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ENHANCING DIGITAL LITERACY IN EARLY CHILDHOOD SCHOOL TEACHERS: TECHNOLOGY AND ANALYSIS APPROACHES BASED ON SOCIAL COGNITIVE THEORY

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Abstrak: Era digital yang berkembang pesat berpengaruh terhadap penyelenggaraan pembelajaran di semua level pendidikan. Guru yang memiliki peran krusial dalam pembelajaran harus memiliki kemampuan yang adaptif terhadap perubahan tersebut. Namun, banyak guru khsusunya pada level Pendidikan Anak Usia Dini (PAUD) menghadapi tantangan dalam mengintegrasikan teknologi ke dalam proses pembelajaran dan pengajaran. Pengabdian kepada masyarakat ini bertujuan untuk meningkatkan literasi digital pada guru anak usia dini. Metode pelaksanaan pengabdian yaitu dengan melakukan workshop yang berisi deskripsi pemahaman literasi digital dan praktik membuat materi ajar melalui software digital. Eskperimen yang melibatkan 49 partisipan dari 20 PAUD dilakukan untuk mengukur efektivitas implementasi workshop literasi digital. Pengumpulan data dilakukan melalui penyebaran angket pretest dan posttest, observasi dan wawancara. Hasil program pengabdian ini menunjukkan bahwa pelatihan literasi digital memberikan peningkatan literasi digital pada guru. Temuan pengabdian ini menunjukkan bahwa efikasi diri dan faktor sosial memberikan kontribusi terhadap keberhasilan training dalam program. Pelaksanaan training digital literasi dengan mempertimbangkan elemen-elemen teori kognitif sosial menjadi alternatif untuk meningkatkan kompetensi guru PAUD dalam praktik mengajar.

Kata Kunci: guru PAUD, literasi digital, pelatihan, kompetensi

Abstract: The rapid development of the digital era affects teaching and learning practices at all levels of education. Teachers who play a crucial role in learning must have adaptive skills to respond to these changes. However, integrating technology into the learning and teaching process remains challenging for teachers of Early Childhood Education (ECED). This community service program aims to improve digital literacy in early childhood teachers. The workshop method was used in this program through the introduction of digital literacy understanding and practice of creating teaching materials through digital software. An experiment involving 49 participants from 20 PAUD was conducted to measure the effectiveness of the digital literacy workshop implementation. Data were collected through pretest and posttest questionnaires, observations, and interviews. The results show that the training in this community service program can improve digital literacy in teachers. The findings show that self-efficacy and social factors contribute to the effectiveness of the training program. The findings show that self-efficacy and social factors contribute to the effectiveness of the training program. Digital literacy training for early childhood education teachers involving elements of social cognitive theory is an alternative way to improve their teaching and learning practice competence.

Keywords: early childhood teacher, digital literacy, training, competency

Introduction

The education field is facing unprecedented challenges due to the rapid development of the fourth industrial revolution and the ongoing Covid-19 pandemic (Babbar & Gupta, 2022; Yeşilyurt & Vezne, 2023). One of these challenges is the shift to online classes using various

digital platforms, which has significantly altered the teaching and learning process. The shift has highlighted the urgent need to create and utilize digital technology-based learning media. The use of digital-based media is believed to improve performance and productivity and promote creativity and innovation in education. Unsurprisingly, researchers have emphasized the importance of adapting to this new reality and embracing technology to ensure a brighter future for education (Haleem et al., 2022).

Digital resources have begun to be widely used by teachers to manage documents, make teaching materials, or facilitate communication with students and parents. No doubt, various applicable and easy-to-use software such as Canva, Cap Cut, Camtasia, Kine Master, and Google Drive are popular software used by teachers. Various training sessions are conducted because many teachers still have not been able to use the application to create teaching materials. This is unsurprising, considering every school has different human resources and tools to implement digital technology in daily activities (Dania & Wolor, 2023).

Many studies have shown that some schools still have low digital experience and competence. Therefore, school principals need to provide opportunities for teachers to attend training so that their digital literacy competencies can meet existing needs (Rahiem, 2021; Timotheou et al., 2023), including early childhood teachers, who can adapt to the demands of the latest world of work (Morgado et al., 2021; Saltos-Rivas et al., 2021; Tatminingsih, 2022). Even though digital literacy training has been provided for teachers, it will still be necessary in the future. This is because teachers require pedagogical skills to offer engaging learning experiences for students through digital media and drive educational transformation (Sánchez-Cruzado et al., 2021; Skakun, 2021; Starkey, 2020).

Several previous studies (Fernández-Batanero et al., 2017; Leoste et al., 2022; Rahiem, 2021) show that there is a need to pay more attention to digital literacy for early childhood teachers. Moreover, the results of Masoumi's (2015) also show that when teachers use technology for early childhood students, it can actually be an interesting media to enrich teaching practices and improve communication while also entertaining students. Although early childhood teachers do not all have experience with digital devices, they are motivated to learn and provide a fun and not boring learning atmosphere for their students.

The problem in this study was the lack of early childhood teachers competent in digital file management and video material creation skills using internet software. According to the pre-survey, only 40% of teachers have received training in making teaching materials, and most of them use simple media such as PowerPoint presentations or videos from YouTube. With the number of students reaching 1146, this challenge becomes even more pressing, and it is crucial to address it to ensure that teachers can work efficiently and effectively. To achieve this, it is important to provide teachers with additional resources and support, such as training, technology, and materials, that will help them create a positive learning environment and ensure that every child receives the attention and support they need to succeed in their education.

The existing problem become the background for the implementation of this community service. In addition to the findings of various studies related to digital literacy of early childhood teachers, another reason also come from the results of field identification in PAUD BA Aisyiyah

early childhood teachers. From the results of the pre-survey, it was found that there are still many early childhood teachers who do not have competence in managing digital files and creating video materials using internet software. There were only 40% of teachers that have participated in training in making teaching materials, but the media used is making simple presentations such as PowerPoint or taking videos from YouTube. With the number of students reaching 1146, this condition is an urgent need to be handled. To answer these conditions, teachers need to be prepared with additional resources and support, such as training and materials. This is important in order to help them create a positive learning environment and ensure that each student receives the attention and support they need to succeed in their education.

Digital literacy in this study refers to the understanding of the concept of digital literacy and the competence of early childhood teachers to be able to manage digital files and make teaching material videos. Based on self-assessment and discussions with teachers, the training focus on enhancing teachers' digital literacy, file management using Google Drive, and creating teaching materials such as videos and PowerPoint presentations using Canva and In Shot. This training assesses the effectiveness of improving teachers' digital literacy, combined with the analysis from the perspective of social cognitive theory.

The competence of early childhood teachers greatly influences student success. Early childhood is invited not to be passive, but also actively given challenges, games, and interesting materials according to their development stages (Forsling, 2023). Therefore, it is undeniable that teachers play the main role in educational innovation because they are in charge of directly teaching students using the learning materials (Haleem et al., 2022). Although previous studies have examined the impact of technological training on teacher competence (Aditya et al., 2021; Masoumi, 2015; Sudarti et al., 2022), studies that analyze training from the perspective of social cognitive theory are still rare. The assumptions of this theory can illustrate how and why digital competency improvement training can affect teacher attitudes and behaviors in teachers' professional lives.

Social cognitive theory views that humans have an active and proactive nature, capable of self-regulation and self-reflection through adaptation within the context of the social system in which they exist. Individual behavior is the result of a two-way relationship between themselves and an interconnected with their social context (Bandura, 2019). Therefore, this theory is useful for evaluating how an activity, such as training, can be observed from aspects of self-efficacy, self-regulation, and vigorous learning. Bandura's socio-cognitive theory has not been widely used in studies on digital training. Among them are studies such as those conducted by (Schneider et al., 2022) to examine the social influence on learning with digital materials and (Devi et al., 2017) who researched modeling as a teaching method for students.

Given the prevalence of the need for digital literacy, it is critical to identify the factors that influence its progress and investigate the factors that must be considered when organizing successful digital literacy training for instructors. Previous research discovered that facilitation conditions and self-efficacy (Li et al., 2024), learning styles with search and reflective systems (Almulla & Al-rahmi, 2023), and teacher relationships with peers that allow for discussion and

reflection to find solutions (Marcionetti & Castelli, 2023), all influence innovative behavior and teacher task completion.

These social-environmental elements make people feel supported when completing activities or solving challenges. Another study (LaRose & Whitten, 2000) found that proximity between teachers, students, and computers in website training gives encouragement and social status, which boosts learning motivation. These factors demonstrate that social cognitive theory considers internal and external factors influencing a person's behavior. In the context of digital literacy training, it is thus vital to undertake research utilizing social cognitive theory to determine the amount to which internal and external factors can influence teachers' digital literacy achievement.

It is essential to conduct this study because it describes knowledge about training strategies to improve teachers' digital competence with empirical evidence and analysis of effectiveness from a social cognitive theory perspective. Therefore, the purpose of this study is to identify whether or not there is a difference experienced by early childhood teachers before and after they attended digital literacy training. The research problem formulation was: "Is there a significant difference in teachers' digital competence before and after attending digital literacy training?". Therefore, the hypothesis that needs to be proven in this study is as follows: Ho: Digital literacy training has no significant effect on improving teachers' digital competence; Ha: Digital literacy training significantly improves teachers' digital competence. The results of this study are expected to provide a reference for policymakers in developing effective training programs to improve the quality of early childhood education through innovative digital-based teaching materials.

Method

This study used quantitative methods with a pretest-posttest experimental design. This design was chosen following the purpose of the study, which was to assess the effectiveness of digital training workshops in improving the digital competence of early childhood teachers. Capacity building is used as an approach in this community service activity. In improving the teacher-learning process, this approach can be used to increase teacher skills' effectiveness, responsiveness, and efficiency in the learning process (Nurwakhidah & Suganda, 2022). This design facilitates the measurement of the effectiveness of digital competence training.

The digital competence of early childhood teachers was measured by their ability to operate Google Drive for data management and create video presentations using Canva and InShot. These software applications were selected because they align with the needs of early childhood teachers and are user-friendly, particularly for beginners.

Participants

49 teachers from 20 early childhood schools were involved in this study. They are members of the Bustanul Aisyiyah Teacher Association of Kartasura District (IGABA) in Central Java. The respondents were selected using purposive techniques, with the criteria being

teaching in early childhood schools, using computers, participating in the entire training series, and filling out the questionnaires.

Instrument

The instruments used in this study include Pretest and Posttest questionnaires consisting of 6 questions related to basic knowledge of digital literacy for teachers, data management in Google Drive, and creating video presentations with Canva and InShot. The questionnaire was prepared according to the training material, which questioned knowledge and competence in using Google Drive, Canva, and InShot. Figure 1 illustrates the research flows.

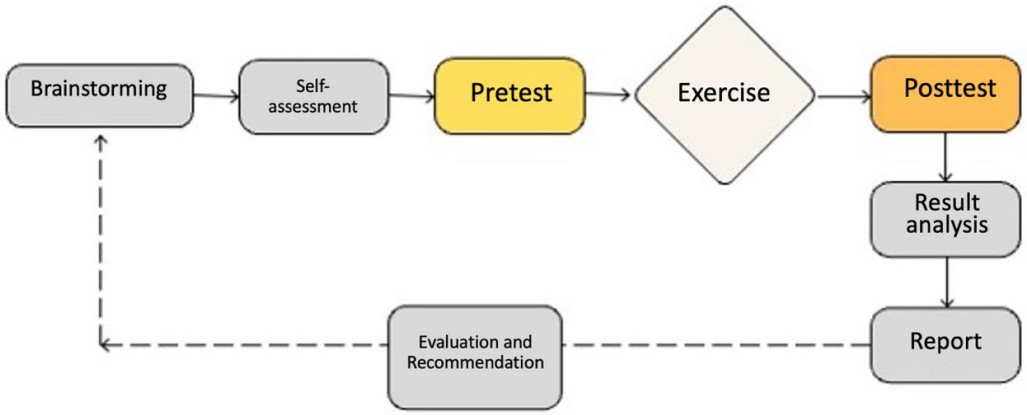

Figure 1. Community service method

Data were collected through the distribution of questionnaires, coupled with interviews and observations. The distribution of questionnaires was carried out through two stages, namely Pretest which was carried out before digital literacy training began to obtain a baseline of digital competence from each teacher. Furthermore, after completion of training, a posttest was carried out to assess the improvement in competence as a result of training. Interviews and observations were conducted with several respondents to help understand the challenges faced by participants and observe real conditions during the training process.

After the data were collected, data analysis was carried out using statistical tests. Statistical software Version SPSS 25.0 was used for this data analysis. First, normality tests were performed to verify the nature of the data distribution through the Kolmogorov-Smirnov and Shapiro-Wilk tests. Second, after knowing the nature of the data, a non-parametric statistical test with the Wilcoxon signed-rank test was used to analyze the comparison between Pretest and Posttest. The Wilcoxon signed-rank test was chosen because it corresponds to paired sample data for data that is not normally distributed. This test is selected to determine if there is a significant difference in pretest and posttest scores, which indicates the effectiveness of the training (Hoskin, 2010; Nelson & Jaimie, 2013).

Results and Discussion

The study found that digital literacy training improves teachers' knowledge and competence, such as enhancing the use of digital software, understanding the importance of digital literacy, improving ideas to create learning materials and also and empowering learners. In line with the results of previous research, training is one of the solutions for teachers from various fields to increase their communication and also organizational cooperation using digital technology (Reisoğlu, 2022). On the other hand, this study has results that are different from those of previous studies. (Artacho et al., 2020) who tested the technology training on teachers, concluded that there is no relation between technology training and digital competence, except for the communication and collaboration aspects in creating digital content. This result occurred in participants who had never attended digital training at all. The first step in analyzing the data was testing the normality test using the Shapiro-Wilk test. The obtained results are presented in Table 1 and Table 2. An explanation of the test results is provided below.

Table 1 presents data regarding the distribution and characteristics of teacher pretest and posttest scores. The average score for the pretest was 12.02, while the posttest was 12.45. This change indicated a general score improvement after teachers followed the digital literacy training. The pretest score had a median of 12.00, which increased to 13.00 on the posttest. A higher median in the posttest indicated a central tendency towards improved scores among most participants. The standard deviation decreased from 1.051 in the pretest to 0.980 in the posttest, indicating that teachers performed more consistently.

The minimum and maximum scores increased from pretest (9-14) to posttest (10-15). These results described that while the lower limit was improving, the upper limit was also extended, illustrating an improvement in teachers' overall competence. The increase in the median score from 12 (pretest) to 13 (posttest) indicates that more than half of the teachers had a higher posttest score than their pretest score, shifting the midpoint in the data distribution to a higher number. These findings indicate that the workshop was successful, though not for all training participants.

Skewness measured the asymmetry of the data distribution from the normal distribution. The pretest score was skewed negatively (-0.716), indicating a longer tail on the left side of the distribution. Skewness decreased in the posttest (-0.336), which means a more symmetrical distribution that became more normal after the digital literacy training. Kurtosis measures the peak of the distribution. A kurtosis score of 1.144 on the pretest described a slightly more peaked distribution than the normal one. It became 0.188 on the posttest, which illustrated the flattening of the distribution curve.

Table 1. Descriptive Statistical Test

	N	Mean	Median	Std. Deviation	Min	Max	Skewness	Kurtosis
pretest	49	12.02	12.00	1.051	9	14	-.716	1.144
posttest	49	12.45	13.00	0.980	10	15	-.336	0.188

Source: Primary Data, 2024

In addition to the descriptive data, the normality test with Shapiro-Wilk also shows Kolmogorov-Smirnova data, as shown in Table 2. With a sample size of less than 50 (in this study, there were 49 teachers), only Shapiro-Wilk data is used. Table 2 shows that the p-value was less than 0.05 (p=0.000<0.05). This indicated that the data was not normally distributed. Therefore, statistical tests should use non-parametric tests.

Table 2. Normality Test

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
pretest	.207	49	.000	.880	49	.000
posttest	.305	49	.000	.850	49	.000

Source: Primary Data, 2024

Lilliefors Significance Correction

After testing the data's normality, the next step was to perform a different test, using the non-parametric Wilcoxson signed rank test. The results in Table 3 indicate that among 49 respondents, 28 maintained the same scores, 16 showed a positive increase, and only 5 encountered a negative decrease.

Table 3. Ranks Test

		N	Mean Rank	Sum of Ranks
posttest - pretest	Negative Ranks	5[a]	11.30	56.50
	Positive Ranks	16[b]	10.91	174.50
	Ties	28[c]		
	Total	49		

Source: Primary Data, 2024
Information: a: Posttest < Pretest, b: Posttest > Pretest; c: posttest = pretest

Table 4 of the Wilcoxon test revealed that the Asymp sig (2-tailed) value for 2-sided tests is 0.033, and the significance level (α) is 5%. Since 0.033 < 0.05, therefore, Ha was accepted, implying that digital literacy training has a significant effect on improving teacher digital competence.

Table 4. Statistical test

	posttest - pretest
Z	-2.128[b]
Asymp. Sig. (2-tailed)	.033

Source: Primary Data, 2024
Information: a: Wilcoxon Signed Ranks Test; b: Based on negative ranks

This study sheds light on the digital proficiency of kindergarten teachers who are part of IGABA. This supports the recommendation that teachers' digital competencies do not all follow the needs of the smart society era. Therefore, digital-based teaching competencies among teachers need to be developed continuously (Artacho et al., 2020). From self-assessment, it is known that not many teachers have mastered file management through Google Drive or made digital teaching materials. Almost all participants had a smartphone with the internet, had a laptop, and were familiar with technology. However, it does not guarantee they have sufficient

digital competence to use ICT in their academic life and professional career (Casillas et al., 2020).

The data from observations and participant interviews shows that the training is very useful for them. From the perspective of social cognitive theory, several factors contribute to training success. This theory asserts that individuals learn through vicarious learning, self-efficacy, and self-regulation (Burney, 2008). In this study, the learning process is carried out by teachers who attended training through observation and imitation. Teachers also pay attention to and imitate training materials and practice according to instructions. The interaction process itself is active learning because the teacher experiences a process of observation (LaRose & Whitten, 2000). With the involvement of 7 mentors in the training, it can help the participants to overcome obstacles quickly.

Another important social cognitive factor is the teacher's self-efficacy, which refers to their confidence in completing a task. High self-efficacy can increase one's likelihood of success (LaRose & Whitten, 2000). In this study, it has been found that teachers are highly motivated to attend training sessions. They filled out the self-assessment honestly, prepared the tools needed according to the instructions, and were enthusiastic about participating in all training sessions. Social cognitive theory assumes that self-efficacy is an important motivation for oneself (Schunk & DiBenedetto, 2020). The findings of this study corroborate the findings from (Martin et al., 2009) about the importance of training for the professional development of teachers in teaching through strengthening self-efficacy.

The motivation and self-confidence of trainees in the study were also experienced by trainees in previous studies. Even though teachers do not have experience making digital-based teaching media, they are ready to learn to adapt to working using digital media (Gudmundsdottir & Hathaway, 2020). Research indicates that digital competency training for teachers should not only improve technical skills but also enhance confidence in adopting technology.

Figure 2. The Early Childhood Teacher Implementing Canva

The other social cognitive factor seen in supporting training effectiveness is self-regulation. This factor reflects how people motivate and direct their behaviour through proactive control by setting challenges and managing their competencies to achieve those challenges (Bandura, 2019). The teacher follows the instructions given to create learning videos using the software taught in the training (Figure 2). Although it is not easy for most teachers, working in groups, actively asking, and trying makes them eager to complete the task given.

Training that provides tasks with clear instructions has been shown to increase teachers' self-efficacy. For example, in this training, teachers made a video of teaching materials with their group. This created enthusiasm and increased engagement through a discussion often characterized by a relaxed atmosphere among teachers and the training mentor. The results are also expected to improve when training is implemented using planned procedures. According to (Wahyudi et al., 2023), good digital literacy in addition to providing knowledge and skills to use various digital communication media wisely in their lives.

These findings reinforce the potential of digital training to improve teachers' pedagogical skills and enable them to integrate technology effectively into the learning process. This is particularly relevant for early childhood teachers who play a critical role in preparing young people for the digital age (Casillas Martín et al., 2020; Rahiem, 2021). Ensuring teachers receive adequate support and resources appropriate to their educational context and professional needs is important. Through the results of this training, teachers need to be supported and facilitated so that they have competencies that are under the development of needs in the digital era, and they can also improve their professional competence as educators.

The teachers expressed enthusiasm and eagerness to implement the content they learned after the digital training. While some teachers found the program user-friendly, they recognized that digital resources facilitated their teaching methods in the classroom. Some teachers over 40 struggle to understand the curriculum but remain passionate. This is apparent as they also obtain assistance from the facilitators, particularly their peers. The training was administered profoundly and informally, allowing teachers to engage in the learning process without feeling inferior.

Teachers cannot be left to answer these needs alone. However, there needs to be formal support in the form of regulations, training, and the availability of tools so that teachers can have pedagogical mastery rather than just being able to use these tools when teaching their students (García et al., 2023; Pérez-Jorge et al., 2020). The more stakeholders who support and cooperate in understanding and helping to solve this need, the better the quality of education in early childhood children (Babbar & Gupta, 2022; Reisoğlu, 2022). For example, in this study, support was shown by the principal and school supervisor to allow teachers to attend the training properly. The findings in this study also essentially support the findings of previous studies, such as the role of teachers in students' adoption of digital technology (ElSayary, 2023; Kit Kilag et al., 2023), the importance of teachers' pedagogical understanding of technology and ethics (Falloon, 2020; Marín & Castañeda, 2023), and the influence of peer support in building trust and support (Adnan et al., 2024).

Conclusion

The study results conclude that training in file management and preparation of digital-based teaching materials improved teachers' digital literacy. This finding contributes to the study of education and technology by demonstrating increased teacher competence. From the analysis, the effectiveness of digital literacy training was supported by an intensive and interactive learning process and support from participants' self-efficacy, self-regulation, peers, and school. Therefore, it is important to consistently conduct digital literacy training to support teachers in adapting to the digital era. Teachers have the potential to enhance the quality of education and contribute to the formation of a smart society. Future teacher digital literacy training should be carried out according to the results of the pre-survey. The selection of software and implementation methods must correspond with the needs of the teachers. Not all educators have high skills, so the training should be implemented flexibly and informally to prevent discomfort. The following research needs to explore other social cognitive factors that influence the success of digital literacy training to improve the digital competence of early childhood teachers.

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