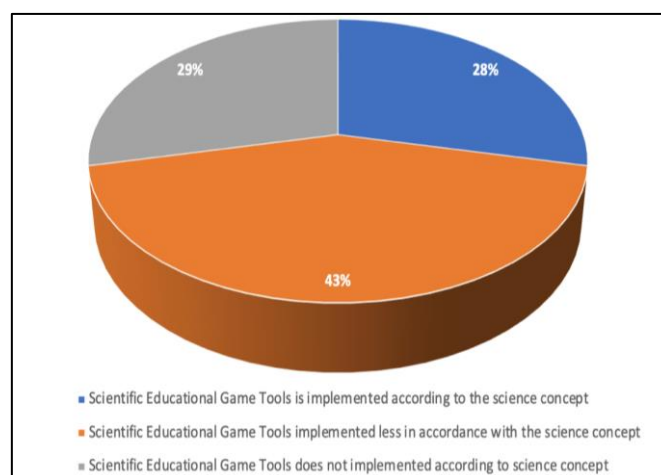
The role of the teacher in the process of science learning in early childhood is very important because he or she has full control of the implementation of learning activities in the classroom. Teachers play a role as decision-makers in choosing educational game tools, learning media, and other matters related to early childhood learning activities. So, in an effort to develop all the potential of students, an educator must be able to plan, prepare and carry out learning activities that are adapted to the characteristics of early childhood (Hidayati, 2020).

In order to teach science in early childhood, it really needs the help of various learning media that can display an abstract process/phenomenon to become concrete, because the nature of children at the elementary school level, especially early childhood, requires a concrete learning process. The availability of appropriate learning media is one way to support effective learning activities to be fun, interactive and make the learning process more effective and efficient (Shoimah, 2020).

Yamin et al., (2019) research results show that children's scientific literacy skills can be developed through direct experience while studying science. The experience gained when observing, exploring, and experimenting, children will make more sense of the knowledge they have acquired during the learning process.

For outdoor scientific educational game tools, there are only 3 types that have been found in target schools, such as seesaw, swing, and slide. All three of them were classified into the category of scientific educational game tools that are often used in early childhood learning activities. However, in its use, based on interview results it is known that these outdoor educational game tools are not associated with early science learning for early childhood students. These outdoor educational game tools are mostly used as a tool to develop children's motor skills. The teacher does not associate children's play activities using indoor educational games with simple science concepts, for example, the concepts of

gravity, work, and energy which can be introduced through the use of seesaws, swings, and slides. Even though physics concepts mostly consist of formulas or mathematical analysis, each theory can be verified through experimentation (Darmaji, et. al, 2018). Experiments in physics (science) are oriented towards science process skills, therefore it is necessary to have appropriate experimental techniques and support the learning process. The implementation of scientific educational game tools shows in Figure 1.



**Figure 1.** Percentage of Scientific educational Game Tools Implementation

From Figure 1 we can see that the implementation of scientific educational game tools in the kindergartens of the Nusa Tenggara province which are in accordance with the concept of science is still lacking. Based on existing data, only 28% of educational game tools are implemented in accordance with the concept of science in early childhood learning. There were 29% of scientific educational game tools that implemented not in accordance with scientific concepts and there were 43% of scientific educational game tools found that were not implemented in accordance with scientific concepts.

Interview results found that Teachers often teach science to children by explaining, telling stories and do not invite children to participate in discovering their own knowledge through experimental activities using the scientific educational game tools that exist in their schools. Most of the scientific educational game tools found were not used optimally in teaching and learning science to early childhood students.

In fact, through direct experimental activities children are able to develop science process skills and increase their understanding of science. (Widayati et al., 2020) also found that Science content should be given to children by accompanying children in playing APE, asking what phenomena are felt by children, why that could happen, predicting what will happen, and providing opportunities for children to make feedback

or ask questions. The teacher must also convey an applicative form or implementation of APE in everyday life. So that children can associate the scientific concepts they find in class with the phenomena they find every day.

## Conclusion

Based on the results of the research that has been done, can be concluded that the implementation of scientific educational game tools in West Nusa Tenggara's kindergarten that is in accordance with the concept of science is still low. The implementation of scientific educational game tools that are in accordance with the concept of science is only 28%. This shows that the teacher's understanding and competency in teaching science with the help of scientific educational games is still limited.

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