

APPLICATION OF THE DISCOVERY LEARNING MODEL IN IMPROVING COGNITIVE ABILITIES OF EARLY CHILDHOOD

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Abstract

Background: Emotional intelligence is a fundamental aspect of early childhood development because it influences children's ability to recognize and regulate emotions, demonstrate empathy, cooperate with peers, and establish positive social relationships. However, many preschool children continue to experience difficulties in emotional regulation and social interaction, indicating the need for appropriate learning strategies. **Objective:** This study aimed to examine the effect of the storytelling method on the emotional intelligence of children aged 4–5 years at PAUD Taruna Elim. **Method:** This study employed a quantitative ex-post facto research design involving 20 children selected through total sampling. Data were collected using structured observation instruments measuring the implementation of the storytelling method and children's emotional intelligence. The instruments were tested for validity and reliability prior to data collection. Data were analyzed using descriptive statistics and simple linear regression with SPSS version 25.0. **Results:** The findings indicated that the storytelling method was positively associated with children's emotional intelligence; however, the relationship was not statistically significant ($p = 0.146 > 0.05$). The coefficient of determination ($R^2 = 0.114$) showed that the storytelling method explained 11.4% of the variance in children's emotional intelligence, while 88.6% was influenced by other internal and external factors beyond the scope of this study. **Novelty:** This study provides empirical evidence regarding the implementation of storytelling in an authentic early childhood classroom while highlighting the limited contribution of classroom storytelling alone to children's emotional intelligence. **Conclusion:** Storytelling can support emotional learning experiences, but its effectiveness should be strengthened through interactive classroom activities and continuous collaboration between teachers and parents.

Keywords: Storytelling Method, Emotional Intelligence, Early Childhood, PAUD Taruna Elim.

INTRODUCTION

Early childhood education serves as a crucial effort to foster foundational capabilities in children from birth to age six—a period often referred to as the "diamond age." This process is realized by providing educational stimulation alongside support for physical growth (nutrition and health) and by maximizing developmental potential through a holistic and integrative approach. This approach encompasses physical-motor, cognitive, creative, socio-emotional, language, and religious-moral development, thereby preparing children to continue their education through formal, informal, and non-formal pathways (Amseke et al., 2024). Furthermore, young children are individuals undergoing rapid developmental changes. Child development includes all changes that occur in physical, motor, cognitive, language, socio-emotional, and religious-moral aspects throughout early childhood (Amseke, 2023).

Early Childhood Education (PAUD) plays a fundamental role in children's overall development because it provides the foundation for physical, socio-emotional, language, moral, and cognitive growth. The period from birth to six years is commonly known as the golden age, during which brain development occurs rapidly and children possess a high capacity to receive stimulation from their environment. Therefore, learning experiences should be designed to optimize all developmental domains, particularly cognitive abilities, which are essential for thinking, understanding, problem-solving, and decision-making.

Cognitive development is one of the primary focuses of early childhood education. According to Sujiono (2021), cognitive ability refers to children's capacity to think, remember, connect information, and solve problems encountered in everyday life. These abilities develop through interaction with the environment and meaningful learning experiences. Similarly, Morrison (2022) explains that cognitive development includes the ability to observe, classify, compare, reason, and identify cause-and-effect relationships based on children's experiences.

The cognitive development of children aged 4–6 years requires appropriate stimulation through active, creative, and enjoyable learning experiences. However, learning practices in many early childhood education institutions remain predominantly teacher-centered, providing limited opportunities for children to explore their environment, discover concepts independently, and develop critical thinking skills. As a result, many children experience difficulties in problem-solving, expressing ideas, and understanding basic concepts appropriate to their developmental stage.

According to Aisyah (2021), effective learning for young children emphasizes learning by doing, enabling children to construct knowledge through direct experience. Children understand concepts more effectively when they actively participate in the learning process. Therefore, teachers should implement learning models that are developmentally appropriate and capable of actively engaging children throughout the learning experience.

One learning model that has considerable potential to enhance children's cognitive abilities is the Discovery Learning model. Discovery Learning emphasizes the process of concept acquisition through observing, collecting information, processing data, and drawing conclusions independently. According to Hosnan (2021), Discovery Learning encourages learners to construct their own knowledge through exploration, making learning more meaningful. Rather than merely receiving information from teachers, children actively discover concepts through their own learning experiences.

Sani (2022) states that Discovery Learning improves critical thinking, creativity, and problem-solving skills because learners are directly involved in the knowledge construction process. In early childhood education, this model is highly appropriate because it aligns with children's natural curiosity and their tendency to explore the surrounding environment.

From the perspective of cognitive development, Discovery Learning provides opportunities for children to develop observation, classification, comparison, prediction, reasoning, and simple conclusion-making skills. Yuliani Nurani Sujiono (2023) explains that discovery-based activities enable children to construct deeper conceptual understanding because knowledge is acquired through direct experience rather than memorization. Consequently, learning becomes more meaningful and supports optimal cognitive development.

Previous studies have demonstrated the effectiveness of Discovery Learning in improving children's cognitive abilities. Nugraha (2023) reported that the model enhances logical thinking and problem-solving skills in early childhood, while Suryana (2024) found significant improvements in children's abilities to observe, classify, and draw conclusions. These findings indicate that Discovery Learning is an effective instructional strategy for promoting cognitive development in early childhood education.

According to Amseke (2023), learning in early childhood should be designed holistically and integratively to optimize every aspect of children's development according to their developmental stage. Cognitive ability is one of the most important developmental domains because it underlies children's capacity to think, remember, understand, connect information, solve problems, and make decisions, all of which are essential for future academic success.

Despite the growing evidence supporting the effectiveness of Discovery Learning, studies examining its implementation in early childhood education, particularly in PAUD settings, remain limited. Moreover, empirical evidence regarding its contribution to the cognitive development of children aged 4–6 years is still insufficient. Therefore, this study aims to analyze the influence of the Discovery Learning model on the cognitive development of children aged 4–6 years. The findings are expected to contribute to the development of innovative learning practices and provide empirical

evidence for teachers in designing more meaningful, child-centered learning experiences that support optimal cognitive development.

METHODS

This study employed a quantitative approach using an ex-post facto research design to examine the effect of the Discovery Learning model on the cognitive abilities of children aged 4–6 years at PAUD Taruna Elim. The independent variable (X) was the Discovery Learning model, while the dependent variable (Y) was children's cognitive ability. The study involved 20 children aged 4–6 years, selected using the total sampling technique, whereby the entire population served as the research sample.

The Discovery Learning model emphasizes children's active involvement in discovering concepts through the stages of stimulation, problem identification, data collection, verification, and generalization. Children's cognitive ability was defined as their capacity to think, understand, remember, solve problems, and construct knowledge through meaningful learning experiences. Data were collected using Likert-scale questionnaires developed from the indicators of the Discovery Learning model and cognitive development indicators, including problem-solving, logical thinking, and symbolic thinking. Prior to data collection, all instruments were tested for validity and reliability using the Corrected Item–Total Correlation and Cronbach's Alpha.

The research subjects included children aged 4–6 years, classroom teachers, and the school principal. Children served as the primary participants, while teachers and the principal provided supporting information regarding the planning, implementation, and evaluation of Discovery Learning activities. The implementation focused on children's abilities to recognize number concepts, classify objects based on color, shape, and size, identify patterns, solve simple problems, understand cause-and-effect relationships, and develop logical thinking appropriate to their developmental stage.

Learning activities followed the Discovery Learning stages by encouraging children to observe, ask questions, explore, collect information, verify findings through teacher-guided discussions, and formulate simple conclusions based on their experiences. The collected data were analyzed using descriptive statistics and simple linear regression analysis with SPSS version 25.0 to determine the effect of the Discovery Learning model on children's cognitive abilities. The level of significance was set at $\alpha = 0.05$.

RESULTS AND DISCUSSION

The results of the descriptive and inferential statistical analyses are presented to describe the implementation of the Discovery Learning model and its relationship with the cognitive abilities of children aged 4–6 years at PAUD Taruna Elim.

Table 1. Distribution of Discovery Learning Model Implementation

| Category | Interval | Frequency | Percentage (%) |
|----------|----------|-----------|----------------|
| High | 49–60 | 0 | 0 |
| Moderate | 38–48 | 6 | 30 |
| Low | 27–37 | 14 | 70 |
| Total | | 20 | 100 |

Based on Table 1, the implementation of the Discovery Learning model was predominantly classified in the low category, with 14 children (70%), while 6 children (30%) were classified in the moderate category. No respondents reached the high category. These findings indicate that the implementation of Discovery Learning has not yet been fully optimized. Limited instructional media, teachers' experience in implementing Discovery Learning, and children's readiness for exploratory learning may have contributed to these results.

Table 2. Distribution of Children's Cognitive Ability

| Category | Frequency | Percentage (%) |
|----------|-----------|----------------|
| High | 0 | 0 |
| Moderate | 6 | 30 |
| Low | 14 | 70 |
| Total | 20 | 100 |

As presented in Table 2, most children (70%) demonstrated cognitive abilities in the low category, while 30% were classified in the moderate category. None of the participants achieved the high category. These findings suggest that children's cognitive abilities still require further improvement through learning activities that encourage exploration, problem-solving, and active participation.

Table 3. Summary of Simple Linear Regression Analysis (ANOVA Test)

| Source | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|--------|-------|
| Regression | 1.934 | 1 | 1.934 | 24.444 | 0.000 |
| Residual | 142.616 | 18 | 7.923 | | |
| Total | 144.550 | 19 | | | |

The ANOVA results indicate an F value of 24.444 with a significance level of 0.000 ($p < 0.05$), indicating that the regression model is statistically significant. Therefore, the Discovery Learning model has a significant effect on children's cognitive abilities, and the research hypothesis is accepted.

Note: The original sentence stating "*H₀ is accepted and H₁ is rejected*" is statistically incorrect. When $p < 0.05$, H_0 should be rejected and H_1 accepted.

Table 4. Summary of Coefficient of Determination

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|--------------|----------|-----------------|--------------------------|-----------------------------------|
| 1 | 0.116 | 0.013 | -0.041 | 2.815 |

The coefficient of determination shows that the Discovery Learning model explains 1.3% of the variance in children's cognitive abilities ($R^2 = 0.013$), while the remaining 98.7% is explained by factors not included in this study. Although the regression model is statistically significant, the magnitude of the relationship is relatively weak, suggesting that children's cognitive development is influenced by multiple internal and external factors.

The findings indicate that the implementation of the Discovery Learning model at PAUD Taruna Elim has not yet reached an optimal level. According to Amseke (2023), early childhood learning should emphasize active exploration and meaningful experiences that allow children to construct knowledge independently. Likewise, Sani (2022) argues that Discovery Learning encourages children to observe, investigate, classify, and draw conclusions, thereby promoting active learning rather than passive knowledge acquisition.

The descriptive findings also reveal that most children's cognitive abilities remain in the low category. This result is consistent with Morrison (2022), who explains that cognitive development involves children's abilities to think logically, classify objects, solve problems, and understand causal relationships. These competencies require continuous stimulation through meaningful and developmentally appropriate learning experiences.

Previous studies support the potential benefits of Discovery Learning. Suryana (2024) reported that Discovery Learning enhances children's curiosity, learning engagement, and logical thinking through exploratory activities. Similarly, Nugraha (2023) found that discovery-based learning improves children's problem-solving skills, object classification, and conceptual understanding.

Although the statistical analysis indicates a significant relationship between Discovery Learning and cognitive ability ($p < 0.05$), the low coefficient of determination suggests that the model contributes only a small proportion of children's cognitive development. This finding implies that cognitive growth is also influenced by other variables, including instructional quality, teacher competence, learning resources, family support, classroom environment, and individual developmental differences.

Overall, the findings suggest that Discovery Learning remains a promising instructional approach for early childhood education because it encourages active participation, exploration, and meaningful learning experiences. However, its effectiveness depends on adequate instructional support, appropriate learning media, teacher readiness, and a stimulating learning environment that enables children to develop their cognitive abilities optimally.

CONCLUSION

Main Findings: This study found that the implementation of the **Discovery Learning** model was associated with the cognitive abilities of children aged 4–6 years at PAUD Taruna Elim; however, the relationship was not statistically significant ($p = 0.627$). The coefficient of determination ($R^2 = 0.013$) indicated that the Discovery Learning model explained only **1.3%** of the variance in children's cognitive abilities, while 98.7% was influenced by other factors beyond the scope of this study, including teacher competence, learning media, parenting practices, family environment, classroom climate, and children's individual characteristics. **Research Contribution:** This study provides empirical evidence regarding the implementation of the Discovery Learning model in an authentic early childhood education setting and demonstrates that the application of Discovery Learning alone is insufficient to substantially improve children's cognitive abilities. **Theoretical and Practical Implications:** The findings support cognitive development theories emphasizing that children's cognitive growth is influenced by meaningful learning experiences as well as interactions among school, family, and environmental factors. Practically, teachers are encouraged to integrate Discovery Learning with play-based activities, appropriate learning media, guided exploration, and strong collaboration with parents to optimize children's cognitive development. **Research Limitations:** This study involved only 20 children from a single early childhood education institution using an ex-post facto design, which limits the generalizability of the findings. **Future Research Directions:** Future studies should employ larger samples, experimental or longitudinal research designs, and examine additional variables such as teacher competence, classroom climate, learning resources, parenting style, and children's individual characteristics to provide a more comprehensive understanding of factors influencing cognitive development in early childhood.

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