

Digital Literacy Training and Learning Innovation in the Digital Era at IGTKI Sub-districts throughout Medan City

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ABSTRACT

This community service activity was carried out to strengthen the capacity and competence of teachers in facing the challenges of education in the digital era. The digitalization of education requires teachers to be able to adapt to developments in information and communication technology (ICT) and integrate it into the learning process creatively and effectively. This activity was carried out with teachers who are members of the Indonesian Kindergarten Teachers Association (IGTKI) in all sub-districts throughout Medan City. The implementation method was carried out through training, workshops, and intensive mentoring on digital literacy, the creation of interactive learning media, and the use of online learning platforms. The results of the activity showed a significant increase in teachers' understanding and skills in designing digital-based learning that is engaging, interactive, and contextual. Through this program, teachers are able to utilize technology as a means of strengthening creativity, collaboration, and communication in early childhood learning. Thus, this community service activity contributes to forming an educational ecosystem that is adaptive, innovative, and ready to face the digital transformation in the future.

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1. INTRODUCTION

The advancement of information and communication technology (ICT) in the 21st century has had a revolutionary impact on various aspects of human life, including the education system. (Muhammad Fu'ad Hadiyastama, Muhammad Nurwahidin, & Dwi Yulianti, 2022) The digital transformation that has developed through advances in software, internet networks, artificial intelligence, and data-driven systems has transformed the way humans acquire and manage information. Education is no longer bound by the constraints of time and space, as technology has become a vital part of every learning process. Technology's role is not only as a source of knowledge but also as a means of interaction, collaboration, and innovation between educators and students. (Fuadah, Mudjenan, & Hasan, 2023) Therefore, the education system in the digital era is required to constantly adapt to technological developments in order to remain relevant to the needs of a dynamic and competitive era.

This major change necessitates a paradigm shift in learning practices. The learning process, previously dominated by teacher-centered learning methods, is now shifting to a student-centered learning model, where students are no longer passive recipients of information but rather active participants in the learning process. In this context, the role of the teacher is also being redefined: not merely as a transmitter of knowledge, but also as a facilitator who guides, a motivator who inspires, and a mentor who inspires.(Harahap, Lubis, Lubis, & Rizky, 2023)and innovators who create engaging and meaningful learning experiences. Teachers in the digital age are required to design technology-based learning that encourages independent learning, collaboration, and active student engagement, in keeping with the fast-paced and visual nature of the digital generation.

In the realm of early childhood education (PAUD), the challenges of the digital era are becoming increasingly complex. Today's children are considered digital natives, a generation accustomed to interacting with technology such as smartphones, computers, and the internet from birth. They have a different learning style than previous generations: they are more drawn to visual displays, quickly absorb information, and enjoy dynamic and engaging interactions.(Asdianur Hadi, Leni Pitriani, 2025)This situation requires early childhood education teachers to possess strong digital literacy skills to guide the use of technology in a positive, educational, and developmentally appropriate manner. Through mastery of ICT, teachers can design digital teaching media that are not only enjoyable but also stimulate the imagination, creativity, and cognitive abilities of young children.

However, in reality, not all early childhood education (PAUD) teachers possess adequate skills in utilizing digital technology. Most still face limitations in operating learning devices and applications, and are unfamiliar with interactive media and digital platforms such as Learning Management Systems (LMS), which can support teaching and learning activities. Furthermore, the lack of digital infrastructure in some PAUD institutions, limited training opportunities, and a lack of technical support are factors that hinder the implementation of ICT-based learning. As a result, the learning process often remains conventional, creating a digital divide between institutions that have adapted to technology and those that have not.(Anani & Gorontalo, 2025)

In fact, teachers' ability to master digital technology is a crucial indicator of the quality of national education. Teachers who are responsive to technological developments will be able to create a dynamic, creative, and relevant learning environment that meets the needs of today's students. Conversely, teachers who are unable to adapt will struggle to innovate and potentially lose effectiveness in carrying out their professional roles.(MA Lubis, Lubis, & Zulyadi, 2024)Therefore, improving teacher competency, particularly in digital literacy and developing technology-based learning, is an urgent need that must be met immediately through synergy between the government, educational institutions, and universities.

As a form of implementation of the Tri Dharma of Higher Education, community service activities are an important means for higher education institutions to make a real contribution to improving the quality of human resources.(M. Yusrizal Adi & MA Lubis, 2024)Universities play a role not only as centers of knowledge and research, but also as agents of change that help society face global challenges and technological transformation.(Zilvi Syalsabillah, 2021)In this case, lecturers and students have a strategic role to bridge the gap between academic theory and practice in the field, especially in helping teachers adapt to the changing paradigm of digital learning.

The community service program, conducted in collaboration with the Indonesian Kindergarten Teachers Association (IGTKI) across all districts in Medan, represents a concrete step in supporting the professionalism and competence of early childhood education teachers amidst the digitalization of education. Through digital literacy training and technology-based learning innovations, this program seeks to introduce a variety of accessible learning tools and applications that are relevant to the needs of early childhood.(MA Lubis, 2023)In addition, this activity also emphasizes the importance of instilling digital ethical values, cybersecurity awareness, and the wise use of technology so that technology truly becomes a supporting tool for humanistic and educational education.

The training conducted in this activity focused on three main components that form the basis for strengthening the capacity of early childhood education (PAUD) teachers in the digital era. First,

improving basic digital literacy skills, namely the ability to access, understand, evaluate, and utilize digital-based information effectively, creatively, and ethically. Digital literacy is a fundamental skill for teachers to navigate the rapid and diverse flow of information in the modern era.(Helda Pratiwi; Mika Elisa; Mulyaningsih Ariyani; Musaddad Harahap, 2024)

Second,Developing innovative skills in creating digital learning media. Teachers are trained to design and produce various forms of interactive media, such as learning videos, educational presentations, and simple applications that engage children. Through these skills, teachers are expected to enrich their teaching strategies and create more enjoyable and contextual learning experiences for students.

Third,The training also emphasized the importance of integrating character and moral values into the use of technology. This aspect aims to ensure teachers maintain a balance between technological advancements and the humanitarian values that are at the heart of education. Thus, technology serves not only as a learning tool but also as a means of character formation and strengthening positive values in children from an early age.

Through this training, it is hoped that early childhood education teachers in Medan will develop into educators who possess not only strong pedagogical competencies but also vision, creativity, and the ability to adapt to technological developments. Teachers are expected to be able to utilize digital technology productively, not merely as a teaching tool, but also as a medium to foster creativity, expand learning communication, and strengthen students' character development in a fun learning environment.

Furthermore, this activity is expected to have a long-term impact on the development of a technology-based education ecosystem in Medan. Collaboration between universities, educational institutions, and professional organizations such as the Indonesian Kindergarten Teachers Association (IGTKI) exemplifies strategic synergy in developing the quality of human resources in education. Through this synergy, improving teacher competency will be a crucial foundation for realizing a more advanced, modern, and responsive early childhood education system to digital challenges.

Ultimately, this community service activity represents a concrete form of higher education's contribution to supporting national education development. Efforts to strengthen digital literacy for early childhood education teachers aim not only to improve technological skills but also to foster a community of empowered, creative, and visionary educators. Thus, teachers are expected to be pioneers in the transformation of education toward a more inclusive, humanistic, and equitable learning system amidst the Industrial Revolution 4.0 era and towards Society 5.0, which places humanity and technological progress in harmonious balance.

2. METHODS

The method of implementing Community Service (PkM) activities uses the Andragogy (Adult Learning) approach, namely that the participants are teachers with different teaching backgrounds and experiences, the andragogy method is applied so that the training process is more relevant to their practical needs.(Kurniati, Saepul Malik, Maslachah, Suhendraya Muchtar, & Sulastini, 2022)Participants are encouraged to learn based on experiences, case studies, and hands-on practice. The collaborative, participatory and educational approach places early childhood education teachers at the center of the digital skills development process. Participants are actively involved in all stages of the activity, from planning and implementation to evaluation. This approach aims to foster a sense of ownership of the results and ensure the program's sustainability after the training.

These two methods were chosen so that participants not only receive theoretical knowledge but also acquire practical skills through hands-on experience and collaborative interactions. This training activity focuses not only on delivering material but also emphasizes active participant involvement.(Yahya, Purnama, & Supeno, 2023)Therefore, each stage of the training was designed to encourage participation, interaction, and critical reflection. During the preparation phase, participants were divided into small groups to ensure the activities were effective and aligned with field needs. They also designed character-based evaluation instruments tailored to the challenges faced in their respective schools. The resulting

designs were then presented and received input from resource persons and other participants. This process encouraged collaboration and an exchange of ideas, enriching participants' understanding of character evaluation. Furthermore, to reinforce the training outcomes, learning simulations were conducted using classroom scenarios designed to reflect various issues.

1. Preparation Stages

The preparation phase is the initial step to ensure activities are effective and meet field needs. Activities include:

a. Needs Assessment

A survey and brief interviews were conducted with several PAUD teachers in Medan City to identify the level of digital literacy, ability in using ICT-based media, and challenges faced in the learning process.

b. Technical Coordination and Planning

The community service team coordinated with the Indonesian Kindergarten Teachers Association (IGTKI) and the Medan City Education Office to determine the schedule, activity location, number of participants, and required facilities.

c. Preparation of Training Materials and Modules

The material is tailored to the participants' abilities and focuses on basic digital literacy, an introduction to digital learning media, and simple technology-based learning innovations. The training modules are available in both printed and digital formats for easy access.

2. Activity Implementation Stage

The implementation stage of activities is carried out through several main forms of activities that complement each other, namely:

a. Socialization Activities

In this stage, participants are given a conceptual understanding of the urgency of digital transformation in education. The material covers technological developments in learning, shifting educational paradigms in the digital era, and the strategic role of teachers as learning innovators.

b. Basic Digital Literacy Training

Participants were introduced to the concept of digital literacy, which encompasses the ability to access, understand, and manage digital information effectively and ethically. In this session, they also learned about various online learning platforms that can be used in early childhood education settings, such as Google Classroom, Canva for Education, and Android-based educational apps for children.

c. Digital Learning Media Creation Workshop

This session is the core of the activity, where participants are directly trained to create technology-based learning media. The training focuses on:

1. Creating interactive presentations using Microsoft PowerPoint and Canva.
2. Introduction to a simple application for creating educational videos and animations for children.
3. The use of interactive quizzes based on Kahoot and Wordwall for children's learning evaluation activities.

During the workshop, participants were guided by a team of lecturers and students who acted as facilitators.

d. Group Discussion and Reflection

Following the training session, participants were divided into small groups to discuss challenges they faced and innovative ideas for implementing technology in the classroom. The results of the discussions were then presented to allow participants to share experiences and best practices.

e. Mentoring and Monitoring

The community service team provided two weeks of post-training mentoring to ensure the implementation of the training findings in their respective schools. Teachers were given the opportunity to consult and receive feedback on the learning media they had created.

3. Evaluation Stage

Evaluation is conducted to measure the success of an activity, both in terms of process and results.

Evaluation is conducted in several ways:

a. Pre-test and Post-test

Used to determine participants' knowledge and skills before and after training. The results showed significant improvements in participants' understanding of digital literacy concepts and the creation of technology-based teaching media.

b. Observation and Interview

The team conducted direct observations during the training and conducted interviews with participants regarding their experiences during the activity.

c. Learning Product Assessment

Each participant was asked to produce one digital learning media product as the final outcome of the training. These products were assessed based on creativity, relevance to the characteristics of early childhood, and suitability for classroom use.

d. Participant Feedback

Participants provided feedback on the implementation of the activity through an evaluation questionnaire. Most participants stated that the activity was very beneficial and encouraged them to be more confident in using technology in teaching and learning.

3. FINDINGS AND DISCUSSION

Implementation of Activities

This community service activity was held in collaboration with the Indonesian Kindergarten Teachers Association (IGTKI) of Medan City, which acts as a strategic partner for higher education institutions in strengthening the capacity and professionalism of Early Childhood Education (PAUD) teachers in the era of digital transformation. This activity involved 30 PAUD teachers from various districts in Medan City. The participants came from diverse educational backgrounds, levels of technology proficiency, and teaching experience. This diversity is a positive potential that enriches the training process, as it allows for the exchange of ideas, experiences, and best practices in the application of technology to early childhood learning.

The training is conducted face-to-face, emphasizing active interaction and hands-on, hands-on learning experiences. The activity design combines three main approaches: workshops, coaching clinics, and peer learning, designed to provide a comprehensive learning experience. Through the workshop approach, participants are introduced to the concept of digital literacy and the principles of technology-based learning innovation.(Ali & Bako, 2024)Meanwhile, the coaching clinic focuses on direct technical assistance in creating digital learning media. The peer-to-peer learning approach is used to foster a spirit of collaboration and a culture of sharing, where teachers can exchange knowledge, provide input, and improve skills collectively.(Hertiavi & Kesaulya, 2020)Substantially, the training material is focused on three main areas, namely:

1. Basic digital literacy, which includes an understanding of information and communication technology concepts, the ability to search for, assess, and utilize digital information appropriately, and an awareness of the importance of critical thinking in filtering online content.
2. Interactive digital learning media innovations, emphasizing teacher skills in designing and producing simple app-based learning media such as Canva for Education, Powtoon, Kahoot!, and Wordwall. These media help make the learning process more engaging, contextual, and tailored to the visual and interactive characteristics of early childhood.

3. Digital ethics and cybersecurity, which emphasize responsible behavior in cyberspace, the importance of maintaining student data privacy, and the safe use of technology in line with children's educational values.

In its implementation, this activity adopts a participatory and contextual approach, positioning teachers as active participants throughout the training process. Teachers not only listen to presentations but also act as practitioners and contributors to learning through discussions, hands-on practice, and group work. Participants are given the opportunity to independently produce digital learning products, such as educational videos, animations, interactive games, and thematic presentations that can be applied to teaching and learning activities in early childhood education (PAUD) classrooms.

In addition to practical activities, reflection sessions and group discussions are an essential part of this training. Through these activities, participants are encouraged to review their learning experiences, identify obstacles, and find the best strategies for integrating technology into early childhood education. This reflective process helps teachers develop critical awareness and ethical understanding, particularly in balancing technological advancements with the development of children's character values.

Overall, this activity represents a collaborative yet transformative training model. The learning process is not only oriented toward improving technical skills but also fosters a paradigm shift in the professionalism of early childhood teachers. Through this activity, teachers are expected to act as creative, innovative, and adaptive facilitators to technological advancements, while maintaining the humanistic values that are at the heart of early childhood education, namely, developing a child's character, morals, and personality holistically.

Improving the Competence of Early Childhood Education Teachers

The training evaluation results showed a significant increase in the competency of early childhood education (PAUD) teachers, both in technical aspects and in understanding digital literacy. Based on pre- and post-training questionnaires, 85% of participants experienced improved abilities in designing and producing interactive digital learning media. This confirms that the training effectively equipped teachers with practical skills in utilizing technology to create creative and enjoyable learning for early childhood. Teachers who were previously unfamiliar with technology now demonstrated high adaptability to various digital applications such as Canva, Powtoon, Wordwall, Kahoot, and Google Forms. They were able to integrate these digital media into thematic learning activities that support children's cognitive, motor, and character development.

In addition to improving technical skills, the training also strengthens teachers' conceptual digital literacy, including the ability to critically evaluate information, understand the ethics of technology use, and maintain the security of students' personal data. This improvement aligns with UNESCO's Digital Literacy Framework (2018), which emphasizes four pillars: information, communication, content creation, and safety.(Muhajirin & Pratama Yusuf, 2023)

Overall, this training not only improves technological mastery, but also forms critical awareness and digital responsibility as part of teacher professionalism in the era of educational transformation.(Jamil, 2025)Teachers become more confident, innovative, and collaborative in implementing learning technology, which ultimately strengthens the digital culture in the PAUD environment.

Changes in Mindset and Professional Attitude

One of the most prominent achievements of this community service activity was a paradigm shift in teachers' understanding and utilization of digital technology in early childhood learning. Prior to the training, most teachers still viewed technology as complicated, difficult to implement, and inconsistent with the characteristics of early childhood education, which emphasizes play and direct interaction. This perception led to limited use of technology in the classroom and its lack of recognition as a vital part of the learning process.(Hertiavi & Kesaulya, 2020)

After participating in digital literacy training, a significant shift in perspective occurred. Teachers began to realize that technology can serve as an effective pedagogical tool to foster creativity, strengthen interactions, and enrich children's learning experiences. Through hands-on activities and intensive mentoring, participants learned that the use of simple technologies, such as animated videos or interactive digital games, can increase children's motivation and engagement during learning activities. Thus, technology is now understood as an integral component of modern, adaptive, child-centered learning strategies.

This change was also evident in the emergence of an innovative and collaborative spirit among the participants. Following the training, the teachers took the initiative to form the Medan Early Childhood Education Teacher Digital Learning Community as a forum for sharing experiences, discussing technical challenges, and developing digital learning projects together. The existence of this community demonstrates that the training not only improves individual competencies but also builds a collaborative and sustainable digital learning ecosystem.

This initiative demonstrates a transformation in the professional culture of early childhood education teachers, from one focused on passive learning to one focused on active and reflective learning. Teachers are beginning to demonstrate independence in seeking out learning resources, exploring new technologies, and disseminating their innovations to colleagues. This shift marks the growth of a participatory digital culture and an awareness of the importance of lifelong learning, where teachers act as agents of change in the primary education environment.

Overall, the results of this training confirm that mastering digital literacy not only improves technical skills but also transforms teachers' mindsets and professionalism. Technology is now seen as an opportunity to innovate, collaborate, and create more creative, contextual, and meaningful learning processes for early childhood in the digital age.

Impact on Learning Practices

One of the most striking outcomes of this community service activity is a profound shift in teachers' mindsets regarding the role and use of digital technology in early childhood learning. This shift extends beyond the technical aspects of using digital devices, but also represents a comprehensive transformation in how teachers think, behave, and practice professionally amidst today's digitalization of education.(Nurma, 2021)

Prior to the training, most teachers expressed doubt and resistance to the implementation of technology in the classroom. They tended to view technology as complicated, difficult to operate, and inappropriate for the characteristics of early childhood education, which emphasizes play, direct interaction, and real-life experiences. This view stems from a conventional paradigm that positions the digital world as separate from children's worlds and is even considered to have the potential to hinder their social and emotional development. As a result, the use of technology in teaching and learning activities is limited to administrative functions, while in the main learning process, teachers still rely on traditional methods such as storytelling, singing, and playing with concrete tools.

However, after receiving training on digital literacy and technology-based learning innovation, there was a significant shift in how teachers interpreted the role of technology. They began to understand that using technology appropriately and tailored to the child's age context can enrich the learning process and increase student engagement. Through hands-on practice, intensive guidance, and collaborative reflection sessions, teachers realized that technology can be a pedagogical tool that can foster creativity, strengthen learning focus, and strengthen interactions between teachers and students. For example, using Canva for Education to design visual media, Powtoon to create learning animations, or applications like Kahoot and Wordwall for interactive games have proven effective in increasing children's enthusiasm and motivation to learn.

Furthermore, teachers are also starting to understand that technology is not a substitute for natural social interaction, but rather a complement that expands children's space for exploration and expression. In the PAUD context, interactive digital media can be used as a means of introducing basic

concepts such as colors, shapes, letters and numbers through interesting, dynamic and multisensory learning experiences. In addition, teachers learn to integrate character values, such as cooperation, responsibility and empathy into the use of technology, so that its application remains in line with the principles of holistic, child-centered education.

This paradigm shift also fostered an innovative and collaborative spirit among the training participants. As a follow-up, the teachers formed the Medan Early Childhood Education Teacher Digital Learning Community as a forum to share best practices, discuss technical challenges, and develop joint digital learning projects. This community serves as a peer-to-peer learning platform, enabling teachers to exchange experiences, provide constructive feedback, and motivate each other in implementing technology-based learning. The community's existence demonstrates that the training not only improves individual competencies but also fosters a collaborative and sustainable digital learning ecosystem.

Furthermore, the formation of this community also marks a transformation in the culture of professionalism among early childhood education (PAUD) teachers. Teachers who previously tended to be passive and await direction are now demonstrating attitudes as active learners, recognizing the importance of continuous self-development (lifelong learning). They are becoming increasingly independent in seeking out learning resources, exploring digital learning innovations, and sharing good practices with colleagues in their communities. This phenomenon indicates a shift in the role of teachers from mere users of technology to agents of change, playing a role in accelerating digital transformation at the elementary education level.

Thus, this training activity not only serves to improve teachers' technical skills in digital literacy but also fosters a professional culture that is reflective, collaborative, and adaptive to technological advancements. Early childhood education teachers now have greater confidence in integrating digital tools into the learning process, viewing them as opportunities to innovate and enrich their pedagogical practices.

Overall, the results of this activity demonstrate that mastering digital literacy has a dual impact: first, it improves teachers' skills in operating technology; second, it shapes professional mindsets and behaviors that are more open to innovation. Technology is no longer considered merely a tool, but rather a learning medium capable of delivering creative, contextual, and meaningful learning processes for early childhood. This paradigm shift is an important foundation for developing competent, progressive PAUD teachers who are ready to face the challenges of education in the era of the 4.0 industrial revolution towards a 5.0 society.

4. CONCLUSION

This community service activity has successfully improved the digital competence and professionalism of early childhood education (PAUD) teachers in the digital era. Through comprehensive training and mentoring, teachers are able to adapt to technological changes and develop creative, enjoyable, and student-centered learning. The success of this activity demonstrates the need for continuous improvement in teachers' digital literacy, supported by universities, local governments, and professional teacher institutions. This collaboration is expected to create an educational ecosystem that is responsive to technological developments and capable of producing a young generation that is intelligent, character-driven, and digitally literate.

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