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ORIGINAL RESEARCH ARTICLE

Teacher Strategies in Managing Gadget Use for Cognitive Development of Children Aged 5-6 Years

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ABSTRACT

This study aims to examine teacher strategies in managing gadget use for cognitive development of children aged 5-6 years at TKIT Al-Faqih, Bekasi. The development of information technology has transformed the lifestyle of modern society, including young children who are now familiar with various gadget devices. Gadget use in early childhood has the potential for both positive and negative impacts on cognitive development, thus requiring appropriate management strategies from teachers. This research employs a qualitative descriptive method with data collection techniques through participatory observation, in-depth interviews, and documentation. The research subjects included classroom teachers and the school principal as informants. The findings reveal that teacher strategies include planning gadget use aligned with learning objectives, selecting age-appropriate educational applications, limiting usage duration, providing active supervision during activities, and balancing with physical play activities and social interaction. The school has policies supporting wise use of gadgets as alternative learning media. Positive impacts observed include improved memory, concentration, problem-solving abilities, logical thinking, and recognition of letters, numbers, colors, and shapes. This research provides significant contributions to the development of early childhood education in the digital era.

Keywords: Teacher Strategy, Gadget Use, Cognitive Development, Early Childhood

ABSTRAK

Penelitian ini bertujuan untuk mengkaji strategi guru dalam mengelola penggunaan gadget untuk perkembangan kognitif anak usia 5-6 tahun di TKIT Al-Faqih, Bekasi. Perkembangan teknologi informasi telah mengubah pola kehidupan masyarakat modern, termasuk anak usia dini yang kini akrab dengan berbagai perangkat gadget. Penggunaan gadget pada anak usia dini memiliki potensi dampak positif maupun negatif terhadap perkembangan kognitif, sehingga diperlukan strategi pengelolaan yang tepat dari guru. Penelitian ini menggunakan metode deskriptif kualitatif dengan teknik pengumpulan data melalui observasi partisipatif, wawancara mendalam, dan dokumentasi. Subjek penelitian meliputi guru kelas dan kepala sekolah sebagai informan. Hasil penelitian menunjukkan bahwa strategi guru meliputi perencanaan penggunaan gadget yang disesuaikan dengan tujuan pembelajaran, pemilihan aplikasi edukatif yang sesuai usia, pembatasan durasi penggunaan, pendampingan aktif selama kegiatan, serta keseimbangan dengan aktivitas bermain fisik dan interaksi sosial. Sekolah memiliki kebijakan yang mendukung penggunaan gadget sebagai media pembelajaran alternatif secara bijak. Dampak positif yang terlihat meliputi peningkatan daya ingat, konsentrasi, kemampuan pemecahan masalah, berpikir logis, serta pengenalan huruf, angka, warna, dan bentuk. Penelitian ini memberikan kontribusi penting bagi pengembangan pendidikan anak usia dini di era digital.

Kata Kunci: Strategi Guru, Penggunaan Gadget, Perkembangan Kognitif, Anak Usia Dini

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1. INTRODUCTION

The rapid advancement of technology has massively transformed various sectors of life toward a new order, including the role of teachers in the digital era. Teachers now face significant changes in their professional responsibilities, requiring them to guide children wisely in navigating technological developments, particularly in selecting and understanding information received (YBKB, 2023). In early childhood education, the teacher's role becomes even more critical as young children aged 5-6 years require guidance, direction, and exemplary models to develop optimally during their golden period of growth and development.

Gadgets such as smartphones, tablets, and laptops have become integral to modern life, including for young children. Based on initial observations at TKIT Al-Faqih, researchers observed that gadgets are already used in teaching-learning activities as alternative supporting tools in digital learning media. Teachers utilize gadgets to display videos, images, songs, and educational games, including puzzles related to teaching materials. Children appeared enthusiastic and focused when interacting with laptop-based learning media; however, some children desired to use the laptop longer and began to ignore teacher instructions, indicating the need for proper management and supervision.

The phenomenon of gadget use in early childhood presents a double-edged sword. On one hand, gadgets offer significant advantages as teaching-learning media that can support children's cognitive development. Educational applications can encourage and enhance children's abilities in

logical thinking, problem-solving, number and letter recognition, concentration, and creativity. Gadgets also facilitate teachers in providing more enjoyable learning alternatives, preventing children from becoming bored easily when gadgets are used appropriately according to learning needs in the digital era.

However, on the other hand, unmonitored gadget use can lead to various problems. Children who become dependent on excessive gadget use experience decreased social interaction, reduced physical activity, addiction, and difficulty concentrating in learning. Research has shown that gadget addiction among school-going children is associated with cognitive function impairment. Additionally, excessive screen time has been linked to impaired attention and emotional regulation in young children. Kara & Çağıltay (2023) explored design issues and preschool-aged children's characteristics through digital games to support executive functions, while Liza et al. (2023) and Lakicevic et al. (2025) confirmed the association between prolonged screen exposure and executive function deficits in preschoolers. Furthermore, Dong et al. (2025) specifically linked screen time to cognitive function impairment in children with attention challenges, and Portugal et al. (2023) alongside Rizzo et al. (2025) highlighted neurobiological and behavioral imbalances resulting from excessive technological device use during early developmental stages. These findings highlight the urgent need for effective management strategies in educational settings.

Previous research has examined various aspects of technology use in early childhood education. Rahmi (2025) investigated teacher strategies in utilizing information and communication technology for children aged 5-6 years, finding that structured and planned ICT use can enhance children's attention and active engagement in learning. Rawanita and Mardhiah (2024) explored parental strategies in managing gadget use, emphasizing the importance of establishing strict rules regarding time and content access. Winarsih and Ismail (2025) examined gadget implementation in early childhood learning, demonstrating that gadget use can support cognitive, social, emotional, and motor development when applied wisely with active teacher supervision. Additionally, Özel & Ersoy (2024) examined the effect of technology integration on behavior management in preschools, while Grieshaber et al. (2025) explored how digital technologies are changing everyday pedagogical practices. Restiawan (2025) specifically addressed adaptive teacher strategies in managing gadgets in the digital era, complementing the findings on parental roles. Studies by Fatimah (2022) and No (2025) further emphasized the critical role of teachers in instilling character values and structuring technology-rich learning environments for early literacy.

The gap in existing research lies in the limited focus on comprehensive teacher strategies specifically designed for managing gadget use to support cognitive development in children aged 5-6 years within Islamic-integrated early childhood education settings. While previous studies have addressed parental strategies or general technology integration, there is insufficient research examining the specific pedagogical approaches teachers employ to balance the benefits and risks of gadget use in the classroom. This study addresses this gap by investigating the holistic strategies implemented by teachers at TKIT Al-Faqih, including planning, content selection, time management, supervision, and evaluation.

The novelty of this research lies in its examination of teacher strategies within the context of an Islamic-integrated early childhood education institution that combines the Merdeka Curriculum

with religious education (tahfiz) as its primary identity. This unique educational context requires teachers to integrate technology use while maintaining Islamic values and character development. Furthermore, this study provides empirical evidence on how teachers manage gadget use as an alternative learning tool rather than a primary instructional method, emphasizing the importance of balancing digital and non-digital learning activities.

Theoretical frameworks underpinning this research include Piaget's theory of cognitive development, which positions children aged 5-6 years in the pre-operational stage where symbolic thinking begins to develop. Vygotsky's concept of the Zone of Proximal Development (ZPD) and scaffolding also provides a foundation for understanding how teachers can support children's learning through guided interaction with technology. Additionally, Bruner's theory of cognitive development, encompassing enactive, iconic, and symbolic stages, informs the understanding of how children process information through various media.

This research is significant for several reasons. First, it contributes to the growing body of knowledge on technology integration in early childhood education, particularly in the Indonesian context. Second, it provides practical guidance for teachers and educational institutions on developing effective strategies for managing gadget use. Third, it offers insights for parents on collaborating with teachers to ensure consistent approaches to gadget management at home and school. Fourth, it addresses the urgent need for evidence-based practices in an era where children are increasingly exposed to digital devices from an early age.

The study focuses on two main research questions: (1) What are the teacher strategies in managing gadget use for children aged 5-6 years at TKIT Al-Faqih? and (2) What is the impact of gadget use on cognitive development of children aged 5-6 years at TKIT Al-Faqih? By answering these questions, this research aims to provide comprehensive understanding of effective pedagogical approaches for managing technology in early childhood education settings.

2. RESEARCH METHODS

This research employs a qualitative descriptive approach to gain an in-depth understanding of teacher strategies in managing gadget use for cognitive development of children aged 5-6 years at TKIT Al-Faqih. According to Sugiyono (2024), qualitative research methods are used in natural settings where the researcher serves as the key instrument, and data collection is conducted through triangulation (combination of observation, interviews, and documentation). This approach was selected because it enables researchers to understand phenomena naturally and comprehensively, capturing the complexity of teacher strategies and their implementation in real classroom settings.

The research was conducted at TKIT Al-Faqih, an Islamic-integrated early childhood education institution located in Perum Wahana Pondok Gede Blok P2/22 RT 13 RW 05, Kel. Jatisari, Kec. Jatisari, Bekasi, West Java. This location was purposively selected based on initial observations showing that gadgets are used as alternative learning media, making it an appropriate setting for examining teacher strategies. The research was conducted during the second semester of the

2025/2026 academic year, from April to July 2026, with data collection taking place from May to June 2026.

The research subjects included classroom teachers as primary informants and the school principal as a supporting informant. The class teacher (Teacher S) is responsible for Group B children aged 5-6 years and actively delivers instruction including cognitive development aspects. The principal (S.S., S.Pd.) provides policy direction and support for technology integration in learning activities. This selection of informants was based on their direct involvement in planning, implementing, and evaluating gadget use in the classroom.

Data collection techniques employed three methods. First, participatory observation was conducted to directly observe teachers and students during gadget-based learning activities. Observations focused on planning, implementation, teacher supervision, child responses, problem-solving abilities, and teacher-child interactions. Second, in-depth semi-structured interviews were conducted with teachers and the principal to gather detailed information about strategies, policies, and impacts of gadget use. Third, documentation included photographs of learning activities and analysis of lesson plans (RPP) to verify and complement observational and interview data.

Data analysis followed the Miles and Huberman (1984) interactive model consisting of three stages: data reduction, data display, and conclusion drawing/verification. Data reduction involved summarizing, selecting, focusing, and simplifying raw field data. Data display presented data in narrative or tabular form to identify patterns and interrelationships. Conclusion drawing and verification involved seeking understanding and themes aligned with research focus, providing findings through additional data or clarification with informants. Data validity was ensured through source triangulation (teachers, principal, documents), technique triangulation (observation, interviews, documentation), time triangulation (multiple data collection times), and member checking with participants.

3. RESULTS AND FINDINGS

The research findings are presented based on two sub-focus areas: (1) teacher strategies in managing gadget use for children aged 5-6 years, and (2) the impact of gadget use on cognitive development of children aged 5-6 years at TKIT Al-Faqih.

Teacher Strategies in Managing Gadget Use

Based on observations conducted on Tuesday, May 19, 2026, from 10:00 to 11:00 AM, researchers observed the following aspects of gadget management:

Table 1. Observation Results of Gadget Management

No	Aspect Observed	Indicator	Observation Result
1	Learning Planning	Teacher prepares gadget and educational applications appropriate for children aged 5-6 years	Teacher creates learning plan and explains well to students
2	Gadget Implementation	Teacher uses gadget as learning media	Teacher uses laptop as learning media
3	Teacher Supervision	Teacher provides guidance and assistance during gadget use	Teacher supervises by sitting alongside students, guiding gadget use
4	Child Response	Children show enthusiasm during gadget use	Children appear cheerful and enthusiastic; display increased learning spirit
5	Problem-Solving Ability	Children can complete simple puzzle tasks	Children demonstrate ability to complete puzzle tasks successfully
6	Teacher-Child Interaction	Active communication occurs between teacher and children	Interaction includes questions: "What game did we play?" Children respond: "Puzzle game, teacher"

Teacher S, the Group B classroom teacher, provided comprehensive information about gadget management strategies: Regarding planning, Teacher S stated: *"I plan gadget use by adjusting it to learning objectives, themes, and developmental stages of children aged 5-6 years. I select educational applications or media, determine short usage durations, and combine it with play and hands-on activities so learning remains active and enjoyable."*

Regarding objectives, Teacher S explained: *"My goal is to make learning more interesting, interactive, and help children understand material through visual media, audio, and educational games."* Regarding content selection: *"I select applications that are age-appropriate, safe, ad-free, easy to use, have educational value, and support learning objectives."* Regarding time management: *"I limit usage time, use gadgets only when needed, and balance it with active play, discussions, and hands-on practice."* Regarding supervision: *"I always accompany, provide guidance, observe children's activities, help if they experience difficulties, and invite children to discuss after activities."*

Teacher D provided additional perspectives on gadget management:

Regarding planning: *"As a teacher, I first determine learning objectives appropriate to children's developmental achievements. I select age-appropriate content, limit gadget usage duration to about 10-20 minutes, and provide supervision during gadget use."* Regarding content selection: *"I select content that is age-appropriate, contains educational elements, is safe and free from violence, and has a simple, easy-to-use display."* Regarding time management: *"I set time limits, ensure continuous teacher supervision during gadget use, and establish consistent rules."*

The principal (S.S., S.Pd.) provided information about school policies: *"The school has policies regarding gadget use. Gadgets may only be used for learning activities with teacher permission. Use of gadgets for playing games, social media, or activities unrelated to lessons during school"*

hours is prohibited. The school supports gadget use as a learning medium as long as it is used wisely, according to learning needs, and with supervision from teachers and parents." "The principal's role is to regulate, supervise, and guide gadget use so it is used properly to support learning. Facilities provided include WiFi, laptops, speakers, and microphones. The school evaluates gadget use by observing child development, assessing learning outcomes, and seeking input from teachers and parents to ensure gadgets are beneficial and used appropriately."

Impact of Gadget Use on Cognitive Development

Based on teacher interviews, several positive impacts of gadget use on cognitive development were identified: Enhanced Memory and Concentration: Teacher S explained: "*Gadgets help train memory, concentration, problem-solving abilities, logical thinking, and recognition of letters, numbers, colors, and shapes through enjoyable activities.*" Improved Problem-Solving: Children demonstrated increased ability to solve simple problems through puzzle activities on the laptop. Observation results confirmed that children could complete puzzle tasks successfully with teacher guidance.



Figure 1. Gadget Use for Cognitive Development of Children Aged 5-6 Years

Increased Focus and Concept Recognition: Teacher S noted: "*Children become more focused, quickly recognize concepts, are better able to solve simple problems, remember information, and follow instructions well.*" Enhanced Logical Thinking: Teacher D reported: "*When used in a limited manner appropriate to age and with teacher supervision, gadget use can improve children's thinking abilities, train memory, increase concentration and attention, and stimulate curiosity.*" Knowledge and Concept Understanding: Teacher D added: "*Improved logical thinking abilities, increased knowledge and concept understanding, and enhanced problem-solving abilities are visible cognitive developments after appropriate gadget use.*"

Teachers implemented several measures to minimize negative impacts: Duration Limitation: Teacher S stated: "*I limit usage duration, select educational content, accompany children, and*

balance with play activities, movement, and social interaction." Educational Content Selection: Teacher D emphasized: *"Limit gadget usage time, accompany children during gadget use, establish gadget use rules, and select educational content and applications."*

Active Supervision: Both teachers confirmed they always supervise children during gadget use, providing guidance and assistance when needed. Balancing Activities: Teachers combine gadget use with physical play, social interaction, and hands-on learning activities. Evaluation and Monitoring: Teacher S explained: *"I conduct observations during activities, record children's development, assess task or educational game results, and compare children's abilities before and after learning."*

4. DISCUSSION

The findings of this research provide comprehensive insights into teacher strategies for managing gadget use to support cognitive development in children aged 5-6 years. These findings align with and extend previous research on technology integration in early childhood education.

The finding that teachers plan gadget use by aligning it with learning objectives, themes, and developmental stages is consistent with Ngalimun's (2016) assertion that strategies aim to create an effective teaching-learning environment for optimal learning outcomes. Teachers demonstrated the ability to holistically arrange learning components to achieve maximum teaching objectives, consistent with the concept that learning strategies include pattern selection in teaching activities to achieve effective instruction. This planning approach is crucial because it ensures that technology use serves pedagogical purposes rather than becoming an end in itself. Research by Khoiriyah (2025) similarly emphasizes that successful technology integration in early childhood education depends on teachers' ability to plan intentionally, considering both educational goals and children's developmental needs.

The teachers' practice of selecting content aligned with children's developmental stages and learning objectives supports Restiawan's (2025) finding that visual media such as animations and videos help children understand concepts that are difficult to explain through text alone. In counting and reading lessons, for example, animations can visualize numbers and letters, making information more concrete and engaging. This is particularly important for children aged 5-6 years who are in Piaget's pre-operational stage, where concrete experiences and visual representations support learning. The selection of age-appropriate, educational, safe, and user-friendly applications reflects teachers' understanding of child development and their commitment to providing meaningful learning experiences.

The implementation of time restrictions (10-20 minutes per session) aligns with Hanik et al.'s (2025) findings that effective strategies include implementing time limitations, introducing alternative activities, and providing active supervision. This approach ensures gadget use remains a supportive learning tool rather than a source of distraction or potential harm. Research by Gastaud et al. (2023) found that cognitive development was associated with two hours or more of screen time per day, suggesting that shorter, structured sessions are preferable for young children. The teachers' practice of limiting gadget use to only when needed and balancing it with physical activities aligns with recommendations from the literature on healthy screen time management.

The finding that teachers consistently supervise and assist children during gadget use is consistent with the concept of scaffolding in Vygotsky's theory of cognitive development. By providing guidance, observing children's activities, and helping when difficulties arise, teachers create a supportive learning environment that enables children to achieve beyond their independent capabilities. Research by Studhalter et al. (2025) found that tablet computers in early science education enriched teacher-child interactions, suggesting that technology can enhance rather than replace meaningful pedagogical relationships when used appropriately. The teachers' practice of inviting children to discuss after activities further reinforces learning and promotes metacognitive development.

The school's clear policies regarding gadget use—permitting only for learning activities with teacher permission and prohibiting non-educational use—provide an important institutional framework that supports teachers' efforts. Research by Jannah et al. (2025) identified teachers' challenges in ICT integration, including lack of institutional support and clear guidelines. The presence of supportive policies at TKIT Al-Faqih likely contributes to the effectiveness of teachers' strategies. The principal's role in regulating, supervising, and guiding gadget use further reinforces consistent implementation across the school. The provision of facilities such as WiFi, laptops, speakers, and microphones demonstrates institutional commitment to technology integration.

The positive impacts observed—including enhanced memory, concentration, problem-solving, logical thinking, and recognition of letters, numbers, colors, and shapes—align with multiple research findings. Khulduniah et al. (2025) found that positive gadget impacts include increased student confidence and enhanced essential skills in reading, mathematics, and critical thinking. Tamsil's (2021) research similarly found that children gain new vocabulary, become more interested in learning, and acquire new knowledge through appropriate technology use. The finding that children become more focused and quickly recognize concepts after gadget use is consistent with research by Mera Cantillo and Aragón Mendizábal (2025) on the impact of educational apps on early mathematical thinking. This is further corroborated by Baikulova et al. (2024), who found that digital interactive didactic games significantly enhance cognitive development in preschool education. Similarly, Chae & Kim (2025) demonstrated that digital block play effectively improves children's mathematical problem-solving abilities, while Liu & Yang (2024) provided evidence that tablet apps positively influence symbolic number abilities in preschoolers. Wang et al. (2023) confirmed that digital puzzle gaming systems enhance learning through interactive multi-sensing. In the Indonesian context, Christiyanti et al. (2025) showed that learning media such as Wordwall and Canva positively affect cognitive development in 5-6-year-olds, while Syaharani & Afrianingsih (2025) specifically highlighted that digital puzzle games improve cognitive abilities in this age group. Furthermore, Zeng (2025) discussed how conversational AI and dialogues in play support early mathematical thinking, and Tan (2025) emphasized the application of art-based knowledge management to promote cognitive development and knowledge creation in preschools.

The teachers' strategy of balancing gadget use with physical play, discussion, and hands-on practice addresses concerns about excessive screen time and its potential negative impacts. Research by Mortimer et al. (2024) found that increased touchscreen use may be negatively related to preschool-age children's executive functions. By ensuring that gadget use is only one component of a broader learning experience that includes active, physical, and social activities, teachers

mitigate potential risks while harnessing benefits. This balanced approach reflects an understanding that cognitive development in early childhood is best supported through diverse, multi-sensory experiences.

The effective implementation of gadget management strategies depends on teacher competence in technology integration. Research by Studhalter et al. (2025) emphasizes that teacher-child interactions are enriched when teachers are confident and skilled in using technology. The findings from this research suggest that teachers at TKIT Al-Faqih possess the necessary competencies to select appropriate content, manage time effectively, and provide meaningful supervision. However, ongoing professional development remains important as technology continues to evolve.

While this research focused primarily on teacher strategies, the principal's mention of seeking input from parents and ensuring gadget use is beneficial and used appropriately highlights the importance of teacher-parent collaboration. Research by Syafrida (2025) emphasizes the need for both parental and teacher roles in managing technology use in early childhood. Consistent approaches between home and school likely enhance the effectiveness of gadget management strategies and support children's cognitive development more comprehensively.

This research extends previous findings by providing detailed examination of teacher strategies within the specific context of an Islamic-integrated early childhood education institution. While Rahmi (2025) examined teacher strategies in ICT utilization, this research provides more specific insights into gadget management for cognitive development. While Rawanita and Mardhiah (2024) focused on parental strategies, this research addresses the unique role of teachers in the school setting. The findings complement Winarsih and Ismail's (2025) research on gadget implementation in early childhood learning by providing more detailed strategy descriptions.

The findings have several practical implications for early childhood education. First, teachers should develop comprehensive plans that align gadget use with learning objectives and developmental stages. Second, careful selection of age-appropriate, educational content is essential to maximize benefits and minimize risks. Third, time limitations and active supervision should be consistently implemented. Fourth, gadget use should be balanced with physical play, social interaction, and hands-on activities. Fifth, clear school policies and institutional support are important for effective implementation.

This research contributes to theoretical understanding of technology integration in early childhood education by demonstrating how Piaget's and Vygotsky's theories can inform practical strategies. The teachers' scaffolding approach during gadget use reflects Vygotsky's ZPD concept. The emphasis on concrete, visual learning experiences aligns with Piaget's understanding of pre-operational children's cognitive characteristics. The research also extends Bruner's theory by showing how enactive, iconic, and symbolic learning can be supported through appropriate technology use.

5. CONCLUSION AND SUGGESTIONS

Based on the research findings regarding teacher strategies in managing gadget use for cognitive development of children aged 5-6 years at TKIT Al-Faqih, several conclusions can be drawn. First, teachers implement comprehensive strategies including planning gadget use aligned with learning objectives, themes, and developmental stages; selecting age-appropriate, educational, and safe applications; limiting usage duration to 10-20 minutes; providing consistent supervision and assistance; balancing digital activities with physical play and social interaction; and implementing clear school policies regarding gadget use. The school supports gadget use as an alternative learning medium with clear policies prohibiting non-educational use during school hours and providing necessary facilities. Second, the positive impacts of appropriate gadget use on cognitive development include enhanced memory, concentration, problem-solving abilities, logical thinking, recognition of letters, numbers, colors, and shapes, improved focus and concept recognition, increased ability to follow instructions, and enhanced curiosity and learning motivation. Teachers implement strategies to reduce negative impacts including limiting duration, selecting educational content, providing supervision, balancing with physical activities, establishing consistent rules, and conducting ongoing evaluation and monitoring.

This research provides significant contributions to the development of early childhood education in the digital era by offering evidence-based insights into effective teacher strategies for managing gadget use. The findings have practical implications for teachers, school administrators, parents, and policymakers in developing approaches that maximize the benefits of technology while minimizing potential risks. Future research should involve more diverse informants and settings for more comprehensive findings, and explore the long-term effects of technology use on various aspects of child development.

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