



Use of Digital Educational Media for Early Childhood Cognitive Stimulation

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ABSTRACT

Digital learning media, one example of the results of the rapid development of digital technology that has penetrated into the world of education including the stimulation of early childhood cognitive development. **The aim of this article** are discusses the utilization of digital educational media as a tool to stimulate cognitive optimally and effectively. Through a literature study approach, this article reviews recent literature to emphasize the role of digital media, such as Augmented Reality (AR), Virtual Reality (VR), zoom, digital flashcards, and learning applications and educational games, in improving early childhood cognitive development. **This research uses the library research approach method or literature study.** **The result of these article** is media not only increase learning motivation, but also help children develop critical thinking skills, creativity, and memory. Although this media offers many benefits, implementing this digital educational media must also face various challenges, such as infrastructure gaps, lack of digital literacy, resistance to change, and the quality of content that is not in accordance with the existing curriculum. This article also emphasizes the importance of careful planning, strong support from parents and teachers, and good management to optimize the benefits of digital learning media for early childhood development.

KEYWORDS

Cognitive, digital media, digital learning media, education, cognitive envelopment.

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INTRODUCTION

Digital technology has now developed rapidly. This development in the digitalization era has spread to the world of education. Children, especially early childhood, are now getting closer to various digital devices because children grow up in an environment rich in stimulation from

technology. This can be a great opportunity to design various learning strategies and media that are effective in developing children's life skills, these skills are also known as aspects of child life development. Providing the right stimulation for children's developmental aspects helps children prepare for the future.



According to the Law on National Education Standards Number 4 of 2022, aspects of early childhood development include religious and moral values; physical motor; cognitive; language; Pancasila values; and social-emotional. An important aspect of development to be stimulated further is cognitive development. Fitri, et al (2020) define, Cognitive is the intelligence of the mind that utilizes the brain's thinking process. Cognitive emphasizes how the brain processes, remembers, and receives information from the surrounding environment.

All aspects of early childhood development are interrelated and run continuously, so they need to be developed as a whole. Early childhood requires a variety of activities to organize information in their brains, because children have difficulty in understanding what has been learned if children are only given a few instructions. In supporting success in the early childhood learning process, it can be assisted by the use of learning media (Novianti, et, al., 2022).

The rapid advancement of digital technology has transformed many sectors, including education. Children are increasingly exposed to digital devices from an early age, which offers a unique opportunity to design educational strategies that align with technological trends. Early cognitive development, one of the core aspects identified in Indonesia's National Education Standards (Law No. 4 of 2022), benefits significantly from appropriate stimulation.

Cognitive development relates to a child's ability to process, retain, and utilize information. Effective media usage can support these processes. Traditional learning is gradually being supplemented by digital tools that offer audio-visual and interactive elements, enhancing the learning experience and fostering engagement (Mariyah et al., 2021; Sitepu, 2022).

The most popular learning media today is digital-based learning media. According to Mariyah, et al (2021), digital-based learning media is a medium used to create audio-visual learning media. Digital learning media has variations in forms and concepts such as zoom, ebooks, Virtual Reality (VR), Augmented Reality (AR), digital flashcards, learning applications, and so on. This can help children in fostering the spirit of learning, increasing children's learning motivation, and providing a pleasant experience during learning activities for children. Learning by utilizing digital-based learning is a new revolution in the use of learning methods (Sitepu, 2022).

According to Sucipto and Kustandi in (Ulfah, et. Al., 2022), digital learning can be interpreted as a learning process through a network or computer network, which is usually accessed via the internet or intranet. With the existence of digital learning media that has internet facilities, learning becomes more enjoyable and does not merely depend on teachers or lecturers, because this media has access to wider and more complete information or knowledge and learning activities become more flexible.

When children are aged 0-6 years and in the golden age period, brain growth is experiencing extraordinary development and develops significantly and affects their future. Educators need media as a communication tool that helps children's understanding because children will think concretely (Lutfi, 2023) and learning for early childhood will take place effectively when assisted by visual or audio visual media.

RESEARCH METHOD

This research uses the library research approach method or literature study. Research from the use of digital educational media for early childhood cognitive stimulation is a literature study as a method of data collection,



namely by reading books and data sources that contain relevant data from various literatures. The source of this research is in the form of several recent articles reviewed from websites such as Google Scholar and Sinta. Research that uses this literature study method has four steps in obtaining research results, namely: (1) combining research materials, (2) understanding research materials, (3) writing research materials, and (4) processing research notes (Agus Rusmana, et. al., 2024). Research analysis that refers to the latest literature published in the last five years (2019-2024) and has relevance to the topic of this research ensures that digital media can have a positive impact and provide optimal stimulation of early childhood Cognitive development.

This analysis draws on current literature to ensure that the digital media developed is not only relevant, but also in line with children's developmental needs. This research shows the influence of technology in developing learning media to optimize children's life skills. The importance of the influence of Cognitive development for early childhood life, the stimulation carried out must also be in line with the needs of children. With this research, it is hoped that parents and teachers as mentors and facilitators can stimulate children's development by utilizing digital learning media.

RESULTS AND DISCUSSION

The utilization of learning media for early childhood is very important for the continuity of teaching and learning activities. According to Hamalik (in Wahyuningtyas & Sulasmono, 2020), the use of learning media during the process of teaching and learning activities can and arouse new desires and interests, and build motivation for students in teaching and learning activities. This is because, the process of learning activities is an activity carried out by teachers and students to achieve

learning objectives. The success or failure of achieving learning goals is determined by educators, because teachers not only convey learning, but more than that, an educator must be able to guide students who are growing and developing both attitudes, physical and psychological, and create a pleasant learning atmosphere so that children are not easily bored and bored (Wulandari, et. Al., 2023).

Technological development is now known as the era of the Industrial Revolution 4.0, according to Herman, et al (2015) (in Purba, et. Al., 2021), this era is a digital era where all elements collaborate and communicate in real-time by utilizing technology. The utilization of this technological development has also spread to the world of education. Hadiprayogo (2023) states that the teacher acts as a facilitator, so the teacher has the task of preparing all the needs of students so that they can undergo an optimal learning process. Currently, teachers do not need to have difficulties in using learning media to be used, there are tons of digital learning media that are more flexible in their use and are more creative, interactive and fun for children.

1. Types of Digital Learning Media that can be Used in the Early Childhood Learning Process

The use of technology today is familiar to the community, especially children who have grown up in gadget stimulation. Gadgets can be utilized properly, namely in supporting the development of children's life skills, such as children's Cognitive skills. Digital technology is considered more effective in stimulating children's cognitive development because digital learning media provides a variety of learning resources, is more flexible, and is interesting, innovative and creative. There are various kinds of media, among others:

a. Zoom

Video conferencing applications such as Zoom can assist students in providing an online meeting place that can be attended by many students. Zoom helps teachers and students as if



they are in one class, where students and teachers can meet face to face through a cellphone or laptop screen (Wityastuti, 2022).

b. Augmented Reality (AR)

This application displays two or three-dimensional virtual objects in real time. According to Rahmatika (2023), the use of this application is useful in learning because Augmented Reality (AR) has interesting properties to arouse student interest in learning learning that is conveyed concretely through three-dimensional visual representations by integrating user involvement in the Augmented Reality frame.

c. Digital flashcards

Flashcards are small pieces of paper that contain pictures, writings, and symbols. Along with the times, the use of flashcards is available in digital form. This digital media-based flashcard is a card containing images, letters, and symbols that are packaged in an application and can be accessed online or offline anywhere and anytime (Elan, et. al., 2023). The use of flashcard media can help children develop language skills that facilitate cognitive development in children optimally stimulated.

d. Virtual Reality (VR)

Virtual reality is a technology that allows users to interact directly through an immersive and imaginative virtual world, by doing this activity it is expected to provide a real experience for its users. In this VR world there are various activities that can help children's cognitive development. This application was developed by providing an in-depth and interactive learning experience for children, so that it is expected to increase children's involvement and understanding abilities in learning activities (Asmaliah, et. Al., 2024).

e. GeoGebra

GeoGebra is one of the digital learning media centered on mathematics. This application emphasizes efforts so that children can concentrate well when learning mathematics. Helping students understand math learning concepts such as cartesian

coordinate material independently is the purpose of making this application.

f. Learning Applications

There are tons of learning apps nowadays and from any subject and flexible access. It is very easy for parents to provide optimal cognitive stimulation for children, namely with games or learning applications. The variety of learning media that can be tailored to the needs of children. This digital-based learning media such as pahamify, wordwall, ruangguru, and others.

With the existence of learning applications and educational games found on social media today can be used as a way to stimulate children's cognitive development. One way to stimulate children's cognitive development. Media that media that presents interesting things that cannot be separated from children's development needs can motivate children in learning activities. Can motivate children in learning activities. In addition, there are many other benefits that can help children improve their cognitive development.

2. Benefits of Using Digital Learning Media for Children's Cognitive Development

The main objective in using digital learning media is to increase children's learning motivation. Learning motivation makes children more active and focused in learning activities and more enthusiastic. This can encourage children to improve their cognitive abilities optimally. One of the strategies that can help children in increasing their learning motivation is with digital learning media as described above. In addition to increasing learning motivation, this digital-based learning media has other benefits related to early childhood cognitive development, namely:

a. Improving Problem Solving Skills

Through educational games, children can be trained in critical thinking skills. This is because game applications often present several challenges that require children to think creatively and find solutions to solve existing problems. This can also improve children's



ability to think critically and make the right decisions.

b. Increase Children's Creativity and Imagination

With an unlimited world, as in VR media, children can explore an unlimited world, children can increase their imagination and have interesting experiences.

c. Improve Concentration

Existing digital learning media can train children's focus skills through interactive elements and features. As in the GeoGebra application, this media can optimize student concentration with activities that have been designed in the application accompanied by instructions from the teacher to overcome minor behavior (Nahaklay & Sepdikasari, 2024).

d. Improves Memory and Comprehension

Engaging learning can help children to understand abstract concepts. Engaging learning can be designed by combining visual, audio, and interactive features that are usually found in digital learning media. This can make it easier for children to understand and remember the information they get from their surroundings.

e. Encourage Children to Do Independent Learning

Encouraging children to do self-learning while learning can help them to develop their life skills. This activity is the same as preparing children's lives for the future. Encouraging self-directed learning can develop lifelong learning abilities, forming a personality that is adaptive, confident, flexible, and others.

f. Variety of Learning Resources

In this digital era, books and articles can be accessed online and even courses can be conducted online with an interactive learning approach. Access to credible and valid information can be done through the internet and with flexible time and place. So this can be a source of digging up information and independent learning for children.

g. Giving Freedom and Responsibility to Children

This digital media allows children to design their own learning projects with structured steps and clear targets. Giving children the freedom to explore their learning needs without fear of making mistakes. By giving responsibility for completing tasks and giving children freedom in creativity, it can have a good impact on child development.

h. Supports Multisensory Learning

This digital learning media can be accessed through smartphones, laptops or the like, allowing the learning process to involve various senses, such as hearing, vision, and movement which makes learning more effective. In addition to developing children's Cognitive skills, learning media also develops children's motor skills.

This digital-based learning media has many benefits that help children develop and prepare their life skills in the future. However, from the many benefits provided by this digital educational media, there are challenges in implementing it.

3. Challenges in Implementing Digital Learning Media

Implementing digital educational media that offers many benefits in the learning process also has its own challenges that need to be faced and overcome. Some challenges are often faced in implementing this digital learning media program:

a. Limited Technology and Facilities

Infrastructure constraints in implementing digital media have an impact on the learning process. The use of technology, which on average uses internet access, makes technology and facility limitations one of the main challenges in implementing this digital media. In Wahyuni (2024), this challenge in the technology gap not only hinders efficient access to educational content but also limits the utilization of advanced technology that can enrich the learning experience of learners.

b. Lack of digital literacy

The challenge for teachers and students in this digital era is to be able to master technology well. Not all students have good skills in



accessing digital devices and learning applications. Meanwhile, some teachers are also less accustomed to using this technology, even though in this digital environment teachers are required to be able to master learning tools and applications that support and are relevant to the learning process (Zebua, 2023).

c. Resistance to Change

As teachers, we must be more innovative in new approaches and realize that teachers are not the only source of knowledge, so there needs to be discussion and collaboration to build interesting activities. And, this resistance to change has an impact on parents and children, where parents are worried that technology will interfere with the child's learning process, and not all children can easily adapt to the use of digital media.

d. Challenges in Learning Evaluation

Often found in tests or exams that use multiple choice systems and automatic scoring, this makes it difficult for educators to capture students' critical thinking skills and analytical abilities.

e. Learning Content

Not all digital learning content is of good quality and relevant to the curriculum, so it is necessary to select the right content with the needs of students with careful consideration.

The challenges in implementing digital-based learning media can be overcome with careful planning, strong support, and joint efforts in building the effectiveness of the learning process and stimulating children's cognitive development optimally.

CONCLUSION

This digital-based learning media is the result of technological developments that spread to the world of education. This digital educational media makes a significant contribution in stimulating the development of cognitive skills in children. Digital media such as Augmented Reality (AR), Virtual Reality (VR), zoom, digital flashcards, and learning applications and educational games, provide interesting learning with interactive experiences that can improve

children's critical thinking, creativity, and memory. In addition, to prepare children for their future lives, this digital educational media also provides benefits such as encouraging children to do independent learning, shaping life skills, and preparing children to face future challenges with their problem-solving abilities. However, with the many benefits of implementing digital learning media, there are still challenges that become obstacles, namely limited access to technology, lack of digital literacy among teachers, parents, or students, and resistance to change. So this needs to be overcome with the collaboration of parents, educators, and the government that provides policies to overcome the challenges faced.

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