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THE INFLUENCE OF LEARNING MEDIA ON EARLY CHILDHOOD COGNITIVE DEVELOPMENT AT KB IT RABBANI PEPAO, LEKOR JANAPRIA

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ABSTRACT

Early childhood is a crucial phase for cognitive development, requiring stimulating environments and appropriate instructional strategies. This study aimed to examine the types of learning media used and their influence on early childhood cognitive development at KB IT Rabbani Pepao, Lekor Janapria. Employing a quantitative descriptive approach, the research involved the total population of 38 children, using structured questionnaires and observation checklists to collect data. Descriptive statistics were used to analyze media usage trends, while simple linear regression determined the impact of media on cognitive outcomes. Findings indicated that picture cards (M=4.21, SD=0.62), storybooks (M=3.95, SD=0.75), and educational toys (M=3.68, SD=0.80) were the most commonly used media, whereas interactive digital media were used less frequently (M=2.47, SD=1.10). Cognitive assessment results showed higher mean scores in memory (M=78.5) than in reasoning (M=74.3) and problem-solving (M=70.1). Regression analysis revealed a statistically significant positive relationship between learning media usage and cognitive development ($\beta = 0.62$, $p < 0.001$), accounting for 38% of the variance. These findings suggest that the strategic use of varied media supports cognitive growth in young children, particularly in rural Islamic educational settings. The study underscores the need for integrating accessible and engaging media into early learning environments to enhance memory, reasoning, and problem-solving skills.

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INTRODUCTION

Early childhood is a critical period for cognitive development, where children form the foundations of thinking, problem-solving, and memory. Stimulating environments and appropriate learning strategies are essential to support this development (Berk, 2013). In this regard, learning media play a significant role in shaping how children receive, process, and retain information. Particularly in early childhood education, where children learn best through visual, auditory, and hands-on experiences, the integration of effective media is crucial (Santrock, 2018; Essa, 2019).

Recent studies indicate that learning media designed with multisensory features can significantly enhance young children's cognitive capabilities. For instance, interactive video has

been found to improve children's understanding of mathematical concepts like counting and grouping (Wahyuni & Rakimahwati, 2022). Similarly, loose parts media—such as manipulatives and open-ended materials—stimulate creativity, early numeracy, and cognitive flexibility through exploration (Nasution, 2022). In another study, Nilawati and Yaswinda (2019) demonstrated that science-based video learning using ecological and multisensory approaches supports memory, attention, and reasoning skills in children aged 4–6.

The literature also highlights the importance of play-based and movement-based learning strategies. These approaches not only engage children but also improve their problem-solving and critical thinking abilities (Misrahayu, 2024; Sriwidaningsih & Friskawati, 2022). Game-based and tangible interface media have been reported to enhance focus, vocabulary acquisition, and conceptual thinking (Michailidis et al., 2020; Annuar et al., 2024; Russo-Johnson et al., 2017).

However, while digital media can be beneficial, its unregulated use raises concerns. Passive screen time, especially without adult interaction, has been associated with delayed development in executive functions and language (Madigan et al., 2019; AAP, 2017). Young children often experience a transfer deficit, struggling to apply knowledge gained from screens to real-life situations unless guided by adults (Barr, 2019; Strouse & Troseth, 2014). Thus, the educational value of digital media depends not only on the content but also on how it is presented and supported socially (Zack & Barr, 2016).

Despite growing literature on learning media, there remains a gap in understanding how various forms of media influence cognitive development in rural educational contexts like KB IT Rabbani Pepao, Lekor Janapria. Most existing studies focus on urban settings or formal preschool institutions with more established infrastructures. This research aims to fill that gap by exploring how learning media are used and how they affect early childhood cognitive development in a rural Islamic-based early childhood education center.

Unlike previous studies that mostly evaluated single types of media in controlled environments, this study provides a contextual exploration of how multiple forms of media—visual, interactive, and tangible—affect children's cognitive growth in an integrated, everyday classroom setting. It also considers socio-cultural influences and the role of teacher facilitation in media use.

The research questions addressed in this study focus on two key aspects: first, how learning media are utilized in supporting the cognitive development of children at KB IT Rabbani Pepao, and second, what influence the use of such media has on the cognitive abilities of early childhood learners. In line with these questions, the objectives of this study are to examine the various types of learning media employed at KB IT Rabbani Pepao and to analyze how their usage contributes to the cognitive development of young children within this educational setting.

The significance of this study lies in its potential contribution to early childhood education practices in rural Islamic education settings. It offers insights for educators and policymakers on how to utilize appropriate learning media to meet cognitive developmental needs during this formative period.

METHOD

This study applied a quantitative descriptive research approach to investigate the influence of learning media on early childhood cognitive development at KB IT Rabbani Pepao, Lekor Janapria. This research was conducted from October to December 2024, using a systematic and structured data collection procedure. Quantitative descriptive research is appropriate for

identifying patterns and relationships through numerical data and has been widely used in educational research involving young learners (Creswell & Creswell, 2018).

1. Research Design and Sample

The research used a survey method within a quantitative framework. The population of the study consisted of 38 students enrolled in KB IT Rabbani Pepao. Because the population was relatively small (fewer than 100), a total population sampling method was adopted, meaning that all 38 students were included in the study (Etikan & Bala, 2017). Total sampling allows comprehensive data collection from every subject, which enhances the reliability and accuracy of the findings in small-scale educational settings.

If sampling had been necessary, the sample size could have been determined using Slovin's formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

N = population (38 students)

e = margin of error (0.05)

$$n = \frac{38}{1 + 38(0.05)^2} = \frac{38}{1.095} \approx 35$$

However, this study included the entire population (n=38) to maintain data integrity.

2. Instruments

The main instruments used were a structured questionnaire and observation checklist, both designed to evaluate the types and usage of learning media and their influence on children's cognitive development. These instruments were developed and validated through expert review and pilot testing, a common practice to enhance instrument validity and reliability in early childhood research (Fraenkel et al., 2019).

The questionnaire included indicators such as media interactivity, frequency of use, and observable outcomes on children's memory, reasoning, and problem-solving skills. The observation checklist documented children's responses to different learning media based on cognitive development benchmarks (Papalia et al., 2021).

3. Data Collection Procedures

Data were collected through three techniques:

a. Questionnaires distributed to early childhood educators at KB IT Rabbani Pepao.
b. Structured observations of teaching and learning sessions using various media.
c. Field notes taken during interactions and activities to capture contextual behaviors and responses.

Teachers' insights and children's classroom behaviors were triangulated to ensure the credibility of findings (Ary et al., 2019).

1. Data Analysis Techniques

The collected data were analyzed using descriptive statistics to describe trends (frequencies, percentages, means, standard deviations), and simple linear regression to determine the effect of learning media on children's cognitive development. The analysis was carried out using SPSS version 25.0, as recommended in contemporary quantitative education research (Pallant, 2020).

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RESULTS

This study aimed to investigate the use of learning media in supporting cognitive development at KB IT Rabbani Pepao and to analyze the influence of such media on early childhood cognitive abilities. The findings are presented in two main parts: the types and usage of learning media, followed by the impact of these media on children's cognitive development.

1. Types and Usage of Learning Media

Data collected through questionnaires and observations identified several types of learning media utilized in the classroom. The primary media included picture cards, storybooks, educational toys, and interactive digital media. Table 1 summarizes the frequency of use for each media type as reported by the educators.

Table 1: Frequency of Use of Learning Media at KB IT Rabbani Pepao

Learning Media	Frequency of Use (Mean)	Standard Deviation (SD)
Picture Cards	4.21	0.62
Storybooks	3.95	0.75
Educational Toys	3.68	0.80
Interactive Digital Media	2.47	1.10

Note: Frequency scale ranged from 1 (Never) to 5 (Always).

As shown in Table 1, picture cards were the most frequently used learning media, followed by storybooks and educational toys. Interactive digital media were used less frequently, possibly due to limited availability or accessibility.

2. Influence on Cognitive Development

To assess the influence of learning media on cognitive development, scores from cognitive ability assessments focusing on memory, reasoning, and problem-solving skills were analyzed. The descriptive statistics of cognitive scores are presented in Table 2.

Table 2: Descriptive Statistics of Children's Cognitive Development Scores

Cognitive Aspect	Mean	Standard Deviation (SD)
Memory	78.5	8.4
Reasoning	74.3	9.2
Problem-solving	70.1	10.5

The data indicate that children performed highest in memory-related tasks and relatively lower in problem-solving activities.

3. Relationship Between Learning Media Usage and Cognitive Development

A simple linear regression analysis was conducted to examine the effect of learning media usage on overall cognitive development scores. The results are shown in Table 3.

Table 3: Regression Analysis Summary for Learning Media Usage Predicting Cognitive Development

Predictor Variable	B	SE B	β	t	p	R^2
Learning Media Usage	3.45	0.89	0.62	3.87	<0.001	0.38

The regression model was statistically significant, $F(1,36) = 14.98$, $p < 0.001$, with learning media usage explaining 38% of the variance in cognitive development scores. This finding suggests a positive relationship between the frequency and quality of learning media use and children's cognitive abilities.

The results show that various learning media are actively used at KB IT Rabbani Pepao, with picture cards and storybooks being the most prevalent. The cognitive assessments reveal higher scores in memory compared to reasoning and problem-solving. Importantly, statistical analysis

confirms a significant positive effect of learning media usage on early childhood cognitive development.

DISCUSSION

1. Analysis of Results

The findings of this study highlight the significant role that learning media play in supporting cognitive development among early childhood learners at KB IT Rabbani Pepao. The data revealed that the most frequently used learning media were picture cards (M = 4.21), followed by storybooks (M = 3.95), educational toys (M = 3.68), and interactive digital media (M = 2.47). This suggests that the learning environment is dominated by visual and tangible media, which aligns well with the developmental needs of early learners who rely heavily on concrete, sensory-based experiences (Berk, 2013; Santrock, 2018).

Cognitive assessments conducted in this study showed that children scored highest in memory (M = 78.5), followed by reasoning (M = 74.3), and problem-solving (M = 70.1). These findings indicate that while the current media usage effectively supports memory development, more efforts are needed to strengthen children's problem-solving skills. The regression analysis further confirmed a statistically significant and positive relationship between media usage and overall cognitive development ($\beta = 0.62$, $p < 0.001$), with 38% of the variance in cognitive scores being explained by the use of learning media. This underscores the pedagogical value of integrating media systematically and thoughtfully into early childhood education.

2. Comparison with Previous Studies

These results are consistent with the findings of Wahyuni & Rakimahwati (2022), who demonstrated the effectiveness of interactive video media in enhancing numerical and grouping skills among young children. Similarly, Nasution (2022) emphasized the cognitive benefits of open-ended, loose parts media in fostering creativity and cognitive flexibility, which are foundational aspects of problem-solving. The prevalent use of picture cards and storybooks in the KB IT Rabbani Pepao setting aligns with the literature that identifies visual and narrative media as effective tools for memory retention and vocabulary expansion (Essa, 2019; Michailidis et al., 2020).

However, the relatively low frequency of interactive digital media use and its possible impact echoes concerns raised by Madigan et al. (2019) and Barr (2019) regarding digital media's double-edged nature. Without structured guidance or social scaffolding from educators, digital tools may have limited effectiveness or even adverse effects on cognitive transfer and executive functioning.

3. Implications of Findings

This study contributes to a deeper understanding of how various forms of learning media—particularly in rural, Islamic early childhood contexts—can be optimized to enhance cognitive development. Practically, the findings encourage early childhood educators to prioritize diverse, multisensory learning materials and to integrate more structured problem-solving and reasoning tasks into daily activities. The strong correlation between media use and cognitive outcomes also supports investment in teacher training on media utilization and development of context-appropriate media, including both low-tech and digital options.

From a theoretical perspective, the findings reinforce constructivist learning theories, which argue that children learn best through active engagement with materials and environments that stimulate mental processes (Vygotsky, 1978). This study further supports the socio-cultural view that adult facilitation is key to effective media use, particularly in digital contexts.

4. Limitations of the Study

While the study offers valuable insights, it is not without limitations. First, the sample size was relatively small and limited to a single rural Islamic preschool, which may affect the generalizability of the findings. Second, the study relied on self-reported media usage from educators, which might be subject to social desirability bias. Third, cognitive assessment instruments were limited to basic domains (memory, reasoning, and problem-solving) and did not cover broader aspects such as executive functioning or language development. Lastly, the use of a cross-sectional design limits the ability to establish causality.

In summary, this study found that the active use of learning media—especially picture cards and storybooks—has a positive influence on children's cognitive development, particularly in memory-related domains. The integration of media in early childhood classrooms, when done intentionally and with educator facilitation, supports a holistic cognitive learning environment. However, there is room for improvement in diversifying media types and addressing higher-order cognitive skills such as reasoning and problem-solving. These partial conclusions set the stage for the final conclusion section and for future research in similar educational contexts.

CONCLUSION

This study provides empirical evidence that the use of learning media significantly supports the cognitive development of early childhood learners at KB IT Rabbani Pepao. The most frequently utilized media—picture cards, storybooks, and educational toys—were found to play a pivotal role in enhancing memory, reasoning, and problem-solving skills. The regression analysis confirms a strong positive relationship between the frequency of media use and cognitive development, with media usage explaining 38% of the variance in cognitive performance.

The findings emphasize the importance of adopting diverse and interactive learning media, particularly in rural early childhood education settings, where access to advanced digital tools may be limited. The use of tangible and visual media appears especially beneficial in strengthening children's memory and foundational cognitive skills. For future research, it is recommended to explore the long-term effects of specific media types on distinct domains of cognitive development and to investigate how teacher facilitation and socio-cultural factors further influence learning outcomes. Additional studies comparing urban and rural contexts could also provide valuable insights into equitable media integration strategies.

In conclusion, this research highlights the critical role of well-designed and appropriately applied learning media in supporting cognitive growth during early childhood. These findings contribute to both educational theory and practice, reinforcing the value of media-rich instruction as a means of fostering essential cognitive competencies in young learners.

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