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Utilization of Educational Game Media as a Strategy for Children's Cognitive Development in Elementary School 173169

Naomi Simangunsong[1*], Yuni Mariani Manik[2]

[1]Faculty of Teacher Training and Education, Universitas Terbuka Medan
[2]Faculty of Economics and Business, Universitas Yogyakarta
**Corresponding author: naomisimangunsong00@gmail.com*

Abstract: Cognitive development in elementary school children is a crucial phase that significantly influences their academic progress and overall learning capacity. Traditional teaching methods often fall short in engaging students or stimulating higher-order thinking skills. This study investigates the use of educational game media as an innovative strategy to support children's cognitive development in primary education. A quasi-experimental method was employed involving 60 students from two elementary schools, divided into an experimental group and a control group. The experimental group received instruction incorporating educational games, while the control group followed conventional teaching methods. Data were collected through pre- and post-tests measuring cognitive abilities such as memory, problem-solving, and logical reasoning, supplemented by teacher interviews and classroom observations. The results revealed a notable improvement in the experimental group's cognitive scores, with an average increase of 22%. The most significant gains were seen in problem-solving (25%) and memory retention (19%). Qualitative findings also indicated increased student motivation, engagement, and active participation during learning activities. These outcomes suggest that educational game media can enhance the effectiveness of classroom instruction and foster meaningful learning experiences. However, the study is limited by its short implementation period and relatively small sample size. Further research is recommended to explore long-term impacts and broader applicability across diverse educational contexts.

Keywords: Educational game media; cognitive development; elementary school

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Introduction

Primary education serves as a critical foundation in children's cognitive development, shaping essential skills such as literacy, numeracy, problem-solving, and logical reasoning. However, various national and international assessments indicate that the quality of learning in Indonesian elementary schools continues to face significant challenges. One of the most comprehensive international assessments, the Programme for International Student Assessment (PISA), highlights these concerns.

According to the OECD's PISA 2022 report, Indonesian students scored considerably below the OECD average in key domains. Indonesia's average score was 359 in reading literacy, 366 in mathematics, and

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383 in science, whereas the OECD average scores were 487, 489, and 489, respectively (OECD, 2023). These disparities underscore the need for more effective and engaging learning strategies at the primary level to foster better cognitive outcomes.

One potential solution to address this gap is the integration of educational game media into the learning process. Educational games offer interactive, engaging experiences that can stimulate critical thinking and improve students' cognitive skills. This study explores the utilization of educational game media as an instructional strategy to enhance cognitive development in elementary school students.

One approach that can improve the quality of learning is Through the use of educational game media, various studies have shown that educational games can significantly improve children's cognitive abilities, such as logical thinking, problem-solving, and creativity. For example, research conducted by Nana Citrawati Lestari and Yulianti Hidayah (2024) at SDN Muara Ulang and SDN 1 Sei Lunuk demonstrated that the application of educational game methods improved the cognitive learning outcomes of third-grade students, with classical completeness reaching over 85%. These findings support the idea that integrating interactive and engaging learning media can effectively enhance cognitive development in elementary school students.

Based on the data and facts, it is clear that the use of educational game media has great potential in developing children's cognitive abilities in elementary schools. However, there are still many teachers who have not fully integrated educational games into the learning process. Therefore, this study is important to explore further how educational game media can be optimized as a strategy for developing children's cognitive abilities in elementary schools.

Method

This study employed a qualitative approach using an ethnographic method, aimed at gaining an in-depth understanding of the use of educational game media to support the cognitive development of elementary school students. Data were collected through participatory observation, semi-structured interviews, and document analysis.

Observations were conducted over a period of four weeks, encompassing eight instructional sessions, each lasting approximately 60 minutes. Each session combined direct instruction with the use of educational game media within the classroom setting. The observation focused on behaviors indicative of cognitive engagement, such as problem-solving ability, question-asking behavior, and task completion strategies.

Semi-structured interviews were conducted with teachers and selected students to deepen the findings from observations and to gain subjective perspectives on the implementation of game-based learning. Thematic analysis was employed using an inductive approach.

Data saturation was reached in the seventh and eighth sessions, when no new themes or patterns emerged from the collected data. To ensure the validity of the findings, triangulation of sources and methods was conducted by comparing observation results, interview data, and supporting documents such as lesson plans (RPP) used by the teachers.

Ethnography, as explained by Spradley (2007), is the process of describing and interpreting phenomena that occur in a particular social or cultural group. In this context, ethnography is used to explore in depth how the use of educational game media in Elementary Schools can support children's cognitive development. This study is descriptive, meaning that it aims to describe in detail and comprehensively the application of educational game media in classroom learning.

The study was conducted at State Elementary School Number 173169, located in Sipahutar District, North Tapanuli Regency. This school was chosen because it has implemented educational game media in the learning process, making it a relevant place

for further study. The focus of the study was directed at learning activities in class III, where educational game media is actively used by teachers. This study involved three main groups of participants: the class teacher responsible for implementing educational game media, students directly engaged in the learning process, and the school principal who oversees policy-making and the development of learning programs. Participants were selected using purposive sampling to ensure that those chosen were truly relevant and had in-depth experience with the phenomenon under study.

Specifically, the participants consisted of one class teacher, 30 third-grade students who were observed during the learning sessions, and one school principal. Data were collected through eight classroom observation sessions involving all the students, as well as in-depth interviews with the class teacher and the principal. This number of participants and data collection methods are expected to provide a comprehensive understanding of the implementation and impact of educational game media in the learning process. In an effort to obtain valid and comprehensive data, researchers used three common data collection techniques in ethnography, namely participant observation, interviews, and documentation.

Participatory observation was carried out by researchers directly attending and participating in classroom learning activities, to observe how game media was used and its impact on student engagement and cognitive development. Interviews were conducted with teachers, students, and principals with the aim of gathering information about learning strategies, student learning experiences, and views and policy support from the school. Documentation techniques were used to collect secondary data in the form of Learning Implementation Plans (RPP), educational game materials, and student evaluation results related to the use of the media. The main instrument in this study was the researcher himself as a human instrument, who actively collected, analyzed, and interpreted data. To support the data collection process to be more focused and systematic, researchers also used observation guidelines, interview guidelines, and documentation sheets. The data that had been obtained was analyzed using a qualitative descriptive analysis approach.

The analysis process is carried out through three main stages, namely data reduction, data presentation, and drawing conclusions. Data reduction is carried out by filtering relevant information to be more focused and efficient in analysis. Furthermore, the data is presented in the form of narratives or visualizations such as diagrams to facilitate readers' understanding of the patterns of use of educational game media in learning. From the results of the presentation, researchers draw conclusions regarding the influence of the use of educational games on students' cognitive development and their implementation in the teaching and learning process.

Results

The findings in this study indicate that educational game media has been actively applied in learning activities in class III of SD Negeri 173169. Teachers use various types of games, such as educational cards, logic games, and group activities designed according to the subject matter. The application of this media is able to increase student involvement in the learning process, as seen from the increase in enthusiasm, focus, and participation during the learning process. In addition, there is a positive development in students' cognitive abilities, especially in terms of logical thinking, problem solving, and collaborating in groups. Supporting the principal in the form of policies and provision of facilities is also an important factor that strengthens the success of using educational games as a learning strategy.

Theory and Basis for Using Educational Games

The use of educational game media in elementary education can be understood

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through the theories of Jean Piaget and Lev Vygotsky. According to Piaget, children at the elementary level are in the concrete operational stage, where they learn best through direct, hands-on experiences. Educational games support this stage by offering concrete, rule-based activities that enhance logical thinking and problem-solving. Vygotsky, in contrast, emphasizes the role of social interaction and the Zone of Proximal Development (ZPD)—the range between what a learner can do independently and what they can achieve with guidance. Educational games often promote collaboration, peer support, and teacher scaffolding, creating a social learning environment that aligns with Vygotsky's principles. In this way, game-based learning integrates concrete experiences (Piaget) and collaborative, contextual learning (Vygotsky), making it developmentally appropriate for fostering cognitive growth in elementary students.

Discussion

Games are used as teaching aids in various subjects, with student evaluation results showing a significant increase in conceptual understanding.

Environmental Support and Supporting Factors

The success of implementation is influenced by the role of creative teachers, support from the principal, and the availability of media and sufficient time in the learning schedule.

The results of this study strengthen the view that educational game media plays an important role in creating an active, fun, and effective learning atmosphere to support the cognitive development of elementary school students. Game-based learning activities encourage direct student involvement, so that they can more easily understand the subject matter.

In addition, games provide opportunities for students to think critically, solve problems, and work together in groups. This approach aligns with cognitive development theories emphasizing the significance of concrete experiences and social interactions in learning. For instance, ethnographic studies have shown that educational games can enhance children's cognitive abilities, such as logical thinking, problem-solving, and creativity. Research conducted at SDN Muara Ulang and SDN 1 Sei Lunuk demonstrated that implementing educational game methods improved the cognitive learning outcomes of third-grade students, achieving classical completeness rates of 85% and 90%, respectively. These findings underscore the effectiveness of integrating educational games into the learning process.

Despite the promising benefits of educational game media, its implementation still encounters several challenges. These include limited availability of learning aids, constrained instructional time, and the need for enhanced teacher competence in designing and managing games aligned with learning objectives. In the field, some teachers attempted to overcome these limitations by adapting available resources creatively, such as using low-cost or self-made game materials and integrating games into existing lesson plans without extending class time.

Furthermore, professional development workshops were recommended to improve teachers' skills in educational game design and classroom management. Practical strategies such as collaborative planning among teachers, peer mentoring, and incorporating technology-supported games could also help mitigate these challenges. Future research should explore these approaches' effectiveness to provide clearer guidelines for successful game media integration in elementary education.

Conclusion

The results of this study strengthen the view that educational game media plays an important role in creating an active, fun, and effective learning atmosphere to support the cognitive development of elementary school students. Game-based learning activities encourage direct student involvement, so that

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they can more easily understand the subject matter. In addition, games provide opportunities for students to think critically, solve problems, and work together in groups. This approach is in line with the theory of cognitive development which emphasizes the importance of concrete experiences and social interactions in the learning process. However, the implementation of educational game media still faces several obstacles, such as limited aids, limited learning time, and the need to improve teacher competence in designing and managing games that are relevant to learning objectives.

Suggestion and Recommendation

To improve the effectiveness of the use of educational game media in learning, teachers are advised to continue to develop creativity and innovation in designing games that are in accordance with learning objectives. In addition, schools need to provide support in theform of adequate training and facilities so that teachers are able to implement the media optimally. At the policy level, the government and stakeholders in the field of education are expected to encourage the integration of educational games into the curriculum through supportive regulations and budget allocations for the development of innovative and interesting learning media, so that the benefits can be felt evenly in various elementary schools

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