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## Implementation of Project Base-Learning in Improving Critical Thinking Skills in Early Childhood

Okta Sulistiyo Rina Hatuwe<sup>1</sup>; Sy. Nurul Syobah<sup>2</sup>; Husni Idris<sup>3</sup>

<sup>1, 2</sup>TK Negeri Pembina Penajam Paser Utara;

<sup>3</sup>Universitas Islam Negeri Sultan Aji Muhammad Idris Samarinda

Email: <sup>1</sup>oktasulistiyo0@gmail.com; <sup>2</sup>sy.nurulsyobah@uinsi.ac.id;

<sup>3</sup>husni\_idris@uinsi.ac.id

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### ABSTRACT

*This study investigates the implementation of Project-Based Learning (PBL) as a means to improve critical thinking skills in early childhood. The research was conducted at Nurul Hikmah Integrated Islamic Kindergarten (TKIT) and Handayani III Kindergarten (TK) in Penajam Paser Utara District, with the aim of supporting the implementation of the independent curriculum. This study uses a qualitative research design, using data collection techniques such as interviews, observations, and document studies. while data collection techniques are carried out by condensing data, displaying data, and drawing conclusions. The research findings show that PBL has proven to be an effective approach in improving early childhood critical thinking skills. Through the implementation of carefully planned PBL activities, children showed significant progress in their ability to identify problems, generate creative solutions, and consider different perspectives. In addition, PBL encourages the development of social skills, collaboration and creativity through teamwork and group discussions. Based on the research findings, it is recommended that the implementation of PBL in early childhood education follows a structured process. This includes defining clear learning objectives, selecting interesting and relevant project topics, setting realistic time frames, defining assessment criteria, providing necessary materials and resources, and offering guidance and support throughout the learning process. This research contributes to the existing literature by providing insights into the effective implementation of PBL to enhance critical thinking skills in early childhood education. The findings underscore the importance of well-structured planning, implementation, and evaluation to maximize the benefits of PBL. Further research is encouraged to explore additional factors and strategies that can further improve PBL implementation and outcomes in early childhood education settings. This study also identified several supporting factors that influence the successful implementation of PBL, including: the presence of creative and visionary teachers, a conducive learning environment, relevant learning content and the availability of resources. Conversely, inhibiting factors such as limited support from families, rigid curriculum constraints, limited resources and time constraints were also recognized.*

**Key words:** Project-Based Learning, Critical Thinking Skills, Early Childhood Education

### ABSTRAK

Penelitian ini menyelidiki implementasi Pembelajaran Berbasis Proyek (PBL) sebagai sarana untuk meningkatkan keterampilan berpikir kritis pada anak usia dini. Penelitian dilakukan di Taman Kanak-kanak Islam Terpadu (TKIT) Nurul Hikmah dan Taman Kanak-kanak (TK) Handayani III di Kabupaten Penajam Paser Utara, dengan tujuan untuk mendukung implementasi kurikulum mandiri. Penelitian ini menggunakan desain penelitian kualitatif, dengan menggunakan teknik pengumpulan data berupa wawancara, observasi, dan studi dokumen. Sedangkan teknik analisis data dilakukan dengan cara kondensasi data, display data, dan penarikan kesimpulan. Temuan penelitian menunjukkan bahwa PBL telah terbukti menjadi pendekatan yang efektif dalam meningkatkan keterampilan berpikir kritis anak usia dini. Melalui pelaksanaan kegiatan PBL yang direncanakan dengan cermat, anak-anak menunjukkan kemajuan yang signifikan dalam kemampuan mereka untuk mengidentifikasi masalah, menghasilkan solusi kreatif, dan mempertimbangkan perspektif yang berbeda. Selain itu, PBL mendorong pengembangan keterampilan sosial, kolaborasi, dan kreativitas melalui kerja tim dan diskusi kelompok. Berdasarkan temuan penelitian, disarankan agar implementasi PBL dalam pendidikan anak usia dini mengikuti proses yang terstruktur. Hal ini termasuk mendefinisikan tujuan pembelajaran yang jelas, memilih topik proyek yang menarik dan relevan, menetapkan kerangka waktu yang realistis, mendefinisikan kriteria penilaian, menyediakan bahan dan sumber daya yang diperlukan, dan menawarkan bimbingan dan dukungan selama proses pembelajaran. Penelitian ini berkontribusi pada literatur yang ada dengan memberikan wawasan tentang implementasi PBL yang efektif untuk meningkatkan keterampilan berpikir kritis dalam pendidikan anak usia dini. Temuan ini menggarisbawahi pentingnya perencanaan, implementasi, dan evaluasi yang terstruktur dengan baik untuk memaksimalkan manfaat PBL. Penelitian lebih lanjut didorong untuk mengeksplorasi faktor dan strategi tambahan yang dapat lebih meningkatkan implementasi dan hasil PBL di lingkungan pendidikan anak usia dini. Penelitian ini juga mengidentifikasi beberapa faktor pendukung yang mempengaruhi keberhasilan implementasi PBL, antara lain: adanya guru yang kreatif dan visioner, lingkungan belajar yang kondusif, konten pembelajaran yang relevan, dan ketersediaan sumber daya. Sebaliknya, faktor penghambat seperti terbatasnya dukungan dari keluarga, kurikulum yang kaku, sumber daya yang terbatas, dan keterbatasan waktu juga diakui.

**Kata Kunci:** Pembelajaran Berbasis Proyek, Keterampilan Berpikir Kritis, Pendidikan Anak Usia Dini

### INTRODUCTION

Early childhood, which refers to the period from birth to the age of six or eight years, is a critical phase in children's growth and development. During this time, various aspects such as physical, cognitive, social, and emotional development undergo rapid changes. This period is often referred to as the golden age in child development due to its significant impact on future development. The developments in this phase have a profound influence on children, determining their future mental, physical, and intellectual capacities acquired during childhood (Rifa'i et al., 2022; Salabi, 2021).

Considering the current and future challenges, children will face increasingly complex demands. Therefore, it is crucial for them to understand

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and apply higher-order thinking skills. These skills encompass the ability to apply acquired knowledge and utilize it to find solutions and answers to diverse problems (Rineksiane, 2022, p. 85).

To address the demands of the 21st century, the Indonesian government has implemented the concept of 21st-century learning through an independent curriculum. This curriculum aims to shift the learning approach from teacher-centered to child-centered, fostering the development of children's thinking and learning skills such as problem-solving, critical thinking, collaboration, and communication skills. The implementation of this independent curriculum aims to equip children with skills relevant to future demands and prepare them better to navigate the complexities of the modern world (Sari & Astuti, 2018).

In the 21st-century learning concept, there is a transformation in the learning system, shifting from a previously teacher-centered approach to a child-centered approach (Eka Retnaningsih & Khairiyah, 2022). This transformation aligns with future demands, where students must possess thinking and learning skills.

When discussing learning during the golden age of early childhood, one essential focus is on critical thinking skills. Critical thinking involves a child's ability to analyze information, evaluate arguments, identify assumptions, and draw conclusions based on available evidence. These skills enable children to develop a deep understanding, explore creative ideas, and foster problem-solving abilities.

In the context of early childhood learning, critical thinking skills can be cultivated through various activities. For instance, through role-playing, children can enhance their logical and creative thinking skills by exploring different roles, solving problems encountered in their narratives, and making informed decisions. Additionally, environmental exploration allows children to learn critical skills such as observing, asking questions, and seeking answers in a thoughtful manner. Critical thinking, often referred to as a directed and clear process utilized in mental activities like problem-solving, decision-making, persuasion, assumption analysis, and scientific research (Yunita et al., 2019), is one aspect of cognitive development in children.

To support the development of critical thinking skills in early childhood, the project-based learning approach is a suitable strategy. Project-based learning involves children in solving real-world problems individually or in small groups. This approach guides children to apply critical thinking skills while producing usable products or works. It engages children in real or simulated projects related to specific learning topics (Feng & Wang, 2019; Roessingh & Chambers, 2011). Through projects, children can explore and apply knowledge, solve problems, collaborate effectively, and refine their critical thinking skills.

Despite the advantages of project-based learning, including its potential to enhance children's critical thinking abilities, early childhood education (PAUD) in Penajam District have not widely implemented this approach. Initial observations conducted by researchers at Integrated Islamic Kindergarten

(TKIT) Nurul Hikmah and Kindergarten (TK) Handayani III Penajam indicate that these two PAUD institutions have implemented project-based learning. For instance, environmental-themed learning activities involve teachers inviting children to work in small groups to complete projects related to the topic being taught, such as creating gardens at school, making eco-enzymes and trash cans, exploring various animals in the zoo, or designing and illustrating stories in books. Through these projects, children engage in activities that foster creativity, critical thinking, and problem-solving while learning concepts relevant to the curriculum.

However, in some cases, traditional approaches to early childhood education, characterized by direct instruction and formal academic teaching, still prevail. These approaches may limit a child's developmental potential, particularly in terms of cultivating critical thinking skills.

As critical thinking skills play a pivotal role in addressing complex challenges and societal changes, where the ability to analyze, evaluate, and make informed decisions is crucial, it is imperative to explore and propose alternative learning approaches that can strengthen the development of critical thinking skills in early childhood at TKIT Nurul Hikmah and TK Handayani III Penajam. The main focus of this research is the project-based learning approach, which actively involves children in learning processes that stimulate creativity, collaboration, and critical thinking.

## **RESEARCH METHODS**

This research employs a qualitative methodology with a descriptive case study approach. The research was conducted at two kindergarten institutions in Penajam Paser Utara Regency, East Kalimantan Province: TKIT Nurul Hikmah and TK Handayani III. The study aims to collect data on the implementation of Project-Based Learning (PBL) and its impact on improving the critical thinking skills of early childhood. The data sources in this study include both primary and secondary data.

The primary data sources are obtained through interviews, observations, and documentation. The researchers conducted interviews with relevant stakeholders, observed the implementation of PBL in the classrooms, and gathered relevant documents. For data analysis, the researchers utilized the interactive data analysis techniques proposed by Miles, Huberman, and Saldana, which involve data collection, data condensation, data presentation, and drawing conclusions (Miles et al., 2014). To ensure data validity, triangulation of data sources and data collection techniques was employed. The researchers cross-checked and reconfirmed the data with sources from both research locations.

## RESULTS AND DISCUSSION

### *Project-Based Learning Planning in Improving Critical Thinking Skills in Early Childhood*

In planning Project-Based Learning (PBL) to improve critical thinking skills in early childhood, the following is a summary of the obtained interview, observation, and document study data:

Table 1. Steps in Project Based Learning Plane

| <b>Steps in PBL Planning</b>        | <b>Teacher Activity</b>  |
|-------------------------------------|--|
| Identifying learning objectives     | Define specific learning objectives, such as "Children can identify and solve simple problems through observation and experimentation".  |
| Choose an interesting project topic | "Creating a mini garden in the classroom." This topic involves observation, experimentation and problem-solving activities related to plant growth.  |
| Provide materials and resources     | Provide books on plant growth, measurement tools, soil, plant seeds, and maintenance tools such as water and fertilizer. Teachers also utilize technology, such as learning videos.                                |
| Providing direction and support     | The teacher provides clear direction on the project objectives, work rules and expectations. The teacher also provides support and guidance throughout the learning process, through individual or group meetings. |
| Setting up teamwork                 | The teacher sets up teamwork consisting of several children to work together to complete the project. This trains collaborative and communication skills among children.   |
| Determining assessment criteria     | Determining clear assessment criteria, such as children's ability to observe and identify plant parts, explain the life cycle of plants, and design and maintain a mini garden correctly.                          |

The steps in PBL planning carried out by teachers can be discussed with several theories and other findings from relevant research. By following these steps, teachers can effectively plan and implement PBL to enhance critical thinking skills in early childhood.

1. Identify learning objectives; teachers should identify specific learning objectives that focus on the development of critical thinking skills in early childhood. These goals must align with the child's developmental level and be relevant to the learning context. For instance, a suitable objective could be, "Children will demonstrate the ability to identify problems and devise creative solutions using logical reasoning and accurate observation" (Taufiqurrahman & Junaidi, 2021).
2. Select an engaging project topic; teachers should choose project topics that captivate children's interest and are connected to their daily lives. Engaging topics can enhance motivation and involvement in PBL activities (ÇAKICI & Türkmen, 2013).
3. Provide materials and resources; teachers need to ensure the availability of necessary materials and resources for the successful completion of the project. These may include books, videos, or software that enable children to access information and effectively carry out PBL activities.
4. Provide materials and resources; teachers need to ensure the availability of necessary materials and resources for the successful completion of the project. These may include books, videos, or software that enable children to access information and effectively carry out PBL activities.
5. Form collaborative work teams; teachers should establish work teams to encourage collaboration and communication among students during PBL activities. This can be achieved through group activities, discussions, and teamwork, fostering the enhancement of children's social and collaborative skills (Handrianto & Rahman, 2019).
6. Establish assessment criteria; teachers need to define clear assessment criteria that specifically relate to critical thinking skills. These criteria may include evaluating children's ability to identify problems, generate creative solutions, and consider multiple perspectives.

In addition to the six planning steps already undertaken by teachers, it is essential for them to also establish a specific timeframe and evaluate the learning outcomes. Teachers should determine a realistic timeframe for project completion, ensuring sufficient time for children's exploration, reflection, and problem-solving.

Moreover, teachers need to evaluate the learning outcomes of the children, with a particular focus on the enhancement of critical thinking skills during PBL activities. This evaluation serves multiple purposes: providing feedback to students, assisting teachers in assessing the effectiveness of PBL as a learning method, and gauging the progress made in critical thinking skills.

**Implementation of Project Based Learning in Improving Critical Thinking Ability of Early Childhood**

In the implementation of PBL, learning objectives are achieved by determining topics that are relevant to children's daily lives. During the learning process, necessary materials and resources are provided to the children, such as books and videos. In addition, support and guidance from teachers and parents are also provided to facilitate the development of children's critical thinking skills. In the implementation of Project Based Learning (PBL) to improve early childhood critical thinking skills, some of the activities carried out by teachers have been summarized from the results of interviews, observations and document studies and are presented in the following table:

Table 2. Steps in Project Based Learning Implementation

| <b>Steps in PBL Implementation</b>            | <b>Teacher Activity</b>   |
|---|---|
| Facilitating project selection                | The teacher organizes a group discussion or voting session to select an interesting project, such as "Create an interactive story about animal life in the forest."                               |
| Asking challenging questions                  | The teacher asks questions such as "How can we help the animals in the forest stay safe and happy?" to encourage critical thinking and creative solutions.  |
| Providing guidance and direction              | The teacher provides guidance in the form of steps or checklists to help children plan and carry out their project. For example, making a list of animal characters.                              |
| Encouraging collaboration and discussion      | The teacher organizes group activities that engage children in discussion, such as "Discuss your creative ideas to protect the animals in the forest."  |
| Providing resources and access to information | The teacher provides books, pictures or videos related to animal life in the forest. The teacher also directs children to seek additional information through online resources guided by parents. |
| Encourage reflection and evaluation           | The teacher conducts a reflection session after the completion of the project, such as "What have we learned during this project? What can we improve?"   |
| Conducting formative assessment               | The teacher conducts formative assessment through observation and discussion. The teacher observes the children's ability to connect information, create questions, or come up with new ideas.    |

The steps in implementing PBL carried out by teachers can be discussed with several theories and other findings from relevant research. By integrating these strategies into PBL implementation, teachers can create an engaging and supportive learning environment that promotes critical thinking, collaboration, and student-centered learning.

1. Facilitating project selection; the teacher engages students in a group discussion or voting session to select an interesting project, such as "Creating an interactive story about animal life in the forest." This activity aligns with the principles of student engagement and choice in project-based learning (PBL) (Daniel, 2017). It allows students to take ownership of their learning and promotes intrinsic motivation.
2. Asking challenging questions; the teacher poses questions like "How can we help the animals in the forest stay safe and happy?" to foster critical thinking and encourage creative solutions. This aligns with the Socratic questioning technique, which promotes higher-order thinking and problem-solving skills). By asking thought-provoking questions, the teacher stimulates students' critical thinking abilities (Lintangsari et al., 2022).
3. Asking challenging questions; the teacher poses questions like "How can we help the animals in the forest stay safe and happy?" to foster critical thinking and encourage creative solutions. This aligns with the Socratic questioning technique, which promotes higher-order thinking and problem-solving skills (Mariamah et al., 2021). By asking thought-provoking questions, the teacher stimulates students' critical thinking abilities.
4. Encouraging collaboration and discussion; the teacher organizes group activities that promote discussion, such as "Discuss your creative ideas to protect the animals in the forest." Collaborative learning theories, such as social constructivism, emphasize the importance of social interaction and dialogue in promoting deeper understanding and knowledge construction (Gillies, 2019).
5. Providing resources and access to information; the teacher supplies books, pictures, and videos related to animal life in the forest and guides students to seek additional information through online resources with parental guidance. This aligns with the concept of resource-based learning, where students actively engage with various resources to acquire knowledge and develop information literacy skills.
6. Encouraging reflection and evaluation; the teacher conducts a reflection session after the project's completion, asking questions such as "What have we learned during this project? What can we improve?" Reflection is an essential component of metacognition and self-regulated learning

(Perayani & Rasna, 2022). It helps students consolidate their learning and identify areas for growth and improvement.

7. Conducting formative assessment; the teacher assesses student progress through observation and discussion, focusing on their ability to connect information, generate questions, and generate new ideas. Formative assessment practices, such as observation and feedback, support student learning and provide valuable insights into their development (Wylie et al., 2012).

### ***Evaluation of Project Based Learning in Improving Early Childhood Critical Thinking Ability***

After going through the PBL learning process, an evaluation of the children's learning outcomes is carried out. This evaluation focuses on critical thinking skills that have been improved during PBL activities. This evaluation provides feedback to children and helps teachers to assess the effectiveness of PBL as a learning method.

In the evaluation of Project Based Learning (PBL) learning to improve critical thinking skills in early childhood, several activities carried out by the teacher are presented in a summary table through the acquisition of interview data, observation, and document study.

Table 3. Steps in Project Based Learning Evaluation

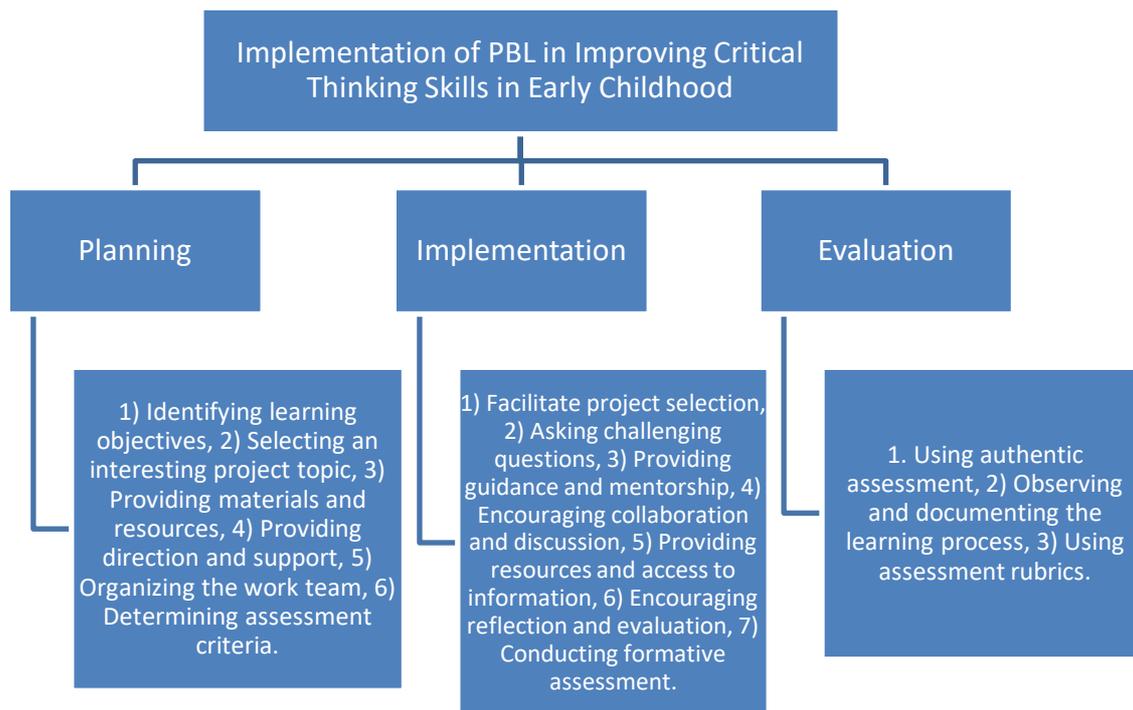
| <b>Steps in PBL Evaluation</b>                 | <b>Teacher Activity</b>  |
|--|--|
| Using authentic assessment                     | The teacher assigns a project task to the children, such as "Make a presentation on environmental problems around the school and provide solutions to solve them." The teacher then assesses the presentation based on the children's ability to analyze the problem, summarize information, provide creative solutions, and evaluate the results. |
| Observing and documenting the learning process | The teacher observes and documents the children's learning process during the project. The teacher makes notes on children's engagement, ability to collaborate, use of problem-solving strategies and attitude towards learning. The teacher notes that a child is active in group discussions and asking critical questions.                     |
| Using an assessment rubric                     | Teachers develop an assessment rubric that covers aspects of critical thinking skills such as analysis, evaluation, reasoning, and alternative solutions. Teachers then use this rubric to assess children's performance in the  |

| Steps in PBL Evaluation | Teacher Activity   |
|-------------------------|--|
|                         | project. For example, in the assessment rubric, there are criteria that mention that children are expected to be able to identify the problem well, provide reasonable solutions, and consider the impact of their proposed solutions. |

The steps in PBL evaluation carried out by teachers can be discussed with several theories and other findings from relevant research. By incorporating these evaluation strategies into PBL, teachers can effectively assess and promote children's critical thinking skills. Authentic assessment tasks, combined with observation and rubric-based assessment, provide a comprehensive view of student performance, and enable teachers to provide targeted feedback for improvement.

1. Using authentic assessment; the teacher assigns a project task to the children, such as making a presentation on environmental problems around the school and providing solutions. This approach aligns with the principles of authentic assessment, where students are evaluated based on real-world tasks and their ability to apply knowledge and skills in authentic contexts (Koh, 2017). By assessing the children's analysis, summarization, creative solutions, and evaluation of results, the teacher captures a holistic view of their critical thinking abilities.
2. Observing and documenting the learning process; the teacher observes and documents the children's learning process during the project, noting their engagement, collaboration, problem-solving strategies, and attitude towards learning. This aligns with the practice of formative assessment, where teachers gather evidence of student learning throughout the learning process to provide feedback and support student progress (Andersson & Palm, 2017; Dunn & Mulvenon, 2009). By documenting these observations, the teacher gains insights into the children's critical thinking development and can tailor instruction accordingly.
3. Using an assessment rubric; the teacher develops an assessment rubric that includes criteria related to critical thinking skills such as analysis, evaluation, reasoning, and alternative solutions. This approach aligns with the use of rubrics in assessment, which provide explicit criteria and standards for evaluating student performance (Andrade & Du, 2005). The rubric allows for consistent and objective assessment of the children's ability to identify problems, provide reasonable solutions, and consider the impact of their proposed solutions.

From the description of the research findings and discussion related to the planning, implementation, and evaluation of PBL in improving the critical thinking skills of early childhood, it can be concluded in the form of an image as follows:



The study's results demonstrate the effectiveness of PBL in enhancing early childhood critical thinking skills. The children successfully improved their ability to identify problems, generate creative solutions, and consider multiple perspectives. Moreover, they also developed social skills, collaboration, and creativity through teamwork in PBL projects.

The study further identified several factors that either supported or hindered the implementation of PBL. Supporting factors encompassed a conducive learning environment, experienced PBL teachers, relevant learning content, and effective teamwork.

On the other hand, inhibiting factors included limited support from families, overly strict curriculum, resource constraints, and time limitations. Direct observation of children during the PBL implementation allowed for the assessment of various aspects, such as active participation, analytical thinking, problem-solving proficiency, argumentative skills, and knowledge integration.

This qualitative data provides a more comprehensive understanding of the changes occurring in children's critical thinking abilities after engaging in PBL. Consequently, the results and discussion of this study underscore the efficacy of PBL in enhancing early childhood critical thinking skills. Attention should be

given to the supporting and inhibiting factors to ensure the smooth implementation of PBL and achieve optimal learning outcomes.

## CONCLUSION

Based on in-depth and comprehensive data analysis, this research has yielded several significant findings regarding the implementation of Project-Based Learning (PBL) to enhance critical thinking skills in early childhood education. The study was conducted at TKIT Nurul Hikmah and Kindergarten Handayani III in Penajam Paser Utara District, as part of supporting the implementation of the independent curriculum.

The findings suggest that a structured and well-planned approach is crucial for successful PBL implementation. The research findings indicate that the planning phase of PBL involves key steps such as determining learning objectives, selecting interesting topics, defining projects, establishing timeframes, setting assessment criteria, providing relevant materials and resources, and offering support and guidance. These steps are essential for creating an engaging and effective PBL learning environment.

In the implementation phase, teachers play a vital role in selecting relevant and interesting projects, ensuring adequate availability of resources, providing appropriate guidance, fostering collaboration and communication among students, and evaluating learning outcomes. These factors contribute to the successful enhancement of early childhood critical thinking skills.

The steps in PBL evaluation carried out by teachers by performing authentic assessment tasks, combined with observation and rubric-based assessment, provide a comprehensive view of student performance, and allow teachers to provide targeted feedback for improvement.

By integrating these research findings, it is evident that a thoughtful and well-structured approach to PBL can effectively promote critical thinking skills in early childhood education. These conclusions have significant implications for educators, as they highlight the importance of planning and implementing PBL in a systematic manner to achieve optimal learning outcomes.

It is recommended that further research explores additional factors that may impact the implementation of PBL, such as teacher training and parental involvement. By addressing these aspects, we can continue to enhance the effectiveness of PBL and its positive impact on early childhood education.

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