

THE ROLE OF EDUCATIONAL GAMES IN FACILITATING UNDERSTANDING OF BIOLOGICAL CONCEPTS IN EARLY CHILDHOOD

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Article Info

Received: 26/11/2022

Revised: 19/12/2022

Accepted: 30/12/2022

Early childhood between 4 and 6 years is known as pre-school age which experts call the golden age, because intelligence during this period increases by 50%. There are many ways that can be done for premature children. One of them is playing. Learning while playing or playing while learning can be fun and entertaining for children, including educational games to provide an understanding of Biology learning concepts. This research aims to explore and analyze the role of educational games in increasing understanding of biological concepts in early childhood. This research uses a qualitative approach with descriptive methods. This research shows that the use of educational game tools specifically for early childhood provides positive results. These play equipment, which are designed according to the child's age, have succeeded in improving sensory skills, helping children recognize their surroundings, and developing children's thinking abilities. Group play also helps children learn together, while the use of language in play supports the development of speaking skills. Apart from that, educational games can foster children's interest in science, especially biology, in an interesting and fun way. This research shows that educational games are not only a learning tool, but also an effective means of forming the basis for children's understanding of biological concepts.

Keywords: Educational Games, Learning Media, Biology, Early Childhood

1. Introduction

The rapid development of science and technology in the current era of globalization has had a significant impact on the world of education. Global needs require the education sector to continue to adapt to technological developments, especially in the use of information and communication technology to improve the quality of learning (Fricticarani et al, 2023). Learning media, as an integral part of the educational process, is undergoing transformation along with changes in technology. The use of learning media, such as audio and visual, in learning in schools and educational institutions is influenced by technological dynamics (Siregar & Marpaung, 2020).

The introduction of technology in learning has a positive impact, motivating students, creating new interests, and even having a psychological impact on them (Rohani, 2015). Advances in science and technology make a positive contribution to teaching standards, with audio media in the form of speech and visual media such as pictures or animation. In this context, educational games are becoming increasingly relevant as a learning medium, especially considering the characteristics of today's students who are included in the digital natives group (Muhali, 2019).

Parents need to understand the important role of educational games in education, while still paying attention to controlling children's access to technology (Pramono et al, 2021). Recognizing that not all video games are appropriate for all ages is very important. Digital educational games, as suggested by Riyanti & Rusdi (2018), can help students understand subjects and improve learning outcomes. Therefore, digital-based learning environments can be considered as an effective tool for advancing the quality of learning.

The development of technology and information brings challenges in digital learning, and efforts continue to be made to create innovative, effective and efficient learning media. Teachers need to understand the abilities and skills of students in class to choose the best learning strategies (Iskandar, 2016). Students' success in mastering subjects depends greatly on their ability to understand



the concepts being taught. Therefore, in facing the digital learning era, learning that combines technology and the best strategies can create a learning atmosphere where students can actively participate and achieve success in understanding the subject matter (Suprayitno & Wahyudi, 2020).

Early Childhood Education (PAUD) has a fundamental essence, namely being an educational forum specifically designed to facilitate the overall growth and development of children (Nurdin, 2021). In this context, early childhood education does not only focus on developing physical aspects, but also prioritizes the development of motor coordination (fine and gross), emotional intelligence, multiple intelligences and spiritual intelligence. Institutionally, PAUD can also be interpreted as an effort to provide education which aims to lay a solid foundation for children's growth and development (Sofyan, 2015).

The age range of early childhood, which covers the period between 4 and 6 years, is known as the pre-school period and in terminology is often referred to as the golden age. During this period, children experience a significant increase of up to 50% in their intelligence development. This period is considered a sensitive time, where physical and psychological functions mature and are ready to respond to stimulation from the surrounding environment. The golden age of early childhood is a golden opportunity to lay the first foundation in developing various abilities, including physical, cognitive, language, artistic, social-emotional abilities, self-discipline, religious values, self-concept and independence (Uce, 2017).

Therefore, considering the important role of cognitive aspects in the learning process and children's knowledge, appropriate game stimulation is needed for children to develop it. One game that can be used to develop children's cognitive abilities is educational games. Educational games are a type of educational game that contains games that hone children's cognitive abilities (Hatta, 2021). Educational games are a type of game specifically designed to stimulate children's cognitive abilities, including activities such as puzzles, taking pictures apart, recognizing colors, shapes and patterns (Asrori & Yuniarni, 2013).

The role of cognitive aspects in biology learning in early childhood requires an appropriate stimulation method to facilitate the development of their cognitive abilities. One relevant approach is through the application of educational games (Dewi et al, 2019). The importance of adapting types of educational games to the characteristics of early childhood is not only general, but also has specific implications in the context of biology learning. Therefore, the educational games used need to be developed so that they do not only focus on sharpening cognitive abilities, but also include aspects that are relevant to biology learning, such as the introduction of basic biological concepts, relationships between organisms, or even an initial understanding of life cycles (Listiana et al. , 2019).

This research aims to explore and analyze the effectiveness of educational games in increasing understanding of biological concepts in early childhood. By involving cognitive aspects and learning characteristics of early childhood, this research will evaluate the impact of educational games on the development of their biological knowledge. The benefits of this research are expected to make a significant contribution to the development of educational game-based learning methods, enrich approaches to biology learning in early childhood, and provide a deeper understanding of the potential of educational games in educational contexts.

2. Method

This research is a type of qualitative research which aims to explore in depth the problems that arise in a social context, by referring to the theoretical framework presented by Moleong (2014). The methodological approach in this research focuses on an in-depth understanding of the research subjects' experiences, including behavior, perception, motivation for action, and other aspects, with an emphasis on holistic descriptions using language and words. This research is descriptive in nature, aiming to provide a clear picture of a particular situation, event, population or area. This explanation is reinforced by the concept of Anggito and Setiawan (2018), who state that descriptive research is aimed at systematically, factually and accurately describing the facts and relationships of the



phenomena being investigated. In the process, all collected data is analyzed and organized to compile research findings which will later be expressed in the form of scientific writing. Thus, this research adopts a descriptive approach to provide a comprehensive picture of the topic under study.

3. Results And Discussion

Educational Game Learning for Early Childhood

Early childhood learning is basically the development of a concrete curriculum in the form of a set of plans containing a number of learning experiences through play that are given to young children based on their potential and developmental tasks that they must master in order to achieve the competencies that children must have (Sujiono, 2019). Basically, the development of a learning program is the development of a number of learning experiences through play activities that can enrich children's experiences about various things, such as how to think about themselves, and also responses to questions from other people. This can help children develop their character and prepare themselves to enter the world of adults full of responsibility.

Mansur (2019) explains that early childhood is a group of children who are in a unique process of growth and development. They have specific growth and development patterns according to their level of growth and development. This period is a golden age, because children experience very rapid growth and development and are irreplaceable in the future. According to Law No. 20 of 2003 concerning the national education system, what is called early childhood is children aged 0-6 years, whereas according to experts it is children aged 0-8 years. Early childhood education is a very broad discussion and very interesting to study, because early childhood is the beginning of a child's growth and development

According to Suyadi, as stated in research by Ariyanti (2016), educational game tools are defined as all forms of games that are able to provide knowledge and abilities to children. This game tool functions as a learning tool specifically designed to develop certain aspects of children. The indicator of the success of a game tool called educational lies in its ability to advance children's development in various fields. This approach is in line with the views of Puspitasari (2018), who defines educational game tools as special game tools for early childhood that can optimize children's development. This tool must be adapted to the age and level of development of the child concerned.

By summarizing the definitions of the experts above, it can be concluded that educational game tools are game instruments specifically designed to help children learn and optimize their development. The uniqueness of this game tool lies in its ability to be adapted to the child's age and level of development, and has the potential to develop various aspects of children's development. The importance of educational game tools does not depend on their price or whether they are purchased in a store, but on their ability to meet certain requirements, such as being able to be played with variety, being interesting, not easily damaged, and being acceptable to various cultures.

Game tools produced through special design and manufacture, or used as learning tools for young children, should not just be games, but also function as a source of educational value that can stimulate children's brain growth. This game tool aims to provide a learning experience that can improve various aspects of children's development, including physical, motoric, emotional, social, language, cognitive, religious and moral aspects, as well as art. Suryadi, described educational game tools as instruments specifically designed to help learning and can optimize children's development according to their age.

The importance of educational game tools can also be seen in Suryadi's statement that these tools support the learning process and can be used as media or tools to explain learning material. Thus, educational game tools are not just ordinary games, but games that are specifically designed for educational purposes, as well as tools that have a strategic role in improving aspects of early childhood development.

The educational game tools for early childhood in question are game tools specifically designed for early childhood. These game tools are designed based on the needs for developing potential



potential in children. For this reason, educational game tools are different from game tools in general. Therefore, game tools for early childhood education have several characteristics, as stated by Guslinda & Rita Kurnia (2018) that educational game tools for early childhood are:

- a) Intended for PAUD age children, this means that the play equipment created should be used for PAUD or Kindergarten age children, not for elementary school children whose age is different from PAUD children.
- b) Functions to develop developmental aspects of PAUD children. Game tools designed or made must be able to develop developmental aspects in early childhood. For this reason, in developing educational game tools, you must understand what aspects of development will be developed or stimulated so that the educational game tools do not function incorrectly.
- c) Can be used in various ways, forms, and for various purposes, developmental aspects or multipurpose benefits. This means that the APE that is made should be able to be played or used in various ways and can also produce forms that stimulate children to discover something new.
- d) Safe for children. APE that is developed or made should be safe for children, meaning that when children play it it is not dangerous for children. It is safe in terms of overall shape, for example, it is not sharp, not pointed or sharp which could injure children.
- e) Designed to encourage activity and creativity, this means that every APE created should be able to build or produce something. By playing APE, children will imagine and be creative in producing something, for example playing with Lego or blocks.
- f) It is constructive or something is produced. What this means is that the APE is intended for early childhood, when the child uses it the child gets a new form from the APE. Where the APE can be arranged, arranged, stacked and lined up like APE blocks.
- g) Contains educational value. Every APE created should contain educational value. For this reason, in developing APE, the aspects of its development and also the age of the students who use it must be clear. Because if it is not clear what aspects will be developed, the educational process will certainly occur.

The Role of Educational Games in Facilitating Understanding of Biological Concepts in Early Childhood

Educational games play an important role in facilitating understanding of biological concepts in young children. Through a play approach, children can develop their understanding of biological concepts in a more fun and interactive way. Here are some roles of educational games in this context:

1. Sensory Stimulation:

Educational games, especially those involving elements such as puzzles or image-based games, have a crucial role in stimulating early childhood sensors. Through engagement in this play, children can develop their sensory skills, including sight and feel, in an interactive and fun way. Puzzles, for example, require children to combine matching pieces, requiring visual observation and hand-eye coordination that can stimulate their sensory abilities. In the context of biological concepts, the game helps children associate images with biological meanings. For example, they can learn to identify different types of animals, plants, or even specific parts of organisms. By associating these images in the context of play, children not only improve their sensory abilities, but also build the basis of an initial understanding of biodiversity and the relationships between organisms.

2. Environmental Introduction

Educational games that focus on biological concepts bring great benefits in helping children recognize and understand the environment around them. Through involvement in such games, children can expand their horizons of knowledge about the biological life that exists around where they live. For example, with games that encourage them to get to know local flora and fauna, children can better understand the various types of plants, animals and microscopic organisms that inhabit the environment around them. This activity not only increases their concrete knowledge about biodiversity, but also builds their connection with the local ecosystem. In this way, educational games

not only become a source of information, but also stimulate children's curiosity about the biological life around them, creating a solid initial foundation for understanding ecology and interactions between organisms.

3. Language Development

Playing educational games is not just a fun activity, but is also an effective means of supporting language development in early childhood. In the context of biology, educational games open up opportunities for children to recognize and pronounce words related to the world of organisms, biological processes and the living environment. Through this game, children can learn to name various types of animals, plants and environmental elements in an interactive and engaging way. The verbal activities involved in this game provide an opportunity for children to practice their speaking skills, enrich their vocabulary, and develop communication skills. By stimulating language in a biological context, educational games create a comprehensive learning experience, building a solid foundation for children's understanding of biological concepts while simultaneously increasing their language proficiency.

4. Collaborative Learning

Several educational games designed to be played in groups have a very significant role in supporting collaborative learning in children. Through involvement in group play, children can develop their social skills while exploring biological concepts together. These activities not only help build relationships between players, but also facilitate the exchange of ideas and mutual understanding of biological aspects. In group interactions, children can share knowledge, create problem-solving strategies together, and support each other in the learning process. Therefore, group-based educational games not only provide a fun learning experience, but are also an effective forum for stimulating collaboration and mutual growth in understanding biological concepts.

5. Cognitive Skills Development

Educational games pave the way for children to hone essential cognitive skills, such as problem solving, observation, and understanding abstract concepts. In this context, games are not just entertainment, but are also an effective means of training children's minds. Through the challenges presented by the game, children are invited to think actively, identify solutions to problems, and observe patterns or relationships between various elements in the game. Understanding abstract concepts, especially those related to the world of biology, becomes more concrete through this interactive experience. Thus, educational games not only help children learn about biology in a fun way, but also enrich their critical thinking skills, which will be useful in deeper understanding related to biological concepts in the future.

6. Cultivate Interest and Concern

Educational games play an important role in cultivating children's interest in science, especially in the context of biology. By designing learning in the form of interesting and fun games, children are not only given knowledge about biological concepts, but are also invited to be actively involved in the learning process. The success of educational games in creating interesting learning experiences not only sparks children's curiosity but also stimulates their interest in science as a whole. Fun learning through games can form a strong foundation for their interest in science, especially in the field of biology, opening the door to future exploration and development of their interest in science.

4. Conclusion

Early childhood learning involves developing a concrete curriculum through play, in accordance with the child's developmental potential and tasks. Law No. 20 of 2003 stipulates that early childhood experiences a unique golden period of growth. In this context, educational game tools are specifically designed to help children learn, with a focus on developing developmental aspects. The importance of this play equipment depends not only on its price, but also on its ability to meet the criteria and be adapted to the child's age and level of development. It is hoped that educational game tools are not just ordinary games, but are a source of educational value that stimulates children's brain



growth. Meanwhile, educational games in facilitating understanding of biological concepts in early childhood have a vital role. The game stimulates children's senses, helping them recognize the environment and biological life around them. Language development is supported through educational biology games, while group play supports children's collaborative learning and cognitive skills. Through an interesting and fun approach, educational games help foster children's interest and concern for science, especially in the field of biology. Thus, educational games are not only a means of transferring knowledge, but also an interactive tool that plays a role in developing various aspects of children's development, creating a solid foundation for understanding biological concepts at an early age.

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