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The Impact of Project-Based Learning on the Cognitive Development of 5-6 Year-Old Children at Bunayya Areman Tugu Cimanggis Integrated Playgroup, Depok

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ABSTRAK:

Project-based learning is a method that can help develop thinking skills in early childhood. This study aims to determine how project-based learning can develop the cognitive abilities of 5-6-year-old children at the Bunayya Areman Tugu Integrated Playgroup in Cimanggis, Depok. This study used a qualitative approach with a case study method. Data collection techniques included interviews, observation, and documentation. The results showed that project activities helped children develop skills such as observing, comparing, categorizing, and problem-solving. Teachers designed projects based on children's interests and themes relevant to everyday life. Children were actively involved in the activities, while the teacher acted as a facilitator. Interviews revealed that children experienced improvements in critical thinking and problem-solving skills, and improved logical thinking skills. The use of interactive strategies in learning improved children's memory and understanding of concepts in early childhood through concrete and contextual means. This study demonstrates that project-based learning can be an effective way to support the cognitive development of early childhood.

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1. Introduction

Education is a teaching and learning process involving teachers and students. The teacher's role is to provide instruction that students can understand, and students must be able to listen to all the information presented by the teacher. If the teacher fails to provide understanding of the material presented, the teacher is considered a failure in providing education. Another meaning of education is that attitudes and behaviors must be changed by an individual or group to foster or mature themselves into more responsible individuals through continuous learning and mentoring, development, and educational activities (Fadilah, 2025).

At the age of 5-6, children have a strong curiosity about their experiences and begin to develop critical thinking and problem-solving skills. The ability to solve problems effectively will support independence in action and decision-making. What we want in problem-solving learning is for children to be able to find solutions and make appropriate decisions so that they become accustomed to solving their own problems. This ability is crucial for supporting the cognitive growth of early childhood (Anggraini, et al., 2020).

Conventional learning focuses solely on direct instruction and discourages children from thinking critically and creatively, thus limiting their development. Children simply follow the teacher's instructions, leading to inactivity. This monotonous, teacher-centered learning doesn't allow children the freedom to explore their abilities and interests. When children become bored with the learning process, they become sleepy and lose interest, becoming preoccupied with their own activities (Putra, 2023). Therefore, learning activities should not only focus on writing and coloring but should also include engaging learning media, so children's critical and creative thinking and problem-solving skills can be cultivated from an early age.

Project-based learning can be a solution for developing the cognitive skills of children aged 5-6 years. With project-based learning, children can learn actively, develop critical and creative thinking skills, and solve problems independently. Project-based learning teaches directly, and the objects presented are concrete, making the learning process meaningful (Wijayanti & Thezy Meilivia, 2023).

Based on the results of observations and assessments of children's development in the cognitive aspect through portfolio documentation and reports on early childhood development achievements at the Bunayya Areman Tugu Integrated Playgroup, Cimanggis District, Depok City, it is known that of the 16 children aged 5-6 years, 6 children showed developmental achievements according to expectations (BSH) which indicates moderate cognitive abilities, while 10 children were at the beginning of development (MB) or not yet developed (BB) achievements which indicate low cognitive abilities.

Teachers still use the lecture method without using appropriate APE (Project-Based Learning) to stimulate children's cognitive development. Researchers observe that children with low cognitive abilities are unable to solve simple problems flexibly, do not demonstrate creativity in problem-solving, and cannot take initiative in choosing game themes. Children tend to imitate or follow the teacher's example in completing assignments and lack initiative in developing their own creative ideas.

Previous research has shown that implementing Project-Based Learning methods can improve the cognitive development of children aged 5-6 years. The results of a study by Herlia Nurimaniah, Sholatul Hayati, and Saeful Aziz (2024) showed that project-based learning methods have a significant impact on children's cognitive development. Project-based learning encourages children's active participation in the learning process. Through complex and challenging tasks, children are encouraged to explore knowledge, deepen their understanding, and hone relevant skills. These projects are designed to develop children's abilities in designing, solving problems, and making decisions independently. The project-based learning model equips students with the skills to learn independently, plan, and complete tasks collaboratively. This learning model is highly relevant to the demands of the 21st century, which demands creative, innovative, and adaptable individuals (Marzuki, 2024).

Based on the background described, this study was designed to answer several key questions: how project-based learning can develop the cognitive skills of children aged 5–6 years, what its benefits are for children's cognitive development, and how teachers implement this learning at the Bunayya Areman Tugu Integrated Kindergarten (KB Terpadu Bunayya) and Tugu.

The purpose of this study was to determine the contribution of project-based learning to early childhood cognitive development and to identify cognitive aspects that develop during project activities. This research is expected to benefit teachers as a source of information in designing learning that supports children's cognitive development, and parents as a reference in supporting their children's learning process through a project-based approach.

2. Methodology

This research used a qualitative approach with a case study method because it was deemed most appropriate for exploring in-depth the implementation of project-based learning in developing the cognitive abilities of 5-6-year-old children at the Bunayya Areman Tugu Integrated Playgroup, Cimanggis, Depok. This approach allows researchers to holistically understand the experiences, interactions, and perceptions between teachers and children in a natural learning context. The focus of the case study on a single location helps to obtain a comprehensive picture of the learning dynamics being implemented. Through in-depth interviews with teachers and documentation of children during project activities as supporting evidence, it is possible to reveal how project activities can stimulate thinking skills, problem-solving skills, and conceptual understanding in a concrete and meaningful way for early childhood.

3. Result And Discussion

The respondents in this study were classroom teachers who had implemented project-based learning in classes of 5-6-year-old children at the Bunayya Areman Tugu Integrated Playgroup, Cimanggis, Depok. Data were collected through in-depth interviews, while the presentation of the research results consists of two focus areas: Project-Based Learning Implementation and Achievement of the Cognitive Achievement of 5-6-year-old Children.

Project-Based Implementation

The stages in implementing project-based learning activities consist of four stages. The stages of project-based learning are as follows:

a. Project Planning Stage

b. Project Implementation Stage

c. Project Presentation Stage
d. Evaluation and Reflection Stage

a) Project Planning Stage

At this stage, the teacher designs project-based learning activities by reviewing the Semester Program (Theme Design) and considering the children's needs and interests. The project theme is selected based on the teacher's wishes, for example, instilling a love of cleanliness in children from an early age and introducing them to various types of waste found in the surrounding environment. The teacher follows structured steps in developing the project plan, namely: 1) Determining learning objectives; 2) Designing the learning flow by finding activities that are interesting for the children; 3) Preparing the tools and materials needed for the project learning process.

The next step is for the teacher to determine goals or indicators for the children's cognitive development by conducting an initial assessment to identify indicators that the children have not yet achieved. In this activity, the teacher actively involves children in designing or selecting project activities through open-ended questions at the beginning of the activity. The teacher acts as a facilitator by opening the activity with open-ended questions, encouraging children to think critically and share their prior knowledge before the project is implemented. During the project, the teacher also stimulates children with open-ended questions, enabling their cognitive abilities to emerge. Thus, the teacher has conducted thorough project planning and actively engaged children in the learning process.

b) Project Implementation Stages

Research on the implementation of project-based learning in a classroom for children aged 5-6 years old revealed that the teacher began project-based learning activities with a class discussion to build shared understanding and actively engage children. Then, she invited the children to participate in hands-on activities, such as making a trash can from cardboard. The teacher acted as an active facilitator, providing assistance when children encountered difficulties and motivating and encouraging children to foster creativity and optimally develop the cognitive abilities that were the learning objectives.

The children were actively involved in each project activity, sharing tasks, and collaborating to create or create collaborative works. The teacher provided opportunities for children to explore and develop their curiosity throughout the project activities through open-ended questions relevant to the project theme. Teachers utilized various media and tools to support project implementation, such as laptops, cardboard, glue, scissors, watercolors, brushes, and markers. Teachers observed and recorded children's cognitive development during project activities using formative assessment checklists. Teachers encountered several challenges during project implementation, such as confusion in starting activities, lack of interest from some children, and conflicts between children over access to available media.

The implementation of project-based learning activities can be illustrated through the documentation below:

Pengarahan Guru	Pengarahan Guru	Pelaksanaan Projek	Hasil Projek	Presentasi	Presentasi
					

Figure 1: Project-Based Learning Stages

c) Project Presentation Stage

The next stage is the project presentation activity. The children present their project results directly through a demonstration, showing the trash cans they have created from cardboard colored according to the type of waste, and demonstrating how to separate organic, non-organic, and hazardous waste. The children present their projects using real-world media or objects, accompanied by verbal explanations or stories about their work.

The teacher's role in this project activity is as a facilitator, assisting the children in presenting their project results, providing direction and guidance so that the children can understand and explain the project they have created. The children demonstrated a good understanding of their project results, as evidenced by their confident presentations.

d) Evaluation and Reflection Stage

Evaluation and reflection are important stages in the project-based learning process. Based on research findings, evaluation can be conducted by observing children's ability to present project results, assessing their ability to understand the concept and objectives of the project, and identifying their strengths and weaknesses in the learning process. Reflection can be conducted by identifying what children have learned, identifying what still needs improvement, and developing plans to improve the quality of future learning. Thus, the project presentation and evaluation stages can help children develop their thinking skills, convey ideas, and understand the concepts learned. Teachers can use the results of evaluation and reflection to improve the quality of future learning.

Achievement of Cognitive Aspects

Based on the research findings, teachers recorded children's cognitive development during project activities using formative assessments in the form of checklists. There are several ways teachers document children's cognitive development: 1) Teachers use formative assessments to monitor children's cognitive progress during the project-based learning process; 2) Teachers record children's specific abilities using checklists, such as the ability to use media to make trash bins and sort waste; 3) Teachers observe children throughout the project process to observe gradual changes in cognitive aspects.

Changes in cognitive aspects are seen gradually, namely, increased thinking skills, where children begin to be able to classify objects, compare sizes, and explain cause and effect in simple terms. The next skill is increased activity, allowing children to become more focused, actively explore, and able to complete tasks independently. Furthermore, children demonstrate improved cognitive development, such as asking questions and understanding cause-and-effect relationships. Thus, the project-based approach has a positive impact on children's cognitive development in a gradual and sustainable manner. Project-based learning can also enhance children's creativity and support the development of independent work skills.

Based on the research findings, teachers evaluate and reflect on project activities in several ways. One of the key components is process assessment, which allows teachers to determine whether the project has impacted children's cognitive development by assessing the achievement of learning objectives, particularly those related to cognitive aspects such as critical thinking, questioning, problem-solving, and recalling information learned during the project.

Determining whether a project has successfully developed children's cognitive aspects is based on the achievement of indicators listed in the checklist, which indicates an improvement in children's abilities. Teachers also conduct follow-up assessments using a rubric that provides a more detailed and measurable overview of children's cognitive development.

Project outcomes that demonstrate a child's cognitive abilities are those in which the child is able to create a work and explain it with their own understanding, such as creating a "keep it clean" poster and explaining its contents, or making a trash can from cardboard and explaining its function. Follow-up is provided if a child has not yet achieved the cognitive indicators. The teacher provides additional guidance the following day and encourages the child to reflect on the project activity in a simpler way.

The teacher assesses the child's cognitive abilities during the project activity by referring to the indicators established in the learning objectives. The cognitive abilities that most noticeably develop during the project are critical thinking, recalling information, asking questions, and connecting learned concepts to real-life situations.
Identifying children's improvements or difficulties by identifying those who demonstrate cognitive improvement or difficulty by referring to the checklist used during the project learning process. Children who demonstrate cognitive improvement are reflected in the indicators recorded on the checklist, while children who remain confused or have not demonstrated active involvement in project activities are considered to be experiencing difficulties and will be provided with further guidance.

4. Conclusion

Project-based learning is an effective approach to improving the cognitive abilities of early childhood. With careful planning and adequate support, project-based learning can improve children's critical thinking, problem-solving, logical thinking, and memory skills. Teachers act as facilitators in project-based learning, enabling children to work independently and complete the tasks they face.

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