

# Professional Development on Digital Literacy for Teachers in Early Childhood Education in the Digital Era

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## Abstract

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**Keywords:**  
Digital literacy;  
Teachers' professional development;  
Learning Community.

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The demand for teachers' digital literacy competencies has become a worldwide concern in transforming education in the digital era, as technology has become an important part of the teaching and learning process. Therefore, this study aimed to identify how sustainable teacher development impacts teachers' digital literacy competencies. This study used a qualitative approach with interviews, questionnaires, documentation, and Focus Group Discussions (FGD) as instruments to gather data. The findings showed that preschool teachers' digital literacy improved, particularly in their ability to create digital content for learning. The strategy to enhance preschool teachers' digital literacy was conducted through a sustainable professional development scheme that placed the teacher community at its center, serving as a medium for teachers to develop their professional abilities. The program focused on three main schemes to improve teachers' digital literacy skills: (1) self-development through Wakelet training to assist teachers in managing digital content in collaboration with other teachers, (2) conducting research-based learning to improve the quality of learning, and (3) fostering teacher innovation in developing teaching media that integrates technology into learning practices. The results of this study provide a significant contribution to exploring the schemes for preschool teachers' professional development in improving digital literacy skills. Future research could capture more creative solutions to technical challenges in sustaining teachers' professional development programs.

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## Abstrak

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**Kata kunci:**  
Literasi digital;  
Pengembangan keprofesian berkelanjutan;  
Komunitas Belajar

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Kompetensi literasi digital menjadi sebuah kebutuhan dalam transformasi pendidikan di era digital karena teknologi menjadi bagian yang tidak dapat dipisahkan dari proses pembelajaran. Oleh karena itu, penelitian ini dimaksudkan untuk mengidentifikasi dampak pengembangan keprofesian guru secara berkelanjutan terhadap penguasaan literasi digital guru. Penelitian ini menggunakan desain penelitian kualitatif dengan instrumen penelitian interview, kuesioner, dokumentasi, dan FGD. Temuan hasil penelitian menunjukkan bahwa kemampuan literasi digital guru meningkat terutama dalam membuat media digital untuk pembelajaran. Adapun strategi penguatan literasi digital guru melalui skema pengembangan keprofesian berkelanjutan telah menempatkan komunitas belajar sebagai wadah peningkatan kapasitas guru melalui skema: (1) pengembangan diri melalui pelatihan wakelet untuk membantu guru mengelola konten digital secara kolaboratif dengan guru lain, (2) implementasi pembelajaran berbasis riset untuk meningkatkan kualitas pembelajaran, dan (3) strategi karya inovatif berupa pembuatan alat peraga dan pembuatan video praktik pembelajaran yang mengintegrasikan teknologi dalam pembelajaran. Hasil penelitian ini memiliki peran strategis dalam memberikan gambaran pola pengembangan peningkatan profesionalitas guru dalam meningkatkan kemampuan literasi digital. Penelitian selanjutnya diharapkan dapat mengkaji program lanjutan yang lebih kreatif untuk mendorong keberlanjutan program pengembangan profesionalitas guru.

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## INTRODUCTION

Globalization and digitalization are characterized by a rapidly changing world, especially in the transformation of technology used in education. In the digital era, technology is used to achieve learning goals effectively (Adela & Ritonga, 2023; Fauzi & Kartiko, 2023). Therefore, teachers' readiness to integrate technology into the teaching and learning process is necessary. Unfortunately, research related to teachers' professional development, particularly in improving teachers' digital literacy in early childhood education, is insufficient. A study by Wibawa on teachers' challenges in the globalization era found that teachers' readiness in accessing and mastering information technology is still very low (Annisa, Akrim, & Manurung, 2020; Wibawa, 2018). While access to varied technology is easier today, most teachers and parents still struggle to find and decide on the most appropriate technology to support preschool students (Papadakis & Kalogiannakis, 2017). The presence of technology to support effective and innovative learning has not yet become a priority for teachers.

Other researches show that the use of digital-based learning media for students is still very low that is 30% of students are not able to use and utilize digital information without guidance (Scheuer et al., 2014, p. 6; Siero, 2017). One of the factors that cause this condition is the teachers' ability to use technology for learning is very low (Ghavifekr & Rosdy, 2015). Therefore, teachers' professionalism development was very necessary as it relates to teachers' qualities that influence learning success. Another research shows that teachers are one of the factors that define the quality of education (Tanjung, Arifudin, & Mulyadi, 2021, bk. 291). Hence, teachers' professionalism should be developed to support the teaching and learning process. Technology will help both teachers and students to learn their subject material. It helps students to expose concepts like science, technology, arts, and mathematics (STEAM) more easily. Based on the preliminary study conducted at three early childhood education institutions in East Java in the areas of Surabaya, Sidoarjo, and Gresik, it was found that some obstacles in using digital learning were the ability to search, find, and use as well as integrate technology in learning (Aalto, Tarnanen, & Heikkinen, 2019; Afi & Dewi, 2021).

Research by Putman shows that teachers' capability to implement technology affected students' literacy skills (Putman, 2017). Therefore, teachers' competency in integrating technology into learning is a necessity (Chai, Koh, & Tsai, 2013; Syarah & Mayuni, 2020). If teachers have better digital literacy skills, they can select and define relevant information from many sources to support learning (Gabidullina, Korganbekov, Makarova, Zakirov, & Kayumova, 2019).

Previous research and the aforementioned conditions have led to a paradigm shift that emphasizes the need for teachers to integrate technology into learning to achieve success. Some studies show that teachers play a significant role in achieving better educational quality (Acedo & Hughes, 2014; Wiliam, 2011). Teachers need to possess technological pedagogical skills that are adequately adapted for the current

implementation of education in the Industry 4.0 era, especially for teachers in early childhood education (Adimsyah, Fauzi, & Rofiq, 2023; Ayyubi, Hayati, Muhaemin, Noerzanah, & Nurfajriyah, 2024; Evan & Rahmat, 2023). To achieve this, it is necessary to map out collaborative efforts to enhance educational quality involving teachers, future teachers, principals, society, universities, and all relevant stakeholders. Overall, teachers' professional development is a crucial part of promoting effective and successful preschool teachers who meet the characteristics of students in the digital era (Fathullah, Ulfiah, Mulyanto, Gaffar, & Khori, 2023; Hafid & Barnoto, 2022; Kardi, Basri, Suhartini, & Meliani, 2023).

Therefore, this study aims to analyze the professional development strategies implemented to improve teachers' digital literacy. The focus of this research is on the strategies used by preschool teachers in three regions of East Java to enhance their digital literacy. The novelty of this research lies in its potential to reveal typical patterns of professional development strategies in early childhood education that have not yet been elaborated in previous studies.

## RESEARCH METHODS

This research applied a qualitative research design that focuses on providing a detailed description of teachers' professional development strategies in early childhood education to enhance their digital literacy competencies. The study was conducted over one academic semester in the 2022-2023 school year, from July to December 2022, at three schools in East Java located in Sidoarjo, Surabaya, and Gresik. The participants of this study were all teachers at these three schools who met the following criteria: (1) teachers who have earned a bachelor's degree, (2) teachers with more than three years of teaching experience, and (3) teachers with extensive experience in teaching using e-learning.

The data collection techniques used were interviews, questionnaires, documentation, and Focus Group Discussions (FGD). In-depth interviews were conducted to gain further data related to the strategies teachers use to improve digital literacy based on models of professional development. Participatory observation was conducted to observe all programs implemented to improve teachers' digital literacy skills. Additionally, the questionnaire used for this research was developed based on the following indicators:

**Table 1. Indicators of Teachers' Digital Literacy Skills**

No.	Aspects	Indicators/ skills
1.	Data and Information literacy	1.1 Find and select data, information, and digital content
		1.2 Evaluate data, information, and digital content
		1.3 Manage data, information, and digital content
2.	Communication and Collaboration	2.1 Interact in using digital technology
		2.2 Share data, information, and content through digital technology
		2.3 <i>Involve as a society through digital technology use</i>

		2.4 Collaborate through digital technology
		2.5 <i>Be aware</i> of cyber etiquette
		2.6 Be able to manage identity data in digital technology
3.	Creation of digital content	1.1 Make digital content
		1.2 Integrate and elaborate digital content
		1.3 Understand <i>copyright and</i> license
		1.4 Make <i>instructional design through a</i> program
4.	Security	1.1 Protect tools and digital content
		1.2 Protect self-identity
		1.3 Protect health and wealth
		1.4 Protect environment
5.	Problem-Solving	5.1 solve technical problems
		5.2 identify needs and respond to technology
		5.3 use digital technology creatively
		5.4 Identify Digital Competence Gap
		5.5 Computational thinking.
6.	Other relevant competence	6.1 operate digital technology for a specific purpose
		6.2 interpret data, information, and digital content for a specific purpose

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Adapted from A Global Framework of Reference on Digital Literacy Skill

Those six aspects are described more as the indicators to dig digital literacy skills possessed by teachers that integrate technology in learning. Meanwhile, FGD is simply defined as a systematic and directed discussion on certain issues. This technique is applied to avoid misperception among participants in determining the most effective strategy in improving teachers' digital literacy competences. FGD is done to draw a conclusion on inter-subjective meaning related to the research topic.

Data analyses in qualitative design conducted through multiple steps of analyses. The data were obtained inductively and organized into units of information (Creswell & J. David, 2018). The analysis of the data from the questionnaire was done by statistic calculation and described qualitatively. The use of descriptive statistic was done to show the level of teachers' digital literacy skills in three partner schools before and after teachers' professionalism development program. Meanwhile, the data taken from in-depth interview was analysed qualitative. All the data in this study was analyzed used the Miles and Huberman model that were (1) data reduction, 2) presenting the data, and (3) conclusion drawing (Miles, Huberman, & Saldaña, 2014). The data was already checked, reduced into theme, coded, compared and categorized, related between categories, and conclusion (Creswell & J. David, 2018). In order to make sure the validity and credibility of the data, member check and triangulation data by collecting data from various sources and different method were completed (Archibald, 2016).

## RESULT AND DISCUSSION

### Result

#### Teachers' Digital Literacy Development at Early Childhood Education

The findings of this study show that digital literacy become a fundamental skill needed by teachers. According to interview, teachers said that digital literacy is an emerging component to succeed teaching and learning process. As it was stated by preschool teacher from Muslimat NU 200 Kureksari “digital learning is a need in today’s education system because our students are digital native. Therefore, teachers should improve the ability in integrating technology in learning”. This statement was proved by such member of FGD forum. Based on the results of focus group discussion involved principals, teachers, lecturers, students of PIAUD, IGRA - Committee of Roudhotul Athfal Teachers, IGTKI - Committee for Indonesian Kindergarten Teachers, and IGTKM - Committee of Islamic Kindergartens, it was showed that teachers recognized the importance of using technology in learning. Teachers need sufficient digital literacy skills to implement technology in learning and improve pedagogical role in using technology for meaningful learning. Nevertheless, the teachers were difficult to develop their self-capacity as there was no system or even a medium to support their capacity reinforcement. Moreover, they also found difficulty in performing learning especially in pandemic era of Covid-19 and New Normal condition that drive teachers to be able to adapt new curriculum. Teachers also found obstacles in preparing digital based learning media such as editing and producing video for learning.

The findings of FGD are summarized on the following chart:

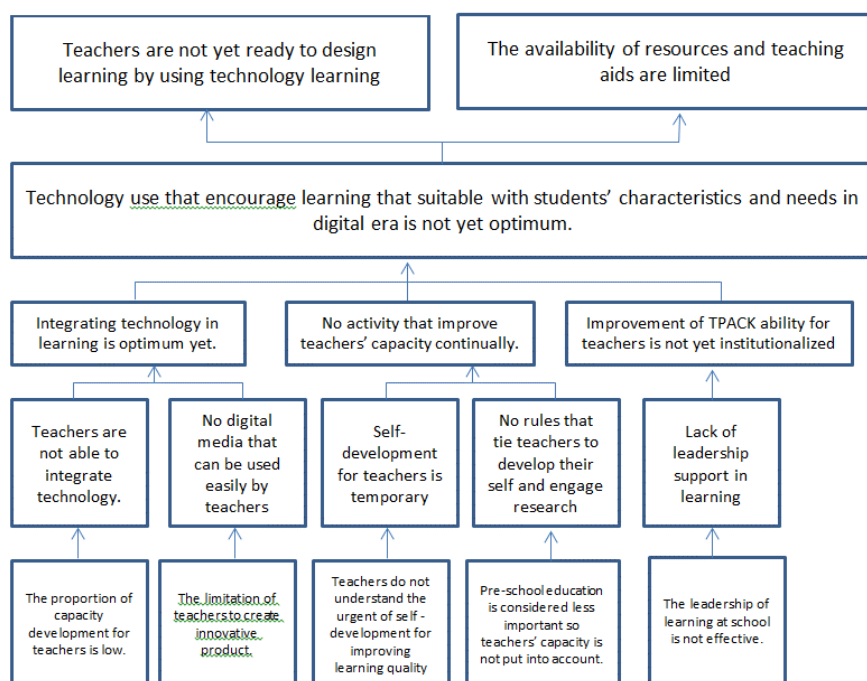
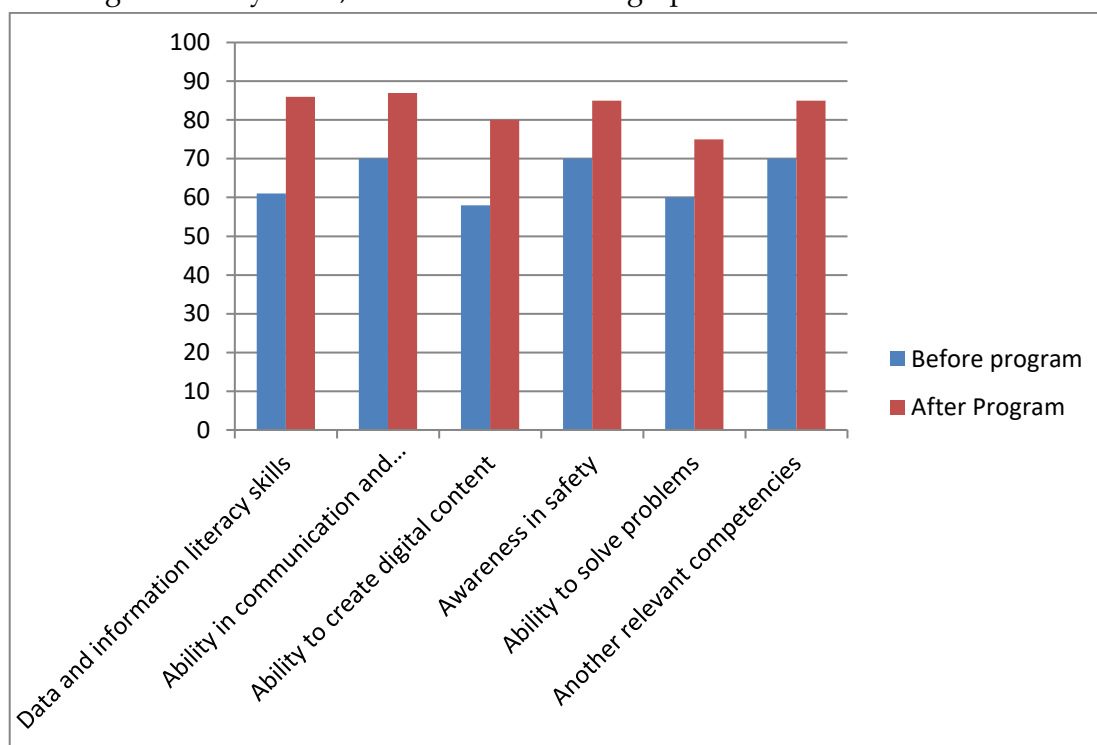


Figure 1: the results of FGD related teachers' need for improving digital literacy

The above chart describes the source problem and its causes as well as the impact of preschool teachers' digital literacy skills on students' success in learning. The development of digital literacy skills to preschool teachers requires the role and support of all stakeholders in conducting training and scientific forum that empower teachers' capability, especially digital literacy skills. Based on the interview results, the support of schools were in case of motivation, opportunity, or financial to drive their teachers in joining training and or scientific event. In detail, schools' strategy in improving preschool teachers' digital literacy was described in detail in the next sub topic.

After joining such improvement program through sustainable professional development, preschool teachers' digital literacy competencies according to the indicator of digital literacy skills, could be seen on the graphic below:



Graphic 1. Teachers' Digital literacy competences after implementing program

Based on the chart, it could be seen that the skills that almost improve (22%) was teachers' ability to create digital content. Meanwhile, the highest score of those six indicators was the ability in communication and collaboration (87%) and 75% as the lowest competencies mastered by teachers in solving the problems.

Teachers' ability in creating digital content was improved indicated by their ability in creating learning media, such as developing interactive learning media based on android assisted by Google Sites. Teachers then save, organize, and share their media by using wakelet. The benefit of using wakelet was encourage teachers

improve their communication skills and build collaborative work among teachers. From the activity, it shows that there is mutual correlation between the improvement of teacher ability in creating digital media and their ability in developing collaboration.

Besides, preschool teachers' capability in accessing, using, and evaluating data and information literacy was also improved. After training, teachers implemented their knowledge and skills in teaching and learning process, then review and evaluate what they have practiced in the class. Teacher then used the results of review as a reference for improving the quality of learning. In this case, teachers were able to interpret data, information and digital content for specific purposes.

### **Teachers' Digital Literacy Development Strategy through Sustainable Professional Development**

Developing teachers' professionalism is considered as important attempt to support qualified learning. One of the teachers' professional competences that should be supported to achieve is their understanding on ICT material and its use. By considering any condition, the asset and potency possessed by schools, teachers' professional development should be institutionalized to ensure the program sustain.

The dynamics that occur at Roudhotul Athfal Muslimat (RAM) NU Banin Banat Gresik, can be explained that RA Muslimat NU 10 Banin Banat Gresik is a school under the Maarif Foundation which was founded in 1971 with the vision of "Realizing an Islamic Generation that is Pious, Akhlaqul Karimah, Healthy, Creative and Independent Characteristics of Ahlusunnah Wal Jamaa'ah." This school is located on Jl. Kyai Sahlan XI/ 15 Sidomukti, Manyar, Gresik. From time to time, this school continues to improve and develop the quality of its human resources through various self-development activities organized by foundations, the public, and independent learning. This can be seen, for example, in increasing teachers' abilities in managing classes and developing various learning models such as model BCCT (Beyond Center and Circle Time).

This school has many human resources, a total of 16 people and have educational qualifications at Bachelor's Degree. There are many school facilities and infrastructure which is available, such as story books, lego, pop up cards, bombs, touch boxes and so on. However, teachers still experience obstacles in implementing learning, especially during the Covid-19 pandemic and the new normal period which uses an emergency curriculum. The obstacles experienced by teachers include difficulties in preparing digital-based learning media such as editing and/or making learning videos.

Various efforts have been made by schools to overcome this problem by being a part in various scientific forums such as webinars and studying independently via YouTube. However, this method has not been optimally able to improve teachers' professional competence regarding the use of ICT (Instruction and Communication Technology). Obstacles that teachers still experience in better understanding the use of

ICT through independent learning include unidirectional learning patterns so that when teachers experience problems in trying certain learning designs or media, they do not have the resources to ask questions and discuss. Therefore, they hope that there is a sustainable teacher competency development scheme for developing teachers' self-capacity.

Meanwhile, at Aisyiyah Bustanul Athfal 13 Surabaya Kindergarten, the teachers not only teach but they also join professional organizations. Through this professional organization, teachers can update information related to curriculum and learning. However, efforts to increase teacher professionalism have not been well planned through this organization or from schools, so schools hope to strengthen teacher competence, especially regarding digital literacy skills, which are currently very much needed by teachers to encourage effective learning in accordance with the characteristics and needs of students in the digital era. A teacher can gain experience by practicing directly in the field, as well as conducting classroom observations of teachers who are professionals in the field of education. Teachers are an important component in the success of an education. Therefore, a teacher is required to be able to master the material, be able to manage the class well, design learning using appropriate methods, and understand the characteristics of his students.

Based on the result taken from discussion with three partner schools in this assistance, the strategy of digital literacy reinforcement is formulated by development program of continuing professional development that includes self-development, conducting research-based learning to improve the quality of learning, and teachers' innovation in developing teaching media for learning practice that integrate technology in learning. Moreover, to support the collaboration and sharing from all partner teachers, it suggests to establish learning community to build a learning habit for teachers, thus, the findings of their research can be followed up on this forum. Those three strategies are described in detail as follows:

#### ***Self-development***

To support teachers' professional development, the inquiry initiative program series focused on an digital literacy improvement were conducted. This program was kind of university-community engagement in which the participants select from among 3 schools partner at East Java. During three months, participants who have selected joined the program both the training on digital literacy and the practical of learning-based research. The agenda included focus group discussion after the session of training in which new concepts of digital literacy instruction in learning as culturally sustaining pedagogy were introduced.

The first program done is Wakelet training that helps teachers to manage the digital content so they can easily find, select, and use the digital content as learning media. Teachers should also be trained on how to use various digital contents in collaboration with other teachers from the same school or others. The speakers from Narotama University was talking about technology use in learning. Furthermore, to



prepare teachers in integrating technology for learning, they also join training on designing learning that coached with expert from *Sekolah Penggerak Kemdikbud*.

The training conducted was about wakelet as collaborative media and curation for preschool teachers. This activity followed by all partner teachers and the representative of preschool teacher association. In this study, the participants learn how to collaborate through learning community, keep and manage various learning sources, exhibit creation and collaborate in assignment and project. This material is effective to help teachers in preparing learning by using various sources which is available in wakelet and work with other teachers when performing lesson.

After the training, FGD was held in which the representatives of GTKM Kecamatan Waru, teachers and principal of kindergarten of Aisyiyah Busthanul Athfal 13 Surabaya, teachers and principal of kindergarten of Muslimat NU 200 Kureksari, teachers and principal of RAM NU Banin Banat Gresik, and stakeholders attended this forum and promote a recommendation. The result of this forum recommended the attempts of improving the teachers' professional development, and the needs for teachers to map their professional plan for the next step so they will be much more prepared to face challenges in teaching and understand the new paradigm in learning. Also, teachers need to build dialog between fellow teachers to explore strategy and solution for answering the challenges so they can encourage their self-development. This activity can be accomplished through learning community. Therefore, teachers should be used to document the learning process in order to help them reflecting the improvement in learning.

#### *Conducting research-based learning to improve the quality of learning*

On the beginning analysis, it is described at a glance that the teachers do not possess proficient competence to deal with research and scientific publication. From those three scheme of professional development components, teachers' activity focuses more on self-development to improve learning quality. A research related with duty, responsibility, and teachers' role, is not considered directly relevant with responsibility in teaching. Teacher never conducted research-based learning. Nonetheless, research done by teachers can be used as authentic reference which is related with current learning condition and gap between the curriculum implementation and schools' readiness as well as all resources. Therefore, teachers are needed to support in engaging classroom action research in their classes with collaborative research scheme.

#### ***Innovative Product Development***

In its implementation, this strategy cannot be separated from self-development activity. It means that the success of self-development for teachers positively contributes their ability in designing various innovative products to support learning. The result of this training shows that the teachers are ready to design learning by using technology as seen on their lesson plan. This lesson plan was implemented in

each class at each institution by considering students' characteristics and interest in learning. During the implementation, another teacher conducted lesson study in the class practicum. Lesson study was aimed to strengthen collaborative sustainable teacher professional development. This activity gives benefit to optimize student learning achievement.

When sit in the class, teacher observed, evaluated, and analyzed the learning process. This activity aims to gain descriptions and experiences in teaching. Through this activity, both partner teachers and involved students evaluate, observe, and find the strengths and weakness appeared on each observed teacher so the next learning process can be revised. The teachers can also learn each other on how to use technology in learning.

The purpose of sit in is a reflection of fellow teachers to find ideal learning models as knowledge to improve their capacity as teachers. Through sit in, teachers can perform learning, manage class well and evaluate students in new classes, as well as identify on how using ICT based learning media that support the quality of learning. The instruments used for sit in are checklist, factual record, interview, and individual conference.

Sit in was completed on Friday, September 2<sup>nd</sup>, 2022 in Kindergarten of Aisyiyah Bustanul Athfal 13 Surabaya and Kindergarten of NU 200 Kureksari. This activity was followed by children of Group B ages 5-5 years old at art and natural *sentra*. The lesson on that day was about My Environment with the sub topic House Equipment. The material given developed six aspects: spiritual and moral value, motoric physics, social emotion, language, cognitive, and art. For the practice of this lesson, the teachers applied problem-based learning (Problem Based Learning-PBL). This model invites children to think critical in solving problem surrounding them. The problem chosen by the teachers was how to manage garbage. In this learning, thus, the teachers invited the students to solve problems on garbage that they usually find at school and use it for a more useful media. To assist the students in understanding more on how using this simple technology, the teachers stimulate them to arouse their curiosity and interest in developing simple technology by watching the video about using unused household equipment such as cutting board made from wood that can be a media of painting and becoming wall decoration.

This learning activity is designed to use *Problem Based Learning* (PBL) with a theme household furniture. The students were instructed to identify lots of unused material found in their environment and think how to make it useful. After creating a product, using unused plastic bottle as a media to keep eggs is suitable with that day learning problem. In the beginning, the teachers seem to have circle time with the children. The next is the teachers ask them to observe a video on using unused household equipment such as unused plastic bottle, fork and spoon made from plastic, and cutting board. Then the teachers invite them to discuss their finding as the result of observation on environment and house equipment.

While in Kindergarten of Muslimat NU 200 Kureksari, the teachers decided My Needs as the theme, Food as the sub theme, and Orange is My Favorite Fruit as the sub topic for the learning process. This activity was completed in Group B that consisting of 16 children. In the main activity, the teachers explained the topic about favorite drink. They also invited the students to watch tutorial video through LCD projector in making orange juice. After the student finished watching the video, the teachers asked them about the equipment, ingredients, and how to make orange juice. After completing the observation and question and answer, the teachers invited them into three activities. The main activity consists of three activities that is the teacher started to explain each activity and divided the group and instructed them to mention the procedure of doing this activity. The first one is making orange juice by using some equipment like blending machine and the ingredients like sugar, water, oranges, spoon, plastic cup, and milk. On the second activity, the students made a collage of oranges by using some tools and orange picture, orange peel and glue. The third activity is playing loose part by arranging the word 'orange' using some tools and stone, wood, beads, and bottle cap.

Referring to the above learning, it is clearly described that the school already develop the learning process by engaging technology either simple technology like using unused material to create daily needs or using ICT based learning media. This kind of learning needs to be followed up and organized through practical community medium. Practical community is a place of learning between principals and teachers in each education unit to share good practices and support teachers' competence development. This community is an association initiated by teachers to share good sharing each other. On this forum, teachers are possible to follow up any program or training that they have so they can implement and reflect the results. The learning process in this practical community includes the cycle of designing, reviewing the learning plan both principals and teachers.

## **DISCUSSION**

The purpose of this study was to explore preschool teachers' digital literacy and the scheme of their professional development in improving this literacy. Findings reveal that teachers' digital literacy improved in almost every aspect across six indicators. This result encourages teachers to integrate digital literacy into the teaching and learning process. Teachers' digital literacy is becoming increasingly important as it encourages them to incorporate technology into learning. The use of technology helps students in early childhood education enhance their learning skills, stimulating growth and development in areas such as social skills, cognitive skills, motor skills, and more. Additionally, it helps students learn effectively and find relevant information and knowledge. Teachers can gain direct practice from the field and observe professional teachers in action. Teachers are a crucial component of educational success. Therefore, they must master the material, manage the classroom effectively, design lessons using

suitable methods, and understand students' characteristics (Akmalia, Nst, & Siahaan, 2023; Anderson et al., 2022).

Digital literacy is one of the competencies that teachers should develop to help them access, organize, understand, integrate, communicate, and utilize information safely (Anisimova & Anisimova, 2020; UNESCO, 2018). Teachers with digital literacy skills in this research were able to integrate technology into their teaching. The results align with research findings by Hobbs, which demonstrated that teachers' digital literacy skills positively contributed to creating opportunities to use digital media in learning (Hobbs & Coiro, 2019). Furthermore, it was noted that the use of technology in learning encouraged better behavior and focus among students. However, teachers faced difficulties in developing their skills due to the lack of a system or medium to support capacity reinforcement. Therefore, this study highlights how sustainable professional development has implemented various strategies to provide ongoing professional development for teachers.

The existence of digital technology has influenced children's lives and significantly affected their learning habits, which can be both positive and negative. This impact is particularly evident in children born in the digital era, known as digital natives—those who have been familiar with electronic and digital media since birth. According to a survey by BPS in 2015, 91.47% of school-aged children prefer watching TV, while only 13.11% enjoy reading. Besides TV, gadgets have also become prevalent among children. A study by Rozalina found that 50% of students, specifically 45 Grade 5 students in Surabaya, regularly use gadgets (Jawa Pos, January 26, 2016). The high usage of digital technology among children should be balanced with educational efforts to help them utilize digital technology appropriately and benefit from it for their learning progress.

One of the factors affecting students' success in learning is teachers' readiness, so teachers need to enhance their digital literacy skills. Several essential elements need to be considered in developing digital literacy skills: cultural aspects, cognitive thinking, communication, self-confidence and responsibility, creativity, and critical thinking (Suherdi, Rezky, & et.al, 2021, bk. 4)

The three strategy descriptions on the research findings show that it needed to be followed up in an organized manner through a more systematic learning community. This forum was effective to facilitated teachers' professionalism, as it in line with the function of it that is to share good practices and support increasing teacher competency (Adimsyah et al., 2023; Arianto et al., 2024; Huda & Rokhman, 2021; Ratnawaty Chotim, 2021). Learning communities are associations initiated by teachers to share good practices with each other. In this forum, teachers can follow up on various programs or training they receive so that the results can be implemented and reflected on. The learning process in the learning is a cycle of designing, carrying out and reviewing learning plans for both school principals and teachers. This model is in line with the concept of teacher professional learning conceptualized by The Center on International Education Benchmarking that learning communities have

emerged as a cornerstone program for effective professional learning (Ben Jensen, Sonnemann, & Roberts, 2016).

From the brief review above, it can be concluded that teachers' ability to use technology is essential for improving learning outcomes. Achieving this requires support and effort from all stakeholders to institute professional development for teachers (Hasanah, Maimun, Marno, & Barizi, 2024; Ifani & Kartiwi, 2024). The findings of this study add evidence that stakeholders play crucial roles in supporting sustainable professional development for teachers. These findings reinforce previous research highlighting the necessity of digital literacy skills for creating a better learning environment. Teachers should develop their skills through ongoing professional development.

## **CONCLUSION**

This research reveals two key points as follows: (1) the result of the program intervention for teacher professional development shows a positive impact on teachers' digital literacy competencies, mainly in encouraging teachers to create digital media for learning; (2) the strategy for reinforcing digital literacy among pre-school teachers includes self-development, scientific publication, and innovative product development. Based on previous research, these schemes are commonly adopted by teachers to improve their professionalism, but they are not always sustainable. Therefore, in this research, teachers formed a learning community as a medium to evaluate, review, and share their best practices for improving professional skills, especially in enhancing digital literacy. The results of this study provide a significant contribution to exploring the schemes for preschool teachers' professional development in improving their digital literacy. Future research could share more creative solutions to technical challenges in sustaining teachers' professional development programs.

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