

Teachers' Needs Analysis for Educational Technology Utilization During the Initial Implementation of Interactive Flat Panel at Happy Kids Early Childhood Education Center

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ABSTRACT

This study aims to analyze teachers' needs in utilizing educational technology at Happy Kids Early Childhood Education (PAUD Happy Kids), where an Interactive Flat Panel (IFV) has recently been introduced into classroom learning. The study contributes by identifying teachers' needs during the early stage of IFV implementation in an early childhood education setting. A qualitative descriptive approach was employed involving two teachers and one principal selected through purposive sampling. Data were collected through observations, semi-structured interviews, and documentation during the second semester of the 2025/2026 academic year. The findings indicate that teachers require technical training, continuous mentoring, and digital pedagogical competencies to optimize IFV integration, highlighting the importance of systematic professional development for sustainable technology-enhanced learning

INTRODUCTION

The rapid development of Information and Communication Technology (ICT) has transformed educational practices at all levels, including Early Childhood Education (ECE). Educational technology is increasingly recognized as a strategic approach to creating interactive, meaningful, and learner-centered learning environments. The integration of digital technology enables teachers to design innovative learning experiences, enhance children's engagement, and facilitate the achievement of learning objectives more effectively. In the context of the Industrial Revolution 4.0 and Society 5.0, teachers are expected not only to master digital tools but also to integrate technology pedagogically to improve learning quality (UNESCO, 2023). From the perspective of Educational Technology, technology is defined as "*the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources*" (Januszewski & Molenda, 2008). This definition emphasizes that technology integration involves not only technological infrastructure but also instructional design, teacher competence, and effective learning strategies.

Early childhood is widely recognized as the *golden age*, a critical period during which children's cognitive, language, social-emotional, physical, and moral development develops rapidly. Therefore, learning experiences should be engaging, interactive, and developmentally appropriate. Teachers play a vital role in selecting instructional strategies and digital learning resources that align with children's developmental characteristics and learning objectives. Previous studies have shown that educational technology can enhance children's engagement, creativity, communication, and problem-solving skills when integrated appropriately into classroom instruction (Prastyaningrum et al., 2023; Priyanti & Haryanto, 2023). Moreover, teachers' digital literacy is essential to ensure that technology is used safely, effectively, and meaningfully to support children's learning and development (Mauluddia & Yulindrasari, 2024).

Despite the increasing availability of digital technologies in schools, integrating educational technology into early childhood education remains challenging. Bintang et al. (2024) reported that although digital technologies have improved learning activities in Indonesian preschools, teachers continue to face barriers related to limited digital competence, inadequate training, and insufficient institutional support. Similarly, Abdiana et al. (2023) emphasized that the successful implementation of educational technology depends not only on the availability of digital infrastructure but also on continuous professional development and mentoring for teachers. These findings indicate that teachers' competencies remain a key factor in achieving effective technology-enhanced learning.

Needs assessment is widely recognized as a systematic process for identifying the gap between existing conditions and desired performance in order to design appropriate interventions (Kaufman & Guerra-López, 2013). Within the field of Educational Technology, needs assessment provides essential information for planning teacher professional development, selecting appropriate instructional technologies, and ensuring that technology integration addresses users' actual needs. Consequently, conducting a needs assessment

before implementing technology-based learning programs is crucial for achieving sustainable educational improvement.

Although previous studies have investigated teachers' digital competence and the integration of educational technology in early childhood education, most have focused on technology utilization, teachers' perceptions, or the effectiveness of digital learning media. Few studies have specifically examined teachers' needs during the initial implementation of Interactive Flat Panel (IFV) technology in early childhood education settings. Furthermore, limited research has explored teachers' professional development needs after schools receive government-supported digital learning facilities.

PAUD Happy Kids provides an appropriate context for addressing this research gap. The school received an Interactive Flat Panel (IFV) from the Indonesian government in December 2025 and has utilized the technology for approximately one semester. Before receiving the IFV, classroom instruction relied primarily on conventional learning media, including printed pictures, flashcards, educational toys, and teacher-developed learning materials. Although the IFV has introduced opportunities for more interactive learning, teachers have not participated in formal training related to its operation or pedagogical integration. As a result, the device is mainly used to display instructional videos, children's songs, interactive images, and simple educational games.

Unlike previous studies that primarily examined technology utilization or teachers' digital competence, this study focuses on identifying teachers' needs during the early implementation of government-provided Interactive Flat Panel technology in an early childhood education institution. The findings are expected to provide empirical evidence for designing effective teacher professional development programs and to contribute to the literature on sustainable educational technology integration in early childhood education.

Therefore, this study aims to analyze teachers' needs in utilizing educational technology at PAUD Happy Kids. The findings are expected to support the development of teacher capacity-building programs and provide practical recommendations for optimizing the integration of Interactive Flat Panel technology in early childhood education.

THEORETICAL REVIEW

Educational Technology

Educational technology is a field of study that focuses on facilitating the learning process through the systematic use of technology, learning resources, instructional strategies, and instructional design. According to Januszewski and Molenda (2008), educational technology is defined as "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources." This definition emphasizes that educational technology is not merely concerned with the use of digital devices but also with the systematic processes involved in designing, developing, implementing, managing, and evaluating learning experiences to improve learning effectiveness and performance.

This perspective suggests that educational technology extends beyond the application of digital tools and encompasses a comprehensive approach to designing and managing learning environments. In line with this view, Branch (2022) argues that educational technology is a systematic approach that integrates learning theories, instructional design, media, and evaluation to enhance the quality of learners' educational experiences. This approach positions teachers as instructional designers who are responsible for selecting, developing, and integrating appropriate technologies based on learners' characteristics, instructional objectives, and learning needs.

The Technological Pedagogical Content Knowledge

The Technological Pedagogical Content Knowledge (TPACK) framework was introduced by Mishra and Koehler (2006) as an extension of Shulman's Pedagogical Content Knowledge (PCK) concept. TPACK explains that effective technology integration in education requires teachers to combine three essential domains of knowledge: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). The interaction among these knowledge domains enables teachers to design and implement meaningful technology-enhanced learning experiences.

According to Mishra and Koehler (2006), technological competence alone is insufficient to improve the quality of teaching and learning. Teachers must be able to select and integrate appropriate technologies based on instructional content, pedagogical strategies, and learners' characteristics so that technology effectively supports the learning process rather than serving merely as a presentation tool. Therefore, TPACK provides a comprehensive framework for understanding the knowledge and skills teachers need to successfully integrate technology into classroom instruction.

Needs Assessment

Needs assessment is a systematic process used to identify the gap between the current condition and the desired condition in order to determine appropriate and effective solutions. According to Kaufman and Guerra-López (2013), needs assessment aims to identify priority needs based on performance gaps, enabling organizations to design interventions that effectively address identified problems and improve performance.

In the field of Educational Technology, needs assessment is considered a crucial initial stage before developing instructional media, designing teacher professional development programs, or implementing educational innovations. This process helps identify users' competencies, implementation barriers, available resources, and the types of support required to ensure successful technology integration. By systematically examining these aspects, needs assessment provides a strong foundation for designing instructional interventions that are relevant, efficient, and responsive to users' actual needs.

METHODOLOGY

This study employed a qualitative approach using a descriptive research design. A qualitative approach was selected because the study aimed to obtain an in-depth understanding of teachers' needs in utilizing educational technology at Happy Kids Early Childhood Education (PAUD Happy Kids). According to

Creswell and Poth (2018), qualitative research seeks to explore and understand the meanings that individuals or groups attribute to social or human problems. This approach enabled the researchers to gain comprehensive insights into teachers' experiences, perceptions, needs, and challenges in utilizing educational technology in the learning process.

The study was conducted at Happy Kids Early Childhood Education (PAUD Happy Kids). The research site was selected purposively because the institution had recently implemented educational technology through the use of an Interactive Flat Panel (IFV) for approximately one semester, making it an appropriate setting for investigating teachers' needs in technology integration.

The participants were selected using purposive sampling, a technique in which informants are chosen based on specific criteria relevant to the research objectives (Sugiyono, 2023). The participants consisted of two teachers as the primary informants and one principal as the supporting informant.

Data were collected through classroom observations, semi-structured interviews, and documentation. Observations were conducted to examine the implementation of technology-enhanced learning, teachers' interactions with the Interactive Flat Panel (IFV), and students' engagement during classroom activities. Semi-structured interviews were carried out with the teachers and the principal to explore their experiences, perceptions, challenges, and professional development needs related to the use of educational technology. Documentation, including lesson plans, photographs of learning activities, and school records, was used to support and validate the findings obtained from observations and interviews.

RESEARCH RESULTS

Condition of Interactive Flat Panel (IFV) Utilization

The observation results indicated that PAUD Happy Kids began utilizing the Interactive Flat Panel (IFV) in December 2025. The device was provided by the Indonesian government as part of its initiative to support the digital transformation of learning in early childhood education institutions. Although the technology has been available, its implementation remains at an early stage, as it has only been used for approximately one semester.

The IFV is primarily utilized to display instructional videos, children's songs, interactive images, digital storybooks, and simple educational games. Teachers also use the device to introduce letters, numbers, colors, shapes, and thematic learning materials through engaging visual presentations. However, classroom observations revealed that many of the IFV's interactive features, including the digital whiteboard, annotation tools, interactive learning applications, and collaborative learning activities, have not yet been fully utilized. This finding suggests that teachers are still in the adaptation phase and have not fully explored the pedagogical potential of the technology to support more interactive and student-centered learning experiences.

Supporting and Inhibiting factors

The findings revealed that the primary supporting factors for implementing educational technology were the availability of the Interactive Flat

Panel (IFV) provided by the government and the support from the school principal. The principal encouraged teachers to integrate the IFV into classroom instruction as part of the school's efforts to improve the quality of educational services at PAUD Happy Kids.

On the other hand, several challenges hindered the effective implementation of educational technology. These included the absence of formal training on IFV operation, teachers' limited experience in developing digital learning media, the lack of instructional guidelines specifically designed for integrating the IFV into early childhood education, and limited time for teachers to explore and maximize the interactive features of the device.

Teachers' Needs in Utilizing Educational Technology

Based on the data analysis, several major needs were identified:

1. Technical training on operating all features of the Interactive Flat Panel (IFV).
2. Professional development on designing digital learning media appropriate for early childhood learners.
3. Continuous mentoring in developing technology-integrated lesson plans aligned with the Daily Lesson Plan (RPPH).
4. Access to digital learning resources that support the Merdeka Curriculum.
5. Sustainable professional development programs to enhance teachers' digital competencies.
6. Institutional support through academic supervision and the sharing of best teaching practices among teachers.

These findings indicate that the availability of technological facilities alone is insufficient to ensure effective technology integration. Continuous professional development and institutional support are essential to enable teachers to utilize educational technology effectively in early childhood classrooms.

DISCUSSION

The findings indicate that the implementation of the Interactive Flat Panel (IFV) at PAUD Happy Kids is still in its initial stage. Although the device has been available since December 2025 through a government assistance program, its utilization remains limited to displaying instructional videos, children's songs, interactive images, and simple educational games. Teachers have not fully explored the interactive features of the IFV because they have not received formal training on its operation and pedagogical integration. These findings suggest that providing technological infrastructure alone does not automatically improve learning quality unless it is accompanied by adequate teacher competency development.

These findings are consistent with the study conducted by Bintang, Pertiwi, and Azainil (2024), which reported that educational technology in early childhood education is commonly implemented through laptops, LCD projectors, smartphones, YouTube, and Canva to support lesson planning, classroom instruction, and assessment. Their study further emphasized that while technology enhances learning effectiveness, its implementation is often constrained by limited infrastructure and insufficient teacher competence in integrating technology into instructional practices.

The present study also found that both teachers demonstrated positive perceptions toward educational technology. They believed that the use of the IFV increased children's attention, enthusiasm, and participation during classroom activities. Nevertheless, teachers experienced difficulties in utilizing all interactive features of the device and designing technology-enhanced learning activities. This finding indicates that teachers' technological competence requires further improvement through systematic and continuous professional development.

These results support the findings of Priyanti and Haryanto (2023), who argued that the limited integration of information and communication technology in early childhood education is primarily caused by inadequate digital competence, insufficient professional development opportunities, and limited institutional support rather than teachers' unwillingness to adopt technology. Their study concluded that strengthening teachers' digital competence is fundamental to optimizing technology-enhanced learning.

In addition to teacher competence, the findings highlight the important role of school leadership in promoting technology integration. The principal encouraged teachers to utilize the IFV during classroom instruction as part of the school's commitment to improving educational quality. However, this support has not yet been complemented by structured training programs, technology-based academic supervision, or continuous mentoring. Consequently, teachers have relied mainly on self-directed learning and independent exploration of the device and online learning resources.

These findings are supported by Abdiana, Suryana, and Mahyuddin (2023), who emphasized that the successful implementation of information and communication technology in early childhood education depends not only on the availability of technological infrastructure but also on continuous teacher professional development. Their study highlighted that teachers require systematic training to integrate technology into instructional strategies rather than merely using it as a presentation tool.

From the perspective of the Technological Pedagogical Content Knowledge (TPACK) framework, the findings suggest that teachers possess adequate pedagogical knowledge for managing early childhood learning but still require improvement in Technological Knowledge (TK) and Technological Pedagogical Knowledge (TPK). This finding is consistent with Budiarti and Shintarahayu (2024), who reported that teachers' readiness for technology-enhanced learning is influenced by the balance among technological, pedagogical, and content knowledge. Teachers who receive continuous training and practical experience demonstrate higher levels of TPACK competence than those without professional support.

Finally, the study identified several priority needs, including technical training on IFV utilization, digital learning media development, mentoring in technology-integrated lesson planning, and sustainable digital competency development. These findings reveal a clear gap between current practice and the expected level of technology integration. Therefore, conducting a systematic needs assessment is essential for designing effective teacher professional

development programs. The findings further imply that successful educational technology integration requires not only adequate technological facilities but also comprehensive institutional policies, continuous professional learning opportunities, and sustained mentoring to maximize the educational benefits of digital technologies in early childhood.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study analyzed teachers' needs in utilizing educational technology at PAUD Happy Kids, where an Interactive Flat Panel (IFV) has recently been introduced into classroom learning. The findings indicate that although the IFV has been implemented for approximately one semester, its utilization remains limited due to the absence of formal training and continuous professional mentoring. Teachers primarily use the device for instructional videos, children's songs, interactive images, and simple educational games, while many interactive features remain underutilized.

The study identified teachers' needs for technical training, digital pedagogical competencies, technology-integrated lesson planning, and continuous professional development to optimize the integration of the IFV into teaching and learning activities. These findings demonstrate that the successful implementation of educational technology depends not only on the availability of technological facilities but also on teachers' competencies and institutional support. Therefore, conducting a systematic needs assessment is essential for designing effective teacher professional development programs and promoting sustainable technology-enhanced learning in early childhood education.

Recommendations

Based on the findings of this study, several recommendations are proposed. First, PAUD Happy Kids is encouraged to develop a structured and continuous professional development program that focuses on technical training in the use of the Interactive Flat Panel (IFV), digital pedagogical competencies, and technology-integrated lesson planning to enhance teachers' ability to implement technology-enhanced learning effectively.

Second, teachers are encouraged to actively improve their digital competencies through professional training, collaborative learning communities, and self-directed learning so that they can optimize the pedagogical use of the IFV in early childhood education.

Third, educational authorities and government agencies should complement the provision of technological facilities with systematic training, continuous mentoring, and regular monitoring and evaluation to ensure the effective and sustainable integration of educational technology in early childhood education institutions.

Finally, future studies are recommended to involve a larger number of early childhood education institutions and participants to obtain broader findings. Further research may also evaluate the effectiveness of professional development programs in improving teachers' digital competencies and the pedagogical integration of Interactive Flat Panel technology in early childhood education settings.

FURTHER STUDY

This study is subject to several limitations. It was conducted in a single early childhood education institution and involved only two teachers and one principal, which may limit the transferability of the findings to other educational settings. Therefore, future research is recommended to include a larger number of early childhood education institutions with diverse characteristics to provide a more comprehensive understanding of teachers' needs in utilizing educational technology.

Future studies may also adopt a mixed-methods approach by integrating qualitative and quantitative data to strengthen the validity and generalizability of the findings. In addition, further research is encouraged to develop and evaluate professional development programs based on the Technological Pedagogical Content Knowledge (TPACK) framework or to examine the effectiveness of Interactive Flat Panel (IFV) integration in improving teachers' digital competencies, instructional practices, and children's learning engagement in early childhood education. Such studies are expected to contribute to the advancement of educational technology integration and evidence-based teacher professional development in early childhood education.

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