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Exploring EFL Pre-service Teachers' Experiences in Accessing Information to Develop Digital Storytelling as Learning Media: A Narrative Inquiry

Nur Arifah Drajati[1*], Febriani Fajar Ekawati[2], Murni Ramli[3], Dewi Rochsantiningsih[4], Sri Haryati[5], Lailatun Nurul Aniq[6]
[1,2,3,4,5,6]Universitas Sebelas Maret | email: nurarifah_drajati@staff.uns.ac.id

Abstract
Technology's darting advancement made digital literacy a key component in pre-service teacher professional development. Their digital literacy ability is reflected in their teaching, including designing learning media such as digital story-telling. Hence, this study is designed to understand how EFL pre-service teachers access information as a part of digital literacy to create digital storytelling learning media. The data were gathered from 28 students of the English Education Department in the Cross-Cultural Understanding course by having them write diaries to reflect on their experiences in designing digital storytelling learning media. Using a narrative inquiry method, the data were analyzed through three steps: repeatedly reading, coding, and categorizing it into thematic headings. The findings from data analysis indicate the mastery of various dimensions of digital literacy, namely photo-visual, reproductive, branching, informational, and social-emotional literacy, by EFL pre-service teachers, substantially contributed to the quality of teaching and student engagement in digital-based learning. This research underscores the need to integrate digital literacy training into teacher education programs to better prepare future educators for the demands of modern, technology-driven classrooms.
***Kata kunci**: Digital Literacy, Digital Storytelling (DST), EFL, Learning Media Pre-Service Teacher*

Abstrak
Kemajuan teknologi yang pesat menjadikan literasi digital sebagai komponen utama dalam pengembangan profesional guru prajabatan. Kemampuan literasi digital mereka tercermin dalam pengajaran mereka, termasuk merancang media pembelajaran seperti mendongeng digital. Oleh karena itu, penelitian ini dirancang untuk memahami bagaimana guru prajabatan EFL mengakses informasi sebagai bagian dari literasi digital untuk membuat media pembelajaran mendongeng digital. Data dikumpulkan dari 28 mahasiswa Jurusan Pendidikan Bahasa Inggris dalam mata kuliah Pemahaman Lintas Budaya dengan meminta mereka menulis buku harian untuk merefleksikan pengalaman mereka dalam merancang media pembelajaran mendongeng digital. Dengan menggunakan metode penyelidikan naratif, data dianalisis melalui tiga langkah: membaca berulang kali, membuat kode, dan mengkategorikannya ke dalam judul tematik. Temuan dari analisis data menunjukkan penguasaan berbagai dimensi literasi digital, yaitu literasi foto-visual, reproduksi, percabangan, informasional, dan sosial-emosional, oleh guru prajabatan EFL, berkontribusi secara substansial terhadap kualitas pengajaran dan keterlibatan siswa dalam pembelajaran berbasis digital. Penelitian ini menggarisbawahi perlunya mengintegrasikan pelatihan literasi digital ke dalam program pendidikan guru untuk lebih mempersiapkan para pendidik masa depan menghadapi tuntutan ruang kelas modern yang digerakkan oleh teknologi.

***Kata Kunci :** Literasi Digital, Bercerita Digital, Bahasa Inggris sebagai Bahasa Asing, Media Pembelajaran, Calon Guru*

PENDAHULUAN

One of the biggest factors influencing schooling today is technology. Many school districts encourage using more technology in the classroom by giving teachers and students access to devices like laptops and tablets, enhancing internet connectivity, and creating computer literacy curricula (Johnson et al., 2016). Technology-enhanced embodied learning is said to have the potential to transform K–12 education when breakthroughs emerge. Despite having great potential to support innovative pedagogies, information and communications technology (ICT) is not a panacea (United Nations Educational, Scientific and Cultural Organization [UNESCO). Despite its advantages, its delayed uptake in traditional education is a long-standing issue (Georgiou & Ioannou, 2019).

The existence of significant developments in the use of technology in the world of education does not mean that they always run smoothly and without obstacles. Many teachers still have difficulty integrating learning instruction and learning materials with technology (Georgiou & Ioannou, 2019). Technology integration carried out by teachers is not only limited to the use of technology when teaching but also how technology can adapt the existing curriculum and open up new learning sources for students (Irgashevich, 2020; Johnson et al., 2016). One form of integrating learning theory and technology occurs in developing digital storytelling-based learning media. Digital storytelling is a way of communicating a story through the media of words, images, audio, video, and graphics (Sage et al., 2018). So, in this case, a teacher or prospective teacher needs to know how to organize digital storytelling-based learning media to suit existing learning instruction.

On the other hand, many teachers in Indonesia still experience difficulties in implementing technology due to a lack of training prepared from an early age (Aulia et al., 2022). One of the things that a teacher or prospective teacher can do to bridge this problem is to carry out various research and collect as much information as possible. To be able to obtain this information, a teacher or prospective teacher needs to have good digital competence as the main support in welcoming the 21st-century era of education (Palacios-Hidalgo & Huertas-Abril, 2022). Digital competency is good literacy skills to be able to scan information correctly and effectively. The key thing to understanding literacy is the availability of easy access to information sources.

Digital literacy refers to the multiplicity of literacies associated with the use of digital technologies (Eshet, 2004; Hague & Payton, 2010, p. 2; Martin & Grudziecki, 2006; Ng, 2012). These technologies include hardware and software, such as mobile phones, game consoles, web technologies and resources, communication and collaborative tools, and information and multimedia resources. Digital literacy is defined as the awareness, attitude, and ability of individuals to appropriately use technologies to identify, access, manage, analyze, evaluate, and synthesize digital resources, and to create, make and share meaning, and collaborate and communicate effectively with others in different modes and formats (Hague & Payton, 2010; Martin & Grudziecki, 2006). Digital literacy comprises five dimensions: photo-visual literacy (the ability to learn by reading from visuals), reproduction literacy (the ability to edit or combine different multimedia resources), branching literacy (the ability to use hypermedia), information literacy (the ability to search, locate and assess web resources effectively) and socio-emotional literacy (the ability to be highly critical and analytical in the context of online socialization and collaboration; Eshet, 2004).

Digital literacy has emerged as a crucial skill in the modern era, extending beyond basic computer proficiency to encompass a range of competencies essential for effective participation in the digital society and economy (Bejaković & Mrnjavac, 2020; Mokhtari, 2023). It involves the ability to access, evaluate, and use digital information ethically and efficiently (Julien, 2019). Studies have shown a significant correlation between digital skills and employment rates, highlighting the importance of digital literacy for workforce employability and socio-economic development (Bejaković & Mrnjavac, 2020). In higher education, digital literacy enhances the teaching-learning process and prepares students for future employment (Mokhtari, 2023). The concept of digital literacy continues to evolve with rapidly changing technology, making it challenging to establish a fixed definition (Lahiri et al., 2022). Its significance extends to various industries, including the Indian apparel sector, where it is seen as a tool for improving productivity and overall business operations (Lahiri et al., 2022).

Access is the ability to identify the source of the data, including the ability to acquire and collect the data and to retrieve such data for repetitive usage. Digital literacy is a critical skill set for full participation in the information society, encompassing not only technical proficiency but also social, ethical, and cognitive aspects (Julien, 2019; Kaur, 2024). It is closely linked to digital citizenship and includes the ability to access, evaluate, and use digital information effectively and ethically (Julien, 2019). Studies have shown that motivation plays a significant role in digital literacy, affecting material access, skill access, and usage access (Sung, 2018). The digital divide remains a challenge, with factors such as socioeconomic status, education, and gender influencing digital inclusion (Kaur, 2024). To address these issues, policies, and initiatives should focus on promoting equal access to digital resources and integrating digital literacy into educational curriculum and community programs (Kaur, 2024). Improving digital literacy has far-reaching implications for personal empowerment, education, employment, and civic participation in the 21st century (Julien, 2019; Kaur, 2024).

The use of learning media in classrooms has been shown to enhance the educational experience and improve student outcomes. Learning media can make abstract concepts more concrete, increase student motivation, and create a more engaging learning environment. When integrated effectively, these tools can optimize classroom management, particularly in online settings, by helping teachers convey learning objectives more efficiently (Ainie et al., 2022). The implementation of educational media fosters active learning by supporting both students and teachers in the teaching-learning process. It can simplify complex teaching materials, attract students' attention, and facilitate a better understanding of the subject matter. However, the effectiveness of learning media depends on the teacher's creativity in selecting appropriate methods and tools. Overall, the integration of learning media in classrooms can significantly enhance the quality of education and student engagement.

Digital storytelling has emerged as an effective educational tool across various disciplines, enhancing learning experiences in classrooms. Studies have shown positive perceptions among nursing students when digital stories are used for patient-centered care competency development (Yocom et al., 2020). In teacher preparation programs, preservice elementary teachers who created digital storytelling videos reported increased appreciation for its pedagogical value and interest in future classroom applications (Shelton et al., 2017). Research on pre-service teacher students demonstrated the practicality and successful implementation of digital storytelling in

online English teaching (Yuliani & Hartanto, 2022). In early childhood education, digital storytelling has been found to support students' learning by encouraging idea organization, expression, and social interaction. This approach fosters collaboration, strengthens emergent literacy practices, and enhances communication skills while developing students' voices through writing and digital content construction. In addition, digital stories are usually a three to five-minute narrative that may combine downloaded visual material, personal photographs, video, music, and voiceover to tell a compelling story (Gubrium & Harper, 2013; Lambert, 2010; Lang et al., 2019). Digital stories allow students to develop and express their own voices (Kim et al., 2020). Individual voices can be revealed in storytelling, and a student voice can be further articulated as people develop awareness about the contexts of their lives. Storytellers shape narratives based on their own emotions and how viewers perceive those emotions, selecting scenes that contribute to the author's overall intention.

The following are several related studies regarding teachers' digital literacy abilities in developing digital-based teaching media in this modern era (List, 2019; Rizal et al, 2019, Anisimova, 2020). A qualitative study involving undergraduate students majoring in the educational department was conducted to understand what pre-service teachers believe in digital literacy development (List, 2019). The study found that pre-service teachers determined digital literacy developed more in sociocultural context through peer learning and communication with teachers during classroom sessions. Another study by Rizal et al. (2019) about undergraduate student-teachers literacy competence during lectures indicated that pre-service teachers' levels of digital literacy fall into the medium group, with specific categories including information (2.97), communication (2.95), content production (2.64), safety (2.63), and problem-solving (2.12). The last study by Anisimova (2020) discovered that "Interactive Didactic Games", "Animation Basics", "Programming Basics" and "Network Technologies" could increase pre-service teacher digital literacy.

Based on those previous studies, there are sociocultural aspects and games and training activities that could help pre-service teachers in developing their literacy competence. However, no study specifically concerns access to information sources during the development of digital literacy competence. Moreover, during the process of digital literacy development, tasks such as digital storytelling train their competence. Therefore, this study was designed to find out how pre-service teachers access information during developing digital story-telling learning media.

METODE PENELITIAN

This study incorporated narrative analysis under the qualitative research paradigm to highlight the participants' experiences and personal perspectives on the topic under Barkhuizen et al. (2014) and Polkinghorne's (1995) theories. This study was conducted in one of the public universities in Central Java Indonesia. 28 pre-service teachers majoring in the English language department were involved in this study, i.e. M, M1, P, N, N1, N2, P1, P2, S, R, R1, S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, T, T1, T2, W, W1, W2, and Y. During the Cross-Cultural Understanding Course in the sixth semester, they developed a learning media in a group based on digital storytelling. Learning media based on digital storytelling made by them integrated the learning material and technological advancement so it would be accessible and convenient for students' learning. In the process of creating the learning media, they could independently search for information

that could be very beneficial during pre-research, pre-production, production, and product evaluation.

Data were collected using diaries during the learning process of participants. After the class, they were given a narrative frame to guide them in telling their experience of accessing information while developing digital storytelling learning media in the Cross-Cultural Understanding course. The data from the diary was then processed in three main steps. First, repeatedly read the data to grasp a comprehensive understanding of the meaning of the data. Second, categorizing and coding the data, in this step the researcher starts to reduce the irrelevant data and associate them according to their similarities. The last step is organizing the data into thematic headings, this process involves the process of integrating the result of the data code to the definition and indicator of access in digital literacy. To make the data analysis reliable, valid, and less biased the researcher did member checking after the analysis to the participants and ensured the data analysis represented their perspective and experience written down in the diary.

PEMBAHASAN

1. Photo-Visual Literacy: Designing Visual Aids for Enhanced Comprehension

In the contemporary educational arena, where digitalization has become a dominant force, photo-visual literacy has developed into a key element that facilitates the creation of effective and engaging learning media. This research revealed that the use of design instruments, such as Canva and Adobe Illustrator, by EFL teachers who were still in the education stage, not only improved visual aesthetics but also significantly supported learning efficacy. Through these applications, participants were able to create visual content that not only met high aesthetic standards but also provided strong instructional support, ultimately maintaining student engagement and enriching their learning experience.

Participants in this study consistently integrated advanced visual design principles in the development of their learning materials, demonstrating a deep understanding of how visual elements can be leveraged to strengthen the delivery of educational content. This careful use of design tools suggested that photo-visual literacy in this context involved more than just the ability to create or edit images; it also included aesthetic and strategic judgments regarding how and when to use them in pedagogical contexts.

Participants indicated that appropriate selection, adaptation, and implementation of visual tools were critical to creating material that not only attracts attention but also enhances conceptual understanding. This demonstrated a level of expertise that reflected strong analytical skills and a deep understanding of visual learning theory, which was increasingly recognized as a vital component in digital learning design.

The analysis carried out also revealed that these pre-service teachers could critically assess the effectiveness of the visual materials they chose. Their decisions were based on careful evaluation of how specific visual elements would impact student engagement and understanding, underscoring the importance of photo-visual literacy in supporting reflective, evidence-based learning practices.

A specific example of the application of these capabilities was found in the practice of P, who effectively integrates graphics obtained through Canva into her digital storytelling projects. M stated:

"For content that lies in Digital storytelling, both the story content and the questions and exercises that will be used, I use technology such as Kahoot, Canva, Nearpod, etc. The reason

is because it is more efficient and more interesting to engage students. During the process of compiling content, the media I use is Canva. For the media components, I get them through Canva. The reason is that there are many choices of images that match the storyline."

Its application not only enriched the narrative he developed but also helped facilitate students' understanding of the concepts presented. This reflected the use of photo-visual literacy that was not only technical but also pedagogical, showing how visual tools, when chosen and used strategically, could significantly improve the quality of learning.

2. Reproductive Literacy: Enhancing Learning Through Media Convergence

The second finding of the study focused on reproductive literacy, where participants demonstrated skills in editing and combining multimedia resources to create cohesive and informative digital narratives. Participants' use of platforms such as Canva, Nearpod, and Kahoot indicated a deep understanding of how digital tools could converge to produce dynamic learning content. This creative process involved critical evaluation of various media sources, including video, text, and audio, that they integrated to support established instructional goals.

In applying reproductive literacy, participants not only selected relevant resources but also adapted them in a way that ensures seamless integration between different content. These abilities reflected high technical skills and a mature understanding of multimedia design principles. Through data analysis, it was apparent that participants used these tools to maximize students' interactivity and engagement, both of which were important indicators of effective learning materials.

Furthermore, in these reproductive practices, preservice teachers demonstrated their evaluative skills by assessing the quality and relevance of the content they process. This criteria-based source selection was essential in ensuring that the information presented is not only accurate but also meets students' learning needs. This evaluation also included adaptation of the narrative to ensure that the combined resources reinforced, rather than obscured, the educational message being conveyed.

One example of an effective reproductive literacy application was found in M1, which integrated resources from various platforms to support English language learning. He explained:

"In class, we were given the task of accessing sources from the internet to find ideas, I got initial ideas through online research and reading examples of existing digital storytelling. I also accessed several sources from the internet, namely related to literary and cultural references that are relevant to the theme of my story. I also used several technologies such as graphic design applications to design storyboards and create visualizations of my story. I usually evaluate the accuracy and reliability of the sources of information that I receive from the internet."

By strategically combining visual, text, and interactive elements, it created an immersive, multidimensional learning experience that stimulated critical thinking and student engagement.

3. Branching Literacy: Connecting Learning Nodes through Hyperlinks

Branching literacy referred to participants' ability to use hypermedia effectively in the development of their digital storytelling. This research found that pre-service EFL teachers utilized hyperlinks in ways that broadened the scope of the narrative and enriched students' learning experiences. The use of these hyperlinks was not arbitrary; each link was inserted with strategic considerations to add context or deepen students' understanding of the material discussed.

Participants utilized hyperlinks to connect narrative texts to relevant external sources, providing instant access to definitions, additional explanations, or complementary educational resources. This demonstrated their expertise in leveraging web technologies to dynamically expand and enrich course content. Hyperlinks not only served as cross-references but also as a bridge connecting theory with practice, helping students explore more about the topics covered.

Further analysis revealed that participants' use of hyperlinks also supported students' independent learning. By giving students the tools to explore topics at their own pace, pre-service teachers facilitated a learning environment that was more adaptive and responsive to students' individual needs. This was a key practice in branching literacy that recognized and respected differences in learning pace and style.

In practice, as done by S5, hyperlinks are used to link the concepts discussed with articles, videos and other multimedia resources that can add informative and pedagogical value to the material presented. She narrated:

"When I started writing the script for dialogues in my digital story, I needed sources from the internet. Because in the content that I created, there is some important information for students. So, I also included some hyperlink features."

This not only strengthened information retention but also improved students' ability to make connections between concepts and apply them in a broader context.

4. Information Literacy: Filtering Information for Educational Use

Information literacy is an important foundation for EFL teachers in accessing, evaluating, and using information from the internet to support the creation of their learning materials. This research identified that participants had a developed ability to critically assess the reliability and relevance of online sources. They used a variety of strategies to ensure that the information they used in learning materials is accurate, reliable, and evidence-based.

Participants demonstrated skills in using search engines and databases to find appropriate content that supports their learning goals. They were also skilled in applying rigorous evaluation criteria to select sources, reflecting a good understanding of the importance of credible sources of information in education. This included fact checking and verifying information through multiple sources, demonstrating a systematic and methodical approach to data collection.

Furthermore, the ability to synthesize information from multiple sources into a coherent and pedagogical narrative indicated an advanced level of information literacy. These aspiring teachers could integrate new knowledge into existing frameworks in ways that enhance students' understanding and enrich their overall learning experience.

For example, N2 used verified sources to support the creation of material about local history. By combining information from web-based articles, academic journals, and interviews with experts, she created learning modules that are not only informative but also engaging and relevant for students, demonstrating the practical application of information literacy in curriculum development.

5. Socio-Emotional Literacy: Supporting Emotional Wellness in E-Learning

Socio-emotional literacy in this context includes the ability of prospective EFL teachers to interact, collaborate, and communicate effectively using digital platforms. This research found that participants used social media and online collaborative tools not only to communicate but also to build and maintain supportive learning communities. This

capability was critical, especially in distance learning contexts, where face-to-face interaction is limited.

Participants demonstrated a high level of awareness of how emotions and tone of communication could influence dynamics in the virtual classroom. They used digital communication tools to convey support, provide constructive feedback, and encourage active student participation. Analysis showed that they applied empathetic communication principles in online discussions, demonstrating sensitivity to the socio-emotional needs of their students.

Furthermore, they adopted strategies to manage conflict and facilitate effective teamwork among students, using forums, chat groups, and other collaborative media. This reflected their understanding of the importance of building inclusive and supportive learning spaces, where every student felt valued and empowered to participate. This practice not only increased student engagement but also strengthened their social skills, which was critical in a global, interconnected world.

In the context of this digital interaction, participants also demonstrated a strong awareness of the importance of maintaining privacy and online ethics. They actively promoted safe and responsible practices among their students, demonstrating that socio-emotional literacy also included ethical and legal components that cannot be ignored in today's digital education.

Next, participants explored and implemented various approaches to understand and overcome emotional challenges that students may experience during the online learning process. They used surveys, feedback forms, and reflection sessions to gather information about students' learning experiences, which they then used to adjust their teaching and interaction methods more effectively.

A concrete example of the application of socio-emotional literacy could be seen in the practice of T, who integrates reflection group sessions as part of her curriculum. In this session, students were encouraged to share their experiences and feelings about the material studied, as well as the challenges they face. T facilitated these discussions with an inclusive and supportive approach, ensuring that every voice was heard and valued. This approach not only strengthened students' understanding of the material but also promoted their mental health and emotional well-being, underscoring the importance of socio-emotional literacy in the development of students' interpersonal and intrapersonal competencies.

This holistic approach to socio-emotional literacy showed how technology could be used not only as a tool to deliver content but also as a means to enrich interpersonal relationships and support students' emotional and social growth. This underscored how effective digital literacy went beyond the technical and touches on critical aspects of the human experience, which is critical in 21st-century education.

Discussion

This research aims to understand how prospective English as a Foreign Language (EFL) teachers access information as part of digital literacy in creating digital storytelling-based learning media. The main results show that prospective teachers have varying abilities in five dimensions of digital literacy: photo-visual literacy, reproductive literacy, branching literacy, information literacy, and socio-emotional literacy. Each of these dimensions illustrates the various ways in which technology can facilitate more interactive and engaging learning while revealing the challenges they face in effectively integrating this technology into their teaching practices.

Photo-visual literacy was identified as a key skill that enables prospective teachers to effectively integrate visual elements in their teaching (Bejaković & Mrnjavac, 2020; Mokhtari, 2023). The use of tools such as Canva and Adobe Illustrator shows how technology can be used to enhance the visual presentation of course material, which not only enriches the learning experience but also supports student retention of information. This research links the importance of photo-visual literacy to multimodal learning theory, which emphasizes how the combination of text, images, and other media can improve students' conceptual understanding. These results support previous findings proposing that increased access to digital tools increases teachers' ability to create more dynamic and engaging learning materials.

In the context of reproductive literacy, teacher candidates demonstrate skills in editing and combining multiple multimedia sources to create coherent educational content. This capability is very important in the development of effective digital learning media because it allows the integration of various sources of information that can enrich lesson content and make it more relevant and interesting for students (Lahiri et al., 2022). These findings delve deeper into how technological literacy can facilitate collaborative and interactive learning, in line with literature that suggests that technology can be an important tool in supporting innovative and responsive teaching methods.

Branching literacy, related to the use of hypermedia, has proven crucial in helping students explore and connect concepts in broader learning. Teacher candidates use hyperlinks to provide direct access to additional resources, allowing students to conduct independent investigations and deepen their understanding of the material. This research demonstrates how branching literacy can assist in creating more adaptive and student-centric learning experiences, which is one of the key aspects of effective 21st-century education.

The ability of prospective teachers to access, evaluate, and use information from the internet emphasizes the importance of information literacy in the context of modern education. In this research, information literacy is not only needed to identify accurate and reliable sources but also to critically integrate that information into the existing curriculum. These results underscore findings by Mokhtari (2023), who show that information literacy is critical for employability and socio-economic development, emphasizing the importance of this literacy ineffective teacher preparation.

Socio-emotional literacy is emerging as an important factor in supporting effective interactions in online learning environments. This research found that pre-service teachers use digital platforms not only for teaching purposes but also to build and maintain supportive learning communities. This reflects the importance of interpersonal skills in educational technology, as expressed by Palacios-Hidalgo and Huertas-Abril (2022), who discuss how digital literacy must include social and ethical aspects to support effective and ethical student engagement.

Although this research provides valuable insight into how preservice teachers access and use technology in their learning, several limitations need to be noted. First, the research sample is limited to prospective EFL teachers at one university in Indonesia, which may not represent all prospective teachers in various geographic or educational contexts. Second, this research relies on participants' self-reports, which can be subjective and influenced by their own perceptual biases. However, despite these limitations, this study makes a significant contribution to the existing literature by exploring the use of technology in teacher education from a multifaceted perspective.

The significance of this research lies in its ability to identify and describe in detail how digital literacy can be integrated into teacher education practice, providing empirical evidence that supports the further development of technology-integrated curricula. These results can be used as a basis for designing more effective educational interventions, which not only improve the digital competence of prospective teachers but also prepare them to become educators capable of facing the educational challenges of the 21st century. Additionally, this research offers valuable insights for policymakers and educational practitioners in formulating more inclusive and effective strategies for technology integration in classrooms.

By emphasizing the importance of digital literacy in teacher education, this research also confirms the urgent need for further investment in educational resources, teacher training, and technology infrastructure. This is a crucial step to ensure that all teacher candidates are equipped with the necessary skills to effectively and ethically implement educational technology in their teaching practices. This implementation will not only improve the quality of education but will also enrich students' learning experiences by utilizing technological capabilities to support more personalized, adaptive, and collaborative learning.

SIMPULAN

This study revealed that the mastery of various dimensions of digital literacy, namely photo-visual, reproductive, branching, informational, and social-emotional literacy, by EFL pre-service teachers, substantially contributed to the quality of teaching and student engagement in digital-based learning. The use of design tools such as Canva and Adobe Illustrator not only improved the visual aesthetics of teaching materials but also supported instructional effectiveness. In addition, the ability of pre-service teachers to combine and adapt various multimedia sources through reproductive literacy and branching literacy, as well as the ability to assess the credibility of information sources, proved relevant in achieving more interactive and student-centered learning objectives. These findings are consistent with the purpose of the study to examine how pre-service teachers utilize technology in creating effective digital learning media. Recommendations from the results of this study include the need to strengthen teacher training programs related to digital literacy, especially in the use of design tools and multimedia integration in learning. Further research is recommended to explore the application of this digital literacy in various other educational contexts and its impact on student learning outcomes, as well as to dig deeper into how digital literacy-based learning strategies can be adapted to meet the individual needs of students at various levels.

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