

Analysis of Principal Policy and Digital Literacy Introduction Model for Early Childhood.

Pusvyta Sari^{1*}

¹Universitas Sunan Drajat Lamongan

*Correspondence to: pusvytasari@unsuda.ac.id

Abstract: This study aims to examine school principals' policies on introducing digital literacy, identify challenges and opportunities in policy implementation, and analyze the learning models applied to introduce digital literacy at TK Muslimat 17 Mathlabul Huda in Lamongan. Using a descriptive qualitative approach, data were collected through semi-structured interviews with school stakeholders, passive observation, and document analysis. Data reliability was ensured through triangulation of sources, time, and techniques. The research findings indicate that the principal's main policy focuses on optimizing curriculum implementation for digital integration. Implementation challenges include infrastructure limitations, a lack of specialized training for teachers, varying levels of parental digital literacy, and parents' difficulties in guiding their children at home. Conversely, key opportunities include parents' willingness to participate in parenting and reflection programs at school, as well as strong support from internal and external stakeholders. In addition, digital literacy is introduced through the integration of the STEAM (Science, Technology, Engineering, Arts, Mathematics) model and collaborative learning models. The STEAM model enhances critical thinking, creativity, and conceptual understanding of the real world, although it requires in-depth technical preparation and a significant amount of time. Meanwhile, the collaborative learning model effectively mitigates equipment limitations while fostering students' social skills, motivation, and shared responsibility; however, it requires prolonged instructional supervision and may trigger minor peer conflicts over shared learning media.

Keywords: *principal policy, digital literacy, instructional models, early childhood.*

INTRODUCTION

The evolution of digital technology has profoundly impacted modern life, making digital literacy a crucial skill in today's world. Therefore, educational institutions must provide students with the necessary digital competencies to ensure they are not disadvantaged by an inability to utilize technology effectively. This educational foundation should be established during a child's most formative years, starting in early childhood education. During this golden age, children need adequate stimulation to develop optimally in subsequent stages (Fitriani & Rohmah, 2024).

Digital literacy skills are essential for early anticipation of the potential negative impacts of the information explosion in the digital age. Therefore, introducing and developing digital literacy skills is crucial from an early age. This requires collaborative efforts between parents, schools, and the community (Miranda et al., 2022). Educators must possess adequate digital literacy knowledge and skills to maximize growth and development during students' golden years and into the future (Novitasari & Fauziddin, 2022).

Conversely, society must proactively address the inherent risks of digitalization, implementing safeguards to shield younger generations from the adverse effects of technological overexposure. These negative impacts include cyberbullying or violence, harassment and insults through digital media, crimes committed through digital media, pornography, the threat of hate speech, and other factors that can affect physical and mental health (Sukmono & Kusuma, 2021 ; Rizkiyah & Ningrum, 2022). These impacts can affect all age groups, including early childhood.

Excessive use of digital devices or screen time among young children has been shown to have a

negative impact on their growth and development. Uncontrolled exposure to digital devices can harm physical health—such as by triggering obesity, vision problems, headaches, musculoskeletal issues, and even cardiovascular disease—as well as damage mental health and the parent-child relationship (Priftis & Panagiotakos, 2023). Uncontrolled use of electronic devices also hinders cognitive development and impairs children's social interactions (Widyadhana & Mashudi, 2024). Screen time for children aged 2 to 5 years should be limited to a maximum of 1 hour or less per day and should not be made a routine part of childcare for children under 5 years of age (Ponti, 2023).

In addition to health issues, the digital age also poses real threats related to digital safety and children's exposure to inappropriate content. Without proper supervision, young children are vulnerable to serious risks online and may access content that is inappropriate for their age. To address these threats, it is crucial to emphasize digital education for parents and caregivers so they can make wiser decisions regarding the types of content their children access (Widyadhana & Mashudi, 2024).

Implementing digital safety strategies—such as limiting screen time and redirecting children to alternative activities—is also essential for protecting children (Hanik et al., 2025). To address these threats and break the cycle of children's dependence on digital devices, proactive measures and strong collaboration are required. Active involvement from parents, caregivers, and educators has proven highly effective in reducing device dependence among young children (Hanik et al., 2025).

Regulating, monitoring, and guiding to uses electronic devices properly for early childhood is crucial (Day & Qodariah, 2018; Lindriany et al., 2022). Problems can arise when children receive insufficient attention, guidance, and supervision from their parents. Especially for early childhood, the introduction of digital literacy requires more guidance from parents, so there needs to be harmony, active participation, and synergy between parents and schools for the success of children's education (Prayoga & Muryanti, 2021).

These efforts must be supported holistically through collaboration among educational institutions, health professionals, and the government in formulating policies and guidelines for device use that support children's positive development amid technological advancements (Widyadhana & Mashudi, 2024). In the realm of early childhood education, school principals play a strategic role in bridging gaps and communicating these issues so that such collaboration can be realized.

Several previous studies on digital literacy served as references in this study. First, "Digital Literacy on YouTube Social Media for Early Childhood" (Salehudin, 2020). This study showed that introducing digital literacy through convenient facilities using YouTube, coupled with support, guidance, direction, and guidance from parents at home, can improve children's digital literacy on social media. Second, "Building Digital Literacy in Early Childhood through School TV" (Yunita & Watini, 2022). This study demonstrated how to build digital literacy using School TV as a literacy medium. School TV is a digital TV-based feature that is an innovation in the 4.0 era. School TV is a positive alternative for digital literacy activities in educational institutions. The menu on School TV is quite comprehensive because it provides both educational and entertaining content.

Third, "Introducing Digital Literacy Skills to Early Childhood" (Miranda et al., 2022). This study shows that the impact of digital media use is highly dependent on the user's skill in filtering the various information presented by the media. This study aimed to determine whether early childhood education (PAUD) teachers had introduced digital literacy skills to their students. The results showed that 92% of respondents had introduced digital literacy skills to their students, indicating a positive

impact on digital literacy efforts at the PAUD level in Pontianak.

Fourth, "Evaluation of the Digital Literacy Program in early childhood education through the Robokids STEAM Coding Game" (Munawar et al., 2023). The results indicate that evaluating a digital literacy education program in early childhood education through the Robokids STEAM coding game requires a policy framework at both the macro and meso levels, training for the entire school community, and the provision of reading materials, visual aids, or digital-based games in the classroom. This research also contributes to the introduction of Robokids STEAM as a robotics game for coding and digital literacy learning in early childhood classrooms. The research also revealed that policies, particularly in educational institutions, are crucial for introducing digital literacy to students.

However, despite the importance of institutional policies highlighted in previous studies, a crucial research gap remains: there has been no specific analysis of school principals' policies regarding the introduction of digital literacy. While previous literature has largely focused on learning media, learning facilities, and parental involvement in learning, as well as teachers' skills and readiness, the role of school principals as key policymakers and leaders in driving digital literacy initiatives in schools has been largely overlooked. Therefore, this study aims to fill this gap by analyzing school principals' policies regarding the introduction of digital literacy, the opportunities and challenges they face, and the instructional models used for introducing digital literacy.

The leadership of school principals plays a crucial role in successfully addressing digital challenges in early childhood education institutions. The main challenges include ensuring the availability of adequate technological resources, developing teachers' skills in using them, and managing data security and student privacy. In addition, school principals need to pay attention to parental involvement in supporting the use of digital media at home and ensure a balance between technology and children's physical and social activities. School principals are expected to develop appropriate management strategies to facilitate effective digital learning, improve the quality of education, and ensure the wise use of technology in learning (Suteki & Sulistyowati, 2024). Some strategies that can be implemented include: enhancing teachers' digital competencies, providing adequate technological infrastructure, and fostering close collaboration with parents and the community—these are the three main pillars supporting the implementation of technology-based learning (Windayani & Sudarma, 2025).

A school principal's ability to execute these digital strategies is fundamentally rooted in their vital role as a policymaker (Silawati et al., 2023). Through wise and forward-looking leadership skills, school principals are able to formulate appropriate institutional policies so that all work programs remain aligned with the educational institution's vision, mission, and goals. In this context, the success of digital literacy programs in early childhood education (PAUD) heavily depends on three policy stages that must be systematically implemented by the principal: formulation, implementation, and evaluation (Hidayati & Rustyawati, 2019). By formulating well-thought-out technology policies, consistently applying them within the school environment, and periodically measuring and analyzing the results, school principals can ensure that the introduction of digital literacy and the use of learning media in early childhood education proceed in a measurable and sustainable manner.

Therefore, this study aims to examine the principal's policies for introducing digital literacy to children, the challenges and opportunities in implementing these policies, and the learning models used at TKM 17 Mathlabul Huda, Paciran, Lamongan. This educational institution has a unique characteristic: most of its students come from fishing families. While the family's activities are not directly related to the digital world, they are accustomed to using digital media, especially mobile

phones, on a daily basis.

METHODS

This study employs a descriptive qualitative approach to gain a profound and comprehensive understanding of the school principal's policies regarding the introduction of digital literacy at TKM 17 Mathlabul Huda. This approach was selected to enable the researcher to describe and interpret field phenomena naturally without variable manipulation, specifically exploring how these policies are formulated, socialized, and implemented. In its execution, the researcher acts as the primary instrument (key instrument), gathering data directly through three comprehensive collection techniques. First, primary data are gathered through semi-structured in-depth interviews with the school principal as the key informant to dissect motivations, legal foundations, and policy frameworks, as well as with teachers to examine field implementation. Second, field data are obtained through passive participant observation to assess the availability of digital facilities and the reality of classroom learning processes. Third, secondary data are compiled via documentary studies, including the School Activity and Budget Plan, the principal's Decrees, the institutional curriculum, meeting minutes, and activity photographs.

Next, all the collected data were analyzed interactively and continuously using the qualitative analysis model developed by Miles, Huberman, and Saldaña, which comprises three simultaneous stages. The process began with data condensation to summarize, focus, and sort the raw field data so that it would be relevant to the focus of the school principals' policies. The filtered data was then presented in the form of descriptive narratives, matrices, or charts to clarify patterns of interrelationships among the data. The final stage is drawing conclusions and verification, in which the validity of the initial findings is tested through triangulation of sources and techniques—that is, by confirming the results of interviews with school principals, official policy documents, and the objective reality of classroom observations—thereby producing valid and credible final conclusions.

RESULT AND DISCUSSION

TKM 17 Mathlabul Huda is a private early childhood education institution with NPSN 20567474, located at Jalan H. Nur Hadi No. 18, Weru Village, Paciran District, Lamongan Regency, East Java. This educational institution was founded on November 6, 1995, by YPMNU Bina Bakti Wanita to facilitate the community's early learning. Many residents in this village are fishermen and processing marine product. Other residents are entrepreneurs, private sector employees, teachers, and civil servants. Given this background, TKM 17 Mathlabul Huda students come from families with diverse professions. Most of the students' families are in the lower-middle class. Nevertheless, the community has high hopes for a quality education while simultaneously practicing and preserving noble values in their social, religious, and national lives. The noble characters that are instilled include: mutual cooperation, good manners, mutual respect and help, and caring for others.

Principal Policy Formulation

TKM 17 Mathlabul Huda implements the three-stage policy development process—formulation, implementation, and evaluation—as conceptualized by Hidayati & Rustyawati, (2019). In the formulation stage, the principal analyzes the needs and the situation and conditions of the institution. This stage is conducted reflectively, drawing on the results of observations, assessments, information acquisition through parenting activities and reflections with stakeholders, experiences in

implementing the learning process, education and training, and benchmarking with teachers during studies and visits to other schools. From all the information gathered, an analysis is conducted regarding the situation and conditions of the strengths, weaknesses, opportunities, and threats of institution. The following is a brief overview:

Table 1. SWOT Analysis

Aspects	Situation and Condition
Strengths	• Educators are capable of using digital devices • Educators are ready to develop themselves • Facilities and infrastructure are available to support learning
Weaknesses	• Not all teachers are skilled in providing guidance to introduce increasingly sophisticated digital literacy • Limited funding • Limited learning facilities and infrastructure for introducing digital devices
opportunities	• Educators are capable of using digital devices • Educators are ready to develop themselves • Facilities and infrastructure are available to support learning
Threats	• difficulties of parents to guiding and mentoring students activities. • Not all parents of students are digitally literate • Competition with other schools • digital technology and learning resources develop rapidly

Explanation

TKM 17 Mathlabul Huda possesses human resources characterized by high digital literacy and proficiency in educational technology. This competency was demonstrated during the implementation of distance learning, where educators successfully managed digital resources and integrated mobile devices and laptops into their teaching workflows. Specifically, the teaching staff exhibited strong pedagogical-technological skills through creating instructional videos, facilitating synchronous and asynchronous communication via WhatsApp, and conducting remote student assessments. Furthermore, teachers utilized digital networks for curriculum documentation and reporting, establishing an efficient, tech-driven bridge between the institution and parents.

In terms of institutional infrastructure, despite minor resource limitations, TKM 17 Mathlabul Huda provides an environment that effectively supports the implementation of an in-depth curriculum. The institution features five flexible classrooms equipped with specialized learning corners, enabling self-directed, student-centered exploration tailored to individual developmental stages. Physical facilities include an indoor playroom for adaptive activities and an expansive outdoor school yard—complete with a playground and an educational garden—which functions as a natural laboratory for experiential science and environmental education. This garden, co-managed by the students, serves as a pedagogical tool for cultivating responsibility, patience, and ecological awareness.

Furthermore, technological resources are adequately distributed; educators utilize internet-connected smartphones, supplemented by school-owned laptops, LCD projectors, printers, and audio speakers. Literacy development is structurally supported through dedicated reading corners featuring diverse storybook collections in each classroom. Ultimately, the strategic placement of these multimedia resources streamlines the facilitation of child-centered learning. This internal ecosystem is further reinforced by robust stakeholder engagement, particularly through the active support of parents for institutional programs.

Conversely, this institution faces a number of operational challenges and resource constraints. Structurally, there remains a shortage of advanced technology-based pedagogical skills among some educators, which hinders the delivery of comprehensive and advanced digital literacy instruction. Schools have limited budgets and therefore do not yet have dedicated digital literacy labs for students to practice simultaneously. The introduction of digital devices such as laptops is conducted on a rotational basis and in small groups.

Meanwhile, external challenges include the domestic digital divide among stakeholders; parents' busy work schedules; and varying levels of parental digital literacy, which hinder learning support at home. Culturally, this school operates in a highly competitive regional environment, with rival institutions positioning themselves under the "Digital School" brand. Furthermore, the relentless pace of technological evolution demands continuous and adaptive professional development, requiring educators to constantly update their digital competencies.

To optimize the quality of learning, professional development programs are essential for enhancing educators' digital competencies and pedagogical capacities in fostering students' digital literacy. At the same time, addressing systemic challenges—such as parents' lack of digital literacy and their busy professional schedules—is crucial, as these factors often reduce parental supervision within the family structure. Building a shared understanding of ethical guidelines and risk mitigation strategies for digital media use between educators and parents or guardians is essential to maximize the benefits of technology while protecting children from negative impacts.

Externally, TKM 17 Mathlabul Huda leverages strong multisectoral collaborations with various community stakeholders to enrich its educational ecosystem. Partnerships with Community Health Centers (Puskesmas) facilitate student health and nutrition initiatives, while collaborations with local libraries expand the available literacy resources. To foster creativity and cultural appreciation, the institution partners with local art studios and community groups. Additionally, experiential learning is enhanced by inviting professionals from various fields—such as health, law enforcement, and agriculture—and organizing educational field trips for students and parents. This localized curriculum is supplemented by utilizing the immediate environment as an active learning resource and maintaining collaborative networks with neighboring early childhood education (PAUD) centers. Through peer-to-peer school visits and active participation in local teacher forums, educators continuously refine their competencies by sharing best pedagogical practices.

Based on this analysis, the principal integrated the digital literacy introduction program through the development of the educational unit curriculum by referring to the national curriculum with in-depth learning and following the multiple intelligence curriculum guidelines developed by Muslimat NU. In the development of this curriculum, (1) learning programs, (2) human resource development programs, and (3) teacher professional development programs were determined. Based on that curriculum, learning activities at TKM 17 Mathlabul Huda include intracurricular and extracurricular activities. Both are conducted with a clear time allocation within daily learning. Thus, each can be done

and each child has a more extensive learning experience.

Intracurricular learning is designed to achieve the Learning Outcomes of the foundation phase through the principle of "Meaningful Play" as the embodiment of "Freedom to Learn, Freedom to Play." Learning provides a fun and meaningful experience for children by using real learning resources from the surrounding environment. The basic principles of intracurricular apply authentic and contextual learning that connects learning with children's daily lives, namely: providing fun and meaningful experiences for children, using real learning resources from the child's environment, connecting learning with daily life.

Meanwhile, the implementation of extracurricular learning is carried out by applying the principle of choice based on children's interests without coercion, mentoring by experienced teachers, and continuing to apply the principle of meaningful and enjoyable according to the in-depth learning framework. Extracurricular activities are designed to enrich and develop children's special interests that support the achievement of the graduate profile dimensions. Types of activities include art and creativity. Digital literacy is introduced into daily learning, specifically through the theme of digital technology. This theme is implemented at both Kindergarten A and B levels, with a three-week time allocation.

To optimize the implementation of an in-depth curriculum, TKM 17 Mathlabul Huda plans to establish a dedicated learning resource center. This infrastructural expansion encompasses a mini-STEAM room designed for foundational science experiments, a sensory room tailored for developmental stimulation, and an upgraded documentation area dedicated to preserving and exhibiting children's artifacts for portfolio-based assessments.

The human resources development framework at this institution includes structured mentoring, coaching, and training programs. These mentoring initiatives provide individually tailored classroom support, beginning with direct observation of the teaching process, followed by reflective discussions on pedagogical principles that are mindful, meaningful, and enjoyable, and concluding with constructive feedback integrated with actionable development plans. Complementing this, the mentoring program employs a collaborative clinical supervision approach led by the principal or a supervisor.

For the teacher professional development program, the principal decided on two programs: a teacher professional competency improvement program and a simple development program. The teacher competency improvement program focuses on teachers' understanding of the in-depth learning curriculum for early childhood education (PAUD), play-while-learning techniques, skills in recognizing and understanding student characteristics, establishing communication skills, and fostering good collaboration with parents in supporting students' learning processes. This also includes assisting with the use of digital devices. The simple development program, includes sharing activities between teachers, classroom visits, discussions of child cases, and short training sessions. These activities aim to foster good collaboration between teachers and mutual assistance in improving their respective skills, both in providing quality learning and in supporting the learning needs of each student. This is crucial given the diverse characteristics of students and parents.

Policy Implementation

All programs planned during the policy formulation stage are then implemented in conjunction with the implementation of the school curriculum. This curriculum implementation is tailored to the unique characteristics of early childhood, who learn through play and require a holistic, integrative

approach. Learning is not conducted in isolation but integrated into each child's learning experience, ensuring natural and meaningful development. The graduate profile dimension serves as the primary orientation in designing all learning activities. The eight dimensions are not developed separately but are integrated into each child's learning experience. The principles of conscious, meaningful, and joyful learning serve as the foundation for creating an optimal learning environment for child development.

The learning experience is designed through three stages: understanding, applying, and reflecting. The understanding stage provides children with opportunities to explore basic concepts through direct observation and manipulation. The application stage allows children to apply their understanding in various play contexts and everyday activities. The reflection stage helps children realize what they have learned and how they can use it. The learning framework includes pedagogical practices that align with the characteristics of early childhood education, a supportive learning environment, meaningful partnerships with parents and the community, and the appropriate and safe use of technology for early childhood.

The curriculum implementation involves four in-depth learning frameworks, namely: Pedagogical Practices (play-based learning, inquiry, and exploration), Learning Environment: (flexible physical space and a positive learning culture), Learning Partnerships (collaboration with stakeholders), and Utilization of digital media (introducing appropriate and safe technology for early childhood). Six development areas are integrated in every learning activity. Religious and Moral Values are developed through the habituation of spiritual values in everyday life with role models and direct experiences, supporting the dimensions of faith and piety. Physical-Motor skills are developed through active play and arts and crafts activities, supporting the health dimension. Cognitive skills are stimulated through inquiry-based exploration and experimentation to develop age-appropriate critical reasoning dimensions. Language is developed through natural communication and storytelling to develop the communication dimension. Social-Emotional skills are fostered through meaningful interactions and collaborative learning to develop the dimensions of collaboration and independence. Art is developed through creative expression and appreciation of local culture to develop the dimensions of creativity.

TKM 17 Mathlabul Huda consists of two grade levels, namely Kindergarten level A and B. Grade A is for children aged 4-5 years, while Kindergarten B is for children aged 5-6 years. Each level gets an intracurricular learning process of 1,050 minutes a week. Learning is carried out in 6 effective days, from Saturday to Thursday. While Friday is a holiday. For extracurricular learning for grade A level is given for 60 minutes every Thursday. While for grade B, it is also done for 60 minutes, every Wednesday. Learning is done by exploring certain topics/themes in intracurricular learning. Each theme has a time allocation of 3 weeks. The themes are: My school (TKM 17 Mathlabul Huda), My Country, The Beauty of Weru Village, My Surroundings, Important to Me, Plants, Animals, Recreation, Professions, Digital Technology, I Love the Earth, Natural Phenomena.

To introduce digital literacy, TKM 17 Mathlabul Huda specifically delivers it in lessons on the theme of Digital Technology. The information and communication technologies introduced primarily include mobile phones, laptops, and televisions. The teacher explains the forms of these technologies along with how to use them and their benefits in everyday life. Every day, the children experience the benefits of these technologies, one example being during assembly and morning exercise together before entering the classroom. The teacher plays a morning exercise video on a laptop and connects it to the speakers. This exercise activity is guided by the teacher. Students follow the teacher's

movements along with the video and music playing.

Students can also watch videos together on the teacher's laptop and occasionally on a projector screen. Afterward, the teacher guides them to a deeper understanding of what they've seen; giving them the opportunity to ask questions and reflect on the meaning they've learned. Learning activities can run smoothly if students are disciplined and follow the teacher's suggestions. Obstacles arise when some children disagree with the teacher's choice of video. This situation presents a challenge for teachers to provide alternative viewing options that are more educational and age-appropriate. The learning situation can also become chaotic when some children refuse to share space with their peers and prefer to sit in front of the monitor alone. Teachers must be more patient and skilled at managing the situation so that learning can return to being conducive and in line with the previously planned learning stages.

The instructional framework at TKM 17 Mathlabul Huda adheres to a deep learning curriculum structured into four systematic phases, each engineered to facilitate mindful, meaningful, and joyful early childhood education. The initial phase, identification, involves analyzing learner readiness, evaluating material characteristics, and defining the target dimensions of the graduate profile. The second phase, instructional design, encompasses establishing learning outcomes, formulating contextual topics, integrating cross-disciplinary approaches, and constructing the overarching pedagogical framework. The third phase, the learning experience, translates these objectives into practice through a tripartite cycle of understanding, application, and reflection, thereby upholding the core principles of engagement. Finally, the assessment phase ensures continuous evaluation by integrating diagnostic, formative, and summative measures before, during, and at the conclusion of the instructional process.

Policy Evaluation

Program evaluation is essential to ascertain the efficacy of policy implementation and current curriculum deployment. To this end, TKM 17 Mathlabul Huda conducts a comprehensive evaluation focusing on curriculum transformation and its ultimate impact on holistic child development. This systematic policy evaluation thoroughly examines the execution of the deep learning curriculum, the implementation of the graduate profile strengthening project, the quality of instructional project planning, the attainment of the eight core dimensions of the graduate profile, and the overall quality of learning. Collectively, these evaluative domains serve as a critical reflection of the efficacy and success of the institution's established educational policies.

Challenges and Opportunities

An analysis of institutional policies, programs, and operational conditions reveals a range of clear strategic challenges and opportunities. Internally, the primary pedagogical obstacle is the need to improve educators' digital competencies. The rapid pace of technological evolution requires teachers to remain agile and proactive in optimizing digital resources. However, this need is hampered by infrastructure limitations, driven by a budget deficit that restricts the availability of educational games and technology-based learning materials.

Externally, the institution faces a domestic digital divide and market competition. Many parents struggle with a digital literacy gap or have demanding work schedules, which limit their ability to support digital learning at home. At the same time, neighboring institutions are actively marketing themselves under the "Digital School" brand. As a result, TKM 17 Mathlabul Huda faces the unique challenge of demonstrating the relevance of its curriculum and digital focus to the public without

adopting a superficial institutional label.

To address this issue, the institution's leadership recognized an urgent need for targeted professional development. Previously, comprehensive training on risk mitigation and ethical guidelines for the use of digital media—for both educators and parents. Additionally, competition is intensifying from rival institutions that brand themselves as 'Digital Schools.' This requires TKM 17 Mathlabul Huda to actively assure the public that its curriculum is contemporary and digitally focused, despite not using that specific title. Developing a clear understanding of these digital boundaries among both teachers and parents is critical to helping children maximize the benefits of technology while avoiding its negative effects.

Nevertheless, strong internal and external opportunities support the principal's vision. Internally, the school's human resources demonstrate great enthusiasm for self-development and professional learning. Externally, despite limited facilities, the school can rely on active stakeholder collaboration. Specifically, digitally proficient parents can be leveraged during school parenting workshops to mentor and support other parents who are still building their digital readiness.

Digital Literacy Introduction Model

To introduce digital literacy and support the implementation of Deep Learning for early childhood, the school principal's policy at TKM 17 Mathlabul Huda specifically establishes the integration of the STEAM (Science, Technology, Engineering, Arts, Mathematics) model and the Collaborative Learning model. These two models are deliberately selected as the core strategic framework delivered within lessons under the theme of Digital Technology.

Through this dual-model approach, the information and communication technologies introduced primarily include cell phones, laptops, and televisions. Teachers explain the forms of these technologies, how to use them, and their benefits in everyday life. Crucially, as a direct reflection of the institutional policy, teachers also emphasize best practices when using digital devices and the digital safety boundaries to avoid. Teachers explain the forms of technologies, how to use them, and their benefits in everyday life. They also explain the best practices when using digital devices and the things to avoid.

During each assembly and morning exercise session before entering the classroom, the teacher plays a morning exercise video on a laptop and connects it to the speakers. The exercise activity is also guided by the teacher. Students follow the teacher's movements along with the video and music. This also serves as an example of introducing the positive use of digital literacy to support children's learning. Learning activities that provide opportunities for children to try using digital devices, such as showing each student how to turn on and off a laptop and type on a laptop, also provide a good individual learning experience. However, adequate facilities and infrastructure are needed, and teachers must also be more prepared and skilled in providing support to each child.

Collaborative learning activities involve group viewing and reflection. Students watch videos together on the teacher's laptop and occasionally on a projector screen. Afterward, the teacher guides them to a deeper understanding of what they've seen, giving them the opportunity to ask questions and reflect on the meaning. Collaborative learning activities to introduce digital literacy are hampered when some children refuse to watch the teacher's chosen video or refuse to practice taking turns. This situation presents a challenge for teachers to provide more educational and age-appropriate viewing alternatives and to implement learning within the planned time allocation. Learning situations can also become chaotic when some children refuse to share with their peers.

The integration of digital literacy in early childhood education relies heavily on the choice of learning models and institutional support. While prior research by Munawar et al. (2023) and Miranda et al. (2022) underscores the necessity of institutional policies and critical filtering skills, the practical execution depends on how limitations are managed. The STEAM learning model offers robust benefits in fostering critical thinking and real-world digital applications; however, its heavy demand for infrastructure and teacher readiness reflects the macro-meso challenges highlighted by Munawar et al. (2023). To mitigate these resource barriers, the collaborative learning model serves as a strategic alternative. It enables teachers to deliver digital literacy, such as utilizing School TV (Yunita & Watini, 2022) or social media platforms (Salehudin, 2020), even within limited infrastructures by emphasizing shared responsibility and social inclusion among early learners.

The advantages of the STEAM learning model are: it can encourage students' critical thinking, enhance creativity, strengthen collaboration, and can help students understand the relationship between concepts and the real world. Students learn to understand the interconnected principles of science, technology, engineering, art, and mathematics, and how they apply them to everyday life, particularly in the digital technologies they learn. The disadvantages of the STEAM Learning Model are: it requires adequate facilities and infrastructure, teacher readiness and skills to provide intensive learning and mentoring related to the technical use of digital equipment through relevant and effective STEAM activities for early childhood, requires considerable time to provide equitable experiences for each student.

The collaborative learning model has the following advantages: it is easier for teachers to deliver material with limited equipment and infrastructure, increase togetherness in diversity and be more inclusive. Students practice caring and social skills and respect for one another, increase learning motivation, and making the learning process fun and enjoyable. It also can cultivate courage and confidence to ask questions and communicate with peers and teachers, foster responsibility for the maintenance of shared digital equipment.

Meanwhile, the disadvantages of the collaborative learning model include: conflict can arise when students compete to use learning media. Therefore, it requires preparation and more mature skills so that teachers can manage effective and productive learning and minimize conflict between students. If there is insufficient time, it can make students unhappy because they don't get a turn to try. So, it requires more time to condition students during practice. Sometimes, some children are passive because they don't want to interact with their more active peers. Therefore, teachers must be more skilled at encouraging all students to be active. It also requires more intensive supervision of the use of digital equipment to prevent damage and harm to students when connected to electricity.

Given that every pedagogical model possesses distinct strengths and limitations, institutional leadership must continuously foster peer collaboration and professional growth among educators. Amidst existing resource constraints, prioritizing teachers' digital competencies is essential. Ultimately, the systematic and optimal execution of this deep learning curriculum is anticipated to elevate instructional quality and drive institutional excellence.

As revealed in the research by Windayani and Sudarma (2025), key strategies for technology-based learning include enhancing teachers' digital competencies, providing adequate technological infrastructure, and fostering close collaboration with parents and the community—identified as the three main pillars of implementation. In alignment with these findings, the principal of TKM 17 Mathlabul Huda has proactively initiated efforts to execute these exact strategies by optimizing

curriculum implementation. Nevertheless, to fully address the magnitude of these technological challenges and mitigate the adverse effects of digital media, the principal must formulate these digital literacy strategies in greater detail. This granular approach is essential to expand curriculum implementation beyond the confines of the classroom, thereby facilitating active pedagogical collaboration with families to ensure continuous digital literacy guidance by parents at home.

CONCLUSION

In conclusion, the leadership's policy of optimizing the deep learning curriculum serves as a pedagogical roadmap that aligns the academic community toward institutional goals. Formulated through situational analyses, retrospective evaluations, and stakeholder consultations, this structured approach streamlines digital literacy integration for educators. Empirical evidence indicates that despite infrastructural deficits and professional development gaps, both STEAM and collaborative learning models represent viable pedagogies for early childhood digital literacy. While the STEAM model excels in fostering critical thinking and contextual real-world comprehension, it requires extensive preparation and robust resources. Conversely, the collaborative model effectively accommodates resource scarcity by cultivating social competencies, though it demands substantial instructional guidance time.

However, this study is subject to specific limitations, as its scope was restricted to analyzing the principal's policies regarding digital literacy introduction and the pedagogical models deployed. It has not yet specifically evaluated the empirical effectiveness or measurable outcomes of these implemented policies.

Given the magnitude of the challenges identified, it is imperative for the school leadership to formulate precise, strategic policies that optimize curriculum execution. This strategic refinement must aim to cultivate a comprehensive learning ecosystem that extends beyond the physical boundaries of the classroom, actively engaging parents to ensure the continuity of wise, reinforcing digital education within the home environment.

REFERENCES

- Day, V. M., & Qodariah, S. (2018). Menumbuhkan Literasi Digital Pada Anak Usia Sekolah 6-12 Tahun. *Prosiding Nasional Psikologi* 2, 1–9.
- Fitriani, N. N., & Rohmah, N. (2024). Effectiveness of Read Aloud in Improving Pre-Reading Skills in Children Aged 4-5 Years at The RA Darul Falah Ketanggan. *Early Childhood Education Papers*, 13(2), 150–154.
- Hanik, S. U., Kurniawan, N., Aswit, M., & Barata, S. (2025). Keamanan Digital untuk Anak Usia Dini : Strategi Pencegahan Ketergantungan Gadget di PAUD. *CJPE: Cokroaminoto Journal of Primary Education*, 8(4), 1511–1522.
- Hidayati, N., & Rustyawati, D. (2019). Kepala sekolah sebagai penentu kebijakan pendidikan di sekolah dasar. *Premiere*, 1(2), 91–103.
- Lindriany, J., Hidayati, D., & Muhammad Nasaruddin, D. (2022). Urgensi Literasi Digital Bagi Anak Usia Dini Dan Orang Tua. *Journal of Education and Teaching (JET)*, 4(1), 35–49. <https://doi.org/10.51454/jet.v4i1.201>
- Miranda, D., R., M., Linarsih, A., & Amalia, A. (2022). Pengenalan Keterampilan Literasi Digital pada Anak Usia Dini. *Edukatif: Jurnal Ilmu Pendidikan*, 4(3), 3844–3851. <https://doi.org/10.31004/edukatif.v4i3.2767>
- Munawar, M., Suciati, S., Saputro, B. A., & Afif, P. (2023). *Evaluasi Program Literasi Digital di PAUD Melalui Robokids STEAM Coding Game*. 7(2), 1847–1867. <https://doi.org/10.31004/obsesi.v7i2.4140>
- Novitasari, Y., & Fauziddin, M. (2022). Analisis Literasi Digital Tenaga Pendidik pada Pendidikan Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(4), 3570–3577. <https://doi.org/10.31004/obsesi.v6i4.2333>

- Ponti, M. (2023). Screen time and preschool children : Promoting health and development in a digital world. *Paediatrics&Child Health*, 28, 184–192. <https://doi.org/https://doi.org/10.1093/pch/pxac125>
- Prayoga, A., & Muryanti, E. (2021). Peran Guru Dalam Pengenalan Literasi Digital Pada Anak Usia Dini Pada Masa Covid-19 Di Tk Se-Kecamatan Pauh Duo. *Generasi Emas: Jurnal Pendidikan Islam Anak Usia Dini*, 4(2), 11–22. <https://journal.uir.ac.id/index.php/generasiemas/article/view/7538>
- Priftis, N., & Panagiotakos, D. (2023). Screen Time and Its Health Consequences in Children and Adolescents. *Children*, MDPI, 10, 1–17. <https://doi.org/https://doi.org/10.3390/children10101665>
- Rizkiyah, P., & Ningrum, M. A. (2022). Pengembangan Buku Cerita Bergambar Berbasis Digital Untuk Meningkatkan Kecakapan Literasi Digital Anak Usia Dini. *Indonesian Journal of Early Childhood: Jurnal Dunia Anak Usia Dini*, 4(1), 115–133. <https://doi.org/10.35473/ijec.v4i1.1230>
- Salehudin, M. (2020). Literasi digital media sosial youtube anak usia dini. *Jurnal Ilmiah Potensia*, 5(2), 106–115.
- Silawati, Hidayati, D., Ulya, L. K., & Zakiyah, R. H. (2023). Strategi kepemimpinan kepala madrasah dalam pendidikan karakter peserta didik di era digital 4.0. *JIPKIS, Jurnal Ilmiah Pendidikan Dan Keislaman*, 3(2), 232–240.
- Sukmono, N. D., & Kusuma, W. S. (2021). Kisah Nabi dan Rosul sebagai Upaya Penanaman Budaya Literasi pada Anak Usia Dini untuk Mencegah Problem Etik Digital. *Edukatif : Jurnal Ilmu Pendidikan*, 3(6), 4944–4951. <https://doi.org/10.31004/edukatif.v3i6.1523>
- Suteki, M., & Sulistyowati, R. W. (2024). Strategi dan tantangan manajemen teknomedia di lembaga pendidikan anak usia dini. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 5(1), 115–122. <https://doi.org/https://doi.org/10.37478/jpm.v5i1.3469>
- Widyadhana, S. A., & Mashudi, E. A. (2024). Dampak Negatif Gadget Terhadap Perkembangan Anak Usia Dini. *INNOVATIVE: Journal of Social Science Research*, 4(1), 4685–4694.
- Windayani, I., & Sudarma, I. K. (2025). Strategi Kepemimpinan Kepala PAUD dalam menghadapi tantangan era digital. *Jurnal Ilmiah Pendidikan Citra Bakti*, 12(1), 230–241.
- Yunita, Y., & Watini, S. (2022). Membangun Literasi Digital Anak Usia Dini melalui TV Sekolah. *JlIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(7), 2603–2608. <https://doi.org/10.54371/jiip.v5i7.729>