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DIGITAL LITERACY ATTITUDES AMONG EFL PRE-SERVICE TEACHERS IN THE DEVELOPMENT OF LEARNING MEDIA

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Abstract: This study investigates the digital literacy attitudes of seventh-semester EFL pre-service teachers at one Muhammadiyah University in West Java, focusing on their experiences, challenges, and needs in utilizing digital tools for instructional purposes. While digital literacy is increasingly recognized as a crucial skill in modern education, many pre-service teachers face significant obstacles, including limited technical proficiency, difficulty in accessing credible online resources, and a lack of understanding of ethical considerations in digital content creation. Employing a qualitative approach through open-ended questionnaires and semi-structured interviews, this research explores participants' perspectives on using digital tools such as Canva and Wordwall in developing learning media. The findings reveal that although pre-service teachers are enthusiastic about incorporating technology into their teaching practices, technical difficulties and ethical concerns often hinder their efforts. Participants emphasized the need for more practical training, hands-on workshops, and ethical guidelines to enhance their digital literacy competencies. The study highlights the importance of integrating structured digital literacy training into teacher education programs, ensuring that future educators are well-equipped to design engaging and pedagogically sound instructional media. Addressing these challenges will ultimately contribute to improving the quality of EFL teaching and fostering a more technology-integrated learning environment.
Keywords: *Digital Literacy; EFL Pre-Service Teacher; Learning Media; Technology*

INTRODUCTION

Technological advancements in the 21st century have significantly influenced various aspects of life, including education. Integrating digital tools into teaching and learning has become increasingly prevalent, enabling educators to create more engaging and interactive learning environments (Mardiah, 2022). The educational sector holds a crucial role in equipping the new generation to confront the challenges posed by the advancement of the Fourth Industrial Revolution (Focacci and Perez 2022). Educators must adapt and prepare themselves for teaching in this new era, which necessitates a shift in learning approaches commonly referred to as learning in the digital transformation era (Seaman and Seaman 2023). In the context of language education, technology offers innovative opportunities for teachers to enhance instructional delivery and improve student engagement. Cardona and Rodriguez (2022) highlighted that it is essential for teachers to address this need in order to foster students' understanding of digital technology and enable them to access a wide range of learning resources through its use. Consequently, digital technology literacy among teachers is crucial for effective teaching and learning processes. In the era of digital transformation, students are increasingly making use of digital technology to acquire knowledge

and support their learning, guided by their teacher (Cruz et al. 2023). Skills in using digital technology is among the key competencies expected of teachers in the era of digital transformation, alongside the other essential skills such as creativity, critical thinking, communication, problem-solving, mathematical ability, and collaboration (Gedik and Delican 2022). To address this challenge, teachers need to be capable of integrating traditional teaching methods with digital approaches in order to effectively support the development of students' competencies in the digital transformation era (Kindei et al. 2022). Therefore, digital technology literacy is essential for pre-service teachers or teachers to effectively facilitate learning activities (Sajidan et al. 2023). Teaching that aligns with the demands of digital transformation era can better equip students to adapt to the workforce, particularly in relation to digital technology use. Without adequate digital literacy skills among teachers, students will be unable to develop these crucial competencies (Filiz & Kurt, 2022).

In Indonesia, the effective utilization of digital platforms for instructional delivery, student engagement, and facilitated learning environments is becoming increasingly vital in maintaining the quality of education in the digital era. To address the growing digital divide and promote effective instruction, initiatives such as Merdeka Belajar and UNESCO's frameworks have emphasized digital transformation in education. Yet, studies have shown that many pre-service teachers still lack the necessary competencies to use digital tools effectively, especially when it comes to instructional media design and ethical use (Mariscal et al. 2023). This particularly relevant in EFL contexts, where technology serves as a gateway to global communication and learning. However, their research remains a literature review focused on the current landscape, influencing factors, and strategies for its enhancement. Established academic research underscores the significance of digital tools in enhancing the learning experience, broadening curriculum diversity, and fostering greater student engagement (Al-Labadi and Sant 2021). The integration of technology for young learners has been encouraged, acknowledging that contemporary children think, behave, and learn differently from previous generations, and possess unique digital skills and competencies (Kurt 2021). Integrating digital platforms within education aligns with Indonesia's broader digital transformation agenda, as reflected in various government initiatives.

Indonesia has made considerable strides in the digitalization of education, notably through policies such as Merdeka Belajar, which promotes the incorporation of digital technologies into classroom learning. The widespread adoption of digital tools became particularly evident during the COVID-19 pandemic when online learning emerged as an essential mode of instruction. However, this rapid transition has also revealed significant challenges, mainly digital literacy and regional disparities in access to digital education. The Covid-19 pandemic has disrupted multiple aspects of human life, prompting government to enforce restrictions on mass gathering and implement social distancing measures to curb the spread of the virus (Elliston 2020; Favale et al. 2020; Purnama et al. 2021). In the educational field, the management of student's learning activities has undergone significant transformation through the adoption of distance learning facilitated by technology and the internet (Churiyah et al. 2020). The implementation of online-based learning offers students opportunity to develop their competencies. This learning approach has potential to optimize students' time by streamlining often demanding tasks associated with modern education. Internet enables students to communicate, access entertainment, stay informed with current developments, and acquire information that fosters diverse perspectives and deeper understanding. Online learning is defined by the integration of digital technologies with modern educational practices. Being well-prepared for online learning is seen as beneficial for diverse learners, addressing the fundamental needs of among university students. In the current era of digital empowerment, it is essential for students in higher education to possess a certain level of digital literacy. This competence enables them to adapt more effectively to the increasingly digital nature of online learning environments (Theobald et al. 2021) and accelerate their potential and capacity for autonomous learning (Papamitsiou and Economides 2019). Despite providing positive sides, the distance learning using the internet offers certain advantages, it also exposes users particularly children to various online risks. One of the main drawbacks is social isolation which limited interaction between peers and teachers that promotes inadequate communication skills (Bokayev et al. 2021; Lemay, Bazelais, and Doleck 2021).

This study aims to examine the digital literacy attitudes oof EFL pre-service teachers, their

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perceived challenges, and their competencies in developing digital instructional media. The following research questions guide this inquiry: (1) How do EFL pre-service teachers perceive digital literacy in the context of instructional media development? (2) What challenges do they encounter in integrating digital tools into their teaching practices? (3) What strategies do they propose for enhancing digital literacy skills?

Literacy has traditionally encompassed a range of communicative and sociocultural practices shared among communities. As society and technology continue to evolve, so too does the concept of literacy (Zheng, Yuan, and Pan 2025). In today's highly connected and technologically advanced worlds, being literate requires individuals to possess and purposefully apply diverse set of skills, competencies, and attitude. These literacies are interrelated, constantly evolving, and adaptable. In the contemporary context of digital communication, a literate individual must be capable of critically assessing information across various formats, including print, audio, film, television, and digital media. In recent year, the educational sector has experienced significant disruption, leading to transformative changes in how the quality of learning is defined. As a result, digital literacy has gained prominence a key area of research in higher education (Kaloyanova, Leventi, and Kaloyanova 2023; Vermisli, Cevik, and Cevik 2022). Digital technology literacy plays a vital role in education, including enabling students to search for and evaluate credible reliable resources, protecting them from various cyber threats, avoiding misinformation, and fostering an understanding of their rights to privacy and data security (Isrokatun et al. 2022). Digital literacy refers to the process of constructing meaning through digital media (Akayoğlu et al. 2020). Its definition can be categorized into two aspects: the conceptual and the standardized operational. Digital literacy encompasses more than just technical know-how, it involves critical thinking, ethical use, and the ability to evaluate and produce information across digital platforms (Lankshear and Knobel 2008). Digital literacy also serves as a foundational element for several core competencies, including online information retrieval (Atoy et al. 2020), critical thinking, problem-solving, and communication skills. Moreover, for EFL pre-service teacher, this literacy is essential in navigating digital content fostering student engagement, and creating media-rich learning environments (Nguyen and Habók 2022). It also facilitates communication and collaboration with peers and teachers through digital platforms (Loglo and Zawacki-Richter 2023).

Digital literacy is a life skill encompassing the ability to utilize technology, information, and communication tools, alongside competencies in information management, critical thinking, and responsible online behavior (Ata & Yıldırım, 2019; Ma et al., 2024; Purnama et al., 2021; Reddy et al., 2022). Digital literacy plays a fundamental role in global education, equipping students with the ability to understand, utilize, and critically assess technology (Normuratova 2024). It enables them to effectively search for and evaluate online information, recognize the advantages and risks of digital tools, and cultivate creativity and problem-solving skills. Moreover, digital literacy can help bridge the information access gap, ensuring students are well-prepared in an increasingly digital society. It is a complex and multifaceted term that can be associated with activities ranging from coding to the consumption and creation of multimodal texts. Within the context of the English curriculum, digital literacy is understood as a practice that involves the use of digital modes of communication for the purpose of constructing meaning (Colton 2020). According to Normuratova (2024), digital literacy encompasses the ability to use, comprehend, and critically assess information and communication technologies (ICTs) and digital fluency for sustainable lifelong learning (Anthonysamy, Koo, and Hew 2020). It involves acquiring the skills necessary to efficiently locate, evaluate, create, and communicate information within a digital environment. ICTs have significantly transformed human life by providing access to information through content such as websites, reports, and videos while also contributing to passive digital consumption.

Several framework guide our understanding of digital literacy. Dudeney (2016) identifies four key components: language (multimodal literacy), information (search and evaluation), connections (participatory and intercultural literacy), and (re)design (content creation and remixing). Ferrari (2013) offers the DIGCOMP framework, which emphasizes information of processing, communication, content creation, safety, and problem-solving.

Digital competence is a complex and multidimensional concept that is essential for participation in the knowledge society, encompassing a broad spectrum of skills and

literacies. Although it is increasingly acknowledged as a fundamental competency within educational and policy frameworks, it lacks a standardized definition (Spante et al. 2018). Digital technology literacy is essential for enhancing teachers' professional development in delivering effective teaching and learning experiences (Blau, Shamir-Inbal, and Avdiel 2020). Digital competence has been recognized as one of the eight core competencies for lifelong learning, alongside multilingualism, mathematical proficiency, and skills in science, engineering, and technology (Getenet et al. 2024). It has been acknowledged that digital competence forms a fundamental aspect of digital literacy. Moreover, the attainment of digital competence is regarded as the initial step towards achieving digital literacy. Teacher professionalism is shaped by critical thinking, creativity, communication, and collaboration skills, as well as various forms of literacy, including digital technology literacy (List, Brante, and Klee 2020). This is particularly important as modern learning activities prioritize students' ability to think creatively and critically, demonstrate proficiency in information technology, and communicate and collaborate effectively (Lilian 2022). Therefore, prospective teachers must also develop strong digital technology literacy to support their professional competence and enable them to foster these skills in their students.

In 1999, the term Net Generation was introduced by Tapscott, evoking the notion that the new generation would possess a high level of competence in using new technologies due to their inseparability from digital devices in all aspects of life, particularly with the increasing frequency of mobile phone usage. Similarly, the seminal distinction between digital natives and digital immigrants, proposed by Prensky (2001), suggested that those born into a digitally connected world would naturally develop technological competence. In contrast, digital immigrants would be required to learn how to integrate technology into their practices in- order- to become proficient users. A decade later, this distinction was challenged by White and Le Cornu (2011), who argued that digital skills were not primarily determined by age but rather by the time and effort invested. Consequently, the terms digital residents and digital visitors were suggested as more appropriate classifications.

However, nearly two decades after Prensky's (2001) identification of digital natives, it appears that these individuals have not necessarily become digital residents. This may be attributed to the fact that, despite their extensive integration into everyday life, digital technologies have not yet reached a state of normalization. It has been suggested by Dudeney and Hockly (2016) that language teachers play a crucial role in facilitating learners' acquisition of digital literacy skills by integrating technology into language learning tasks and activities. However, it has also been argued that such engagement with digital literacy skills can only be ensured if teachers themselves possess digital literacy competence. Consequently, it has been emphasized that both pre-service and in-service teacher education programs should not only focus on equipping educators with the necessary technical skills. However, it should also provide them with an understanding of digital technologies, their significance, and their practical application in language teaching. In learning strategy, students are expected to complete assignments by sourcing information from the internet and other digital platforms, participating in online discussion forums, and staying informed about current developments (Fazilla, Bukit, and Sriadhi 2023). Furthermore, the strategy often involves activities such as searching for, processing, organizing, and presenting information in various formats including text, images, audio, and others which necessitates proficiency in the use of digital resources and tools (Cueva and Inga 2022).

Previous studies show pre-service teacher often overestimate their digital competence, especially in areas involving ethical judgement and critical evaluation (Yünkül and Güneş 2022). This gap highlights the need for structured interventions in teacher education programs to ensure both technical and pedagogical readiness.

METHOD

This qualitative study followed Creswell's (2012) approach to explore digital literacy attitudes of seventh-semester EFL pre-service teachers. Data were collected using open-ended questionnaire and semi-structured interviews via Google Forms. The instrument was validated by experts in education and digital media (Yang 2022).

Participants consisted of 15 English Education students from Universitas Muhammadiyah Cirebon, all enrolled in a Digital Teaching Media course. Demographics showed a majority of female students, and all were engaged in developing digital instructional media as part of their coursework presented in Table 1.

Table 1. *The participants demographic data*

Semester	Male	Female
7		1
7		1
7		1
7		1
7		1
7		1
7	1	
7	1	
7	1	
7	1	
7		1
7		1
7		1
7	1	
7	1	
Total	6	9

The table above presents the demographic profile of the study participants, focusing on the digital literacy attitudes of EFL pre-service teachers creating learning media. All participants were seventh-semester students, consisting of six males and nine females. This composition indicates that majority of participants were females, which influence the study's findings regarding preferences and challenges in using digital tools. The data also provide insights into the diverse perspectives on technological proficiency and digital ethics, which are crucial factor in the effectiveness of digital learning media development.

Data were collected through written open-ended questions. There were five principal reasons for adopting this method. Firstly, at the time of data collection, existing scales and questionnaires on digital literacy were largely field-specific, and a reliable, validated scale for assessing the digital literacy levels of seventh-semester English Education students at one Muhammadiyah Universities in West Java. Secondly, most existing digital literacy scales were primarily focused on technical ICT skills, which were often dependent on specific tools. Thirdly, the content of these scales essentially included up-to-date tools, which are still in use.

Furthermore, a qualitative research approach was considered more appropriate for obtaining an in-depth understanding of participants' perspectives on digital literacy and for allowing their self-assessment of digital competencies. Lastly, due to time and resource constraints, it was not feasible to conduct face-to-face individual interviews with all participants. Therefore, four semi-structured interview questions were distributed via Google Forms to facilitate data collection: (1) What digital tools do you use? And why? Please give examples. (2) Which social media services do you use? How? For what kind of purposes do you use them (academic, personal issues, just for communication)? (3) How do you think you can use digital tools to teach English? Please give details with examples. (4) What do you understand from the phrase digital literacy? Would you identify yourself as a digitally literate person? As a digitally literate pre-service teacher? Why/Why not? Please give details and examples.

In this study, a qualitative research design was employed to explore students' perceptions of digital literacy and their experiences in creating digital learning media. The analysis focused on identifying recurring patterns and themes from the questionnaire responses and interview data. In addition to defining digital literacy, the students were asked to evaluate their digital literacy skills with semi-structured interviews via Google Forms.

Data were analyzed using thematic analysis, involving coding, theme identification, and interpretation. Kay themes emerged regarding attitudes, challenges, and proposed solutions related to digital literacy.

RESULTS AND DISCUSSION

Defining digital literacy based on the answer from semi-structured interviews through Google Forms, these students predominantly focused on the affective contribution of technology to themselves and their students, as demonstrated in the following answers:

> 'I use a variety of digital tools in my studies and classroom activities. For example, I use Google Workspace (Google Classroom, spreadsheets, Google Sites, etc.) to organize assignments, share resources, and facilitate communication with my friends or lecturers. I also use Zoom for virtual classes, especially in situations where face-to-face learning isn't possible. For language learning, I use Canva to create a design poster, make a lesson plan, create documents, etc. These tools help me to make learning more accessible.' – Student A

> 'I use several social media platforms for different purposes. Such as Instagram to explore and share creative ways of teaching English, such as short grammar tips, storytelling, and pronunciation challenges. And YouTube as a platform to find and share educational content related to language learning.' – Student B

On the other hand, some students consider themselves digitally literate people, particularly due to their ability to navigate social media, utilize search engines, and produce digital content. They often associate digital literacy with fundamental computer skills, such as proficiency in Microsoft Office or video editing for academic purposes. However, digital literacy extends beyond mere technical competence; it encompasses the ability to critically evaluate information, understand digital ethics, and employ technology effectively for learning and communication.

> 'Digital literacy means being able to use digital tools and technology to find, understand, create, and share information safely and responsibly. It includes skills like using online resources, checking information for accuracy, staying safe online, and communicating effectively.' – Student C

> 'Yes, I consider myself digitally literate due to I use various digital tools for learning and daily tasks. For example, I use Google Scholar, Elsevier, Taylor and France, Cambridge to find research articles, Microsoft Office and Google Docs for writing, and Canva for designing materials. I also follow online safety rules, like avoiding unreliable sources and citing information properly.' – Student D

> 'As a future teacher, digital literacy helps me teach better. I use Canva to create teaching materials, Kahoot! and Quizizz for quizzes, and YouTube for learning videos. I can also help students learn how to use digital tools wisely and safely.' – Student E

> 'In short, being digitally literate makes teaching more engaging and effective, helping students prepare for a digital world.' – Student F

> 'I consider myself a digitally literate person because I can effectively utilize digital tools to enhance teaching and learning experiences. I adapt to new technologies and integrate them into my daily life and my project teaching methodologies. For example, in my Digital Teaching Media project, I integrate Padlet for argumentative text analysis, ensuring students engage in critical reading and writing. This demonstrates my ability to use technology to support student learning in a meaningful way.' – Student G

Some students may rely on Google for quick information retrieval, and they may struggle to assess the incredible number of sources. Others may excel in using digital platforms for social interaction yet find it challenging to navigate academic databases efficiently. These differences illustrate the varying levels of digital literacy among students, which can significantly impact their learning experiences and their ability to engage with digital teaching media effectively.

To interpret the significance of each item in the questionnaire, responses were categorized into positive, negative, and neutral perceptions. Responses such as "Agree" or "Strongly Agree" were classified as positive, whereas "Disagree" or "Strongly Disagree" were classified as negative. Neutral responses were examined separately to understand the potential ambiguities of indecisiveness in students' views.

Data were analyzed using thematic analysis, following Creswell's (2012) qualitative research framework. This involved: (1) Familiarization with data. (2) Coding (3) Theme identification (4) Interpretation.

The study sought to understand students' attitudes, challenges, and motivations in integrating technology into teaching. The findings were contextualized within the broader discussion of digital literacy development among EFL pre-service teachers. By focusing on students' lived experiences and reflections, this qualitative approach provided deeper insights into their perceptions and needs regarding digital learning media. The following questions were addressed in the open-ended questionnaire Google Form presented in Table 2:

Table 2. *Frequently analysis for each item in the survey*

	Item	Frequency
Section A: Respondent Identity		
2.	Type of Digital Learning Media Created: Instructional Video Interactive Website Infographic / Digital Poster Application / Educational Game Other: __	15
Section B: Attitude Towards Creativity in Digital Learning Media		

3.	I feel free to express my creative ideas in digital learning media.	
	Negative	
	Positive	15
	Neutral	
4.	The media I created contains innovative elements that differentiate it from other learning materials.	
	Negative	
	Positive	12
	Neutral	3
5.	I can integrate various multimedia elements (images, audio, video, animation) to enhance the quality of the media.	
	Negative	
	Positive	14
	Neutral	1
6.	Technological limitations or lack of technical skills hinder my creativity in media development.	
	Negative	11
	Positive	2
	Neutral	2
7.	I am satisfied with the level of creativity in the digital learning media I have created.	
	Negative	
	Positive	14
	Neutral	1
Section C: Application of Digital Literacy		
8.	I use credible sources of information in developing my digital learning media.	
	Negative	
	Positive	9
	Neutral	6
9.	I understand the concept of copyright and always cite sources when using materials from the internet.	
	Negative	4
	Positive	8
	Neutral	3
10.	I ensure that the media I create is accessible and user-friendly for the intended audience.	
	Negative	
	Positive	15
	Neutral	
Section C: Application of Digital Literacy		
11.	I consider digital security aspects in my digital learning media.	
	Negative	
	Positive	13
	Neutral	2
12.	I feel that I have sufficient digital literacy skills to create effective digital learning media.	
	Negative	
	Positive	7
	Neutral	8
Section D: Challenges and Suggestions		
13.	The main challenges I face in developing digital learning media are:	
	Lack of technical skills	
	Lack of creative ideas	8
	Difficulty in finding credible sources of information	3
	Technical issues (software, devices, etc.)	4
	Other: __	
14.	The primary sources I use to learn how to create digital learning media are:	
	Course materials / lecturers	10

	YouTube / online tutorials	4
	Online courses (Coursera, Udemy, etc.)	
	Discussions with peers	1
	Other: __	
15.	What are your suggestions for improving students' skills in creating more creative and high-quality digital learning media? Open-ended response: _____	

Table 3. *Open-ended response table 2, number 15*

Open-ended response:	
What are your suggestions for improving students' skills in creating more creative and high-quality digital learning media?	Provide more suggestions or knowledge about learning websites to students.
	Students should further develop their ability to use technology and be more supported in receiving courses on coding and other relevant skills to become more familiar with utilizing advanced technological capabilities. They should continuously explore the use of various technological media to develop better digital media in the future.
	To enhance students' skills in creating digital learning media, they must understand the needs of their audience, namely, the students who will be the target users of the media.
	Before digital learning media is widely used, it would be beneficial for students to have a platform to conduct trials with a group of students matching the target audience. After that, students can collect feedback from both students and lecturers for further improvements.
What are your suggestions for improving students' skills in creating more creative and high-quality digital learning media?	I believe it would also be beneficial to discuss the role of AI in education, highlighting what can and cannot be used, especially concerning copyright. Ethical attitudes regarding this matter are rarely addressed, leading to some students not understanding copyright issues in academic writing or digital concepts.
	Using engaging animations is essential to capture the audience's attention. Education students should explore new aspects of technology, not only by utilizing existing technological tools but also by creating works that can be beneficial to others.

Based on the results of the questionnaire above provide an overview of pre-service EFL teachers' digital literacy attitudes and challenges in developing the digital learning media. Most participants focused on creating interactive websites (15 responses), with fewer opting for instructional videos, infographics, or educational applications. In terms of creativity, the majority felt free to express their ideas (15 positive responses) and believed their media contained innovative elements (12 positive, 3 neutral). Most participants also integrated multimedia elements effectively (14 positive, 1 neutral) but acknowledged that technological limitations hinder creativity (11 negative, 2 neutral, 2 positive). Regarding digital literacy, 9 participants used credible sources, while 8 understood copyright laws, and 13 considered digital security aspects. However, only 7 felt fully confident in their digital literacy skills, with 8 remaining neutral. Key challenges included lack creative ideas (8 responses) and technical issues (4 responses), while course materials and lecturers (10 responses) were the primary learning sources. These finding suggest that more structured training, hands-on practice, and access to reliable resources are essential to enhance digital media development skills among pre-service teachers.

The analysis of responses from seventh-semester pre-service English teachers provided key insights into the use of digital tools, attitudes towards digital literacy, and challenges encountered in digital media development. Several significant themes were identified:

Canva, Word-wall, and Lumi education were identified as the most frequently utilized tools for the creation of digital learning media. Social media platforms, including YouTube, X (Twitter), Instagram, and Facebook, were widely employed for academic purposes such as language learning and professional development. Additionally, Quizizz, Kahoot, and Google Workspace were frequently used for interactive learning activities.

Participants demonstrated enthusiasm toward integrating digital tools such as Canva, Word-

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wall, and Padlet into their teaching. Many reported using these platforms for creating posters, quizzes, and interactive lessons. However, they also expressed challenges in using advanced tools, citing lack of training and difficulty in assessing credible sources.

The majority defined digital literacy as the ability to search, evaluate, and produce content responsibly. While some considered themselves digitally literate due to their use of tools like Google Scholar and Canva, others acknowledged limitations in understanding copyrights, digital ethics, and source credibility. Survey data indicated that 100% felt free to express creativity, and 80% believed their products were innovative. Furthermore, 93% of students were successfully integrated into multimedia, 73% faced technical barriers, and only 46% felt confident in their overall digital literacy skills.

Recommendations included more workshops, trial phases for media testing, and guidance on digital ethics and AI integration. These findings align with study by Guillén-Gámez & Mayorga-Fernández (2019) and Willig et al. (2021), which emphasize the importance of structured training in developing both competence and confidence among future educators. However, the present study identifies key gaps in digital literacy skills, particularly in relation to technical proficiency, ethical digital practices, and the evaluation of resources. Additionally, although participants actively engaged with digital tools, their technical limitations and lack of structured training indicate that teacher education programs should incorporate more practical, technology-focused courses. The integration of pilot testing and feedback mechanisms into the curriculum could significantly enhance the effectiveness of digital learning media before it is introduced into the classroom. To provide a clearer understanding of how digital literacy skills impact in media creation, Figures 1 and 2 illustrate participants' attitudes toward creativity and their application of digital literacy in developing digital learning media. These figures highlight both the strenghts and areas for improvement in their approach to digital media production.

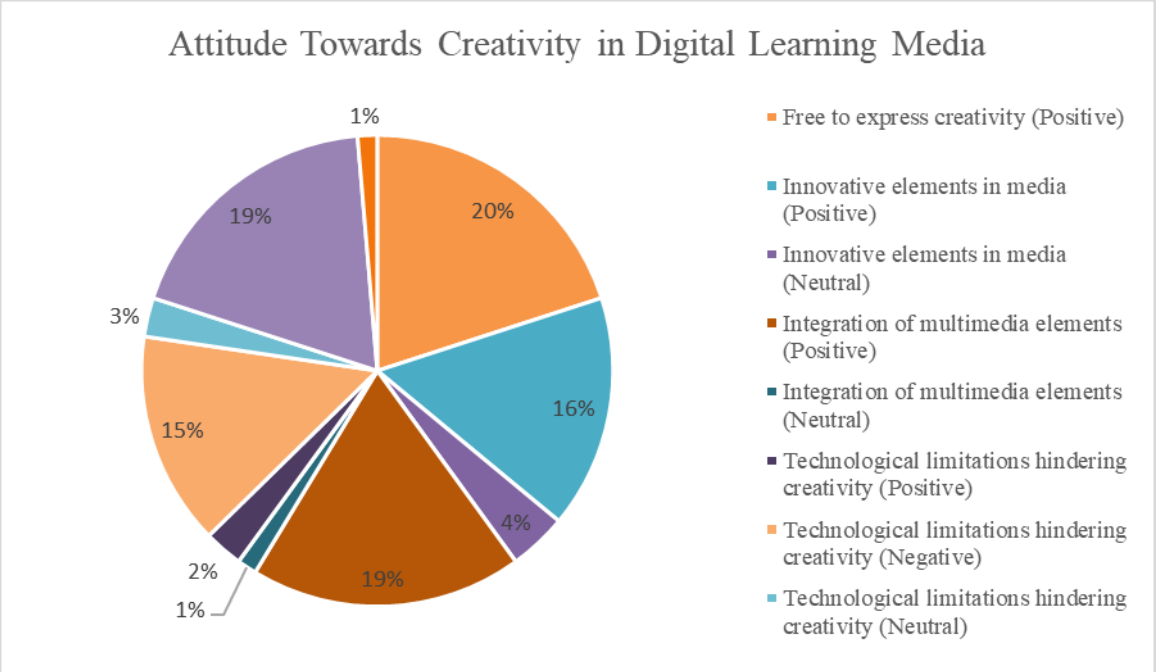

Figure 1. *Attitude towards creativity in digital learning media*

Figure 1 demonstrates that all participants (100%) feel free to express their creativity in digital learning media. Additionally, 80% believe their media contains innovative elements, while 20% remain neutral. Most participants (93.3%) successfully integrate multimedia components such as images, audio, and animation, enhancing their media's effectiveness. However, technical limitations pose a challenge, with 73.3% disagreeing that these limitations hinder their creativity, 13.3% remaining neutral, and 13.3% acknowledging these barriers. Overall, 93.3% express satisfaction with their creativity, indicating a strong enthusiasm for digital media development despite existing challenges.

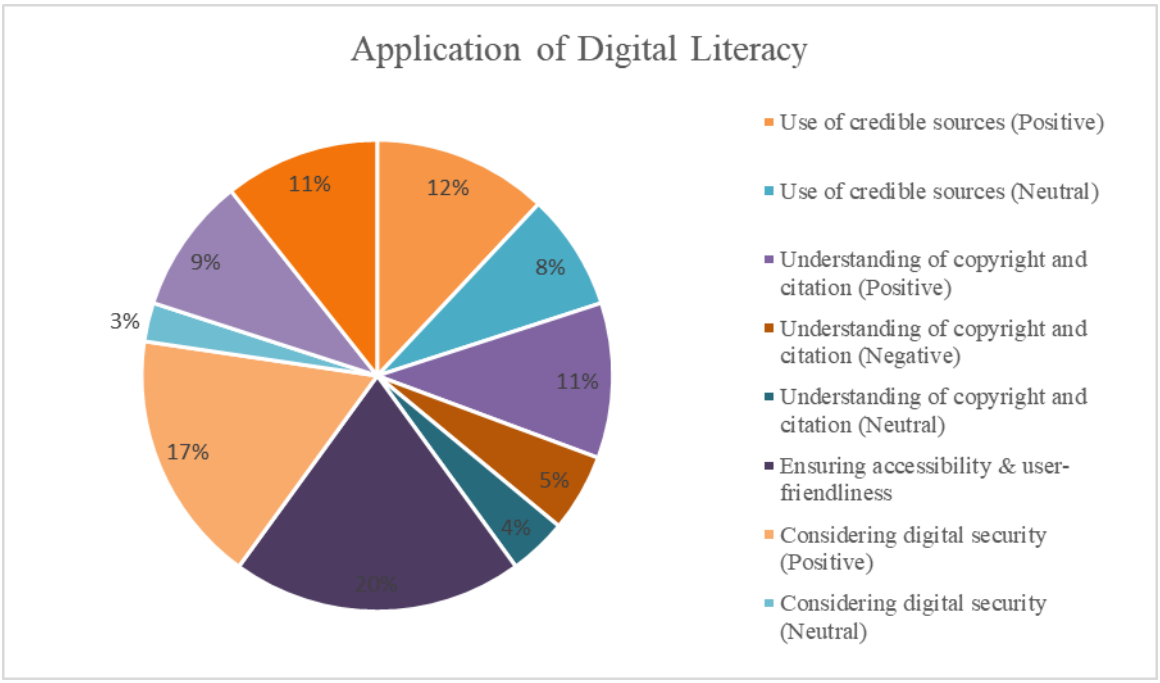

Figure 2. *Application of digital literacy*

Figure 2 explores participants' application of digital literacy skills. While 60% rely on credible sources, 40% remain neutral, suggesting room for improvement in information verification. Understanding of copyright and citation varies, with 53.3% demonstrating awareness, 20% being neutral, and 26.7% lacking sufficient understanding. Notably, all participants (100%) ensure their media is accessible and user-friendly. Digital security considerations are high, with 86.7% incorporating safety measures, though 13.3% remain neutral. However, confidence in digital literacy skills is mixed, with 46.7% feeling adequately skilled and 53.3% remaining neutral. These findings suggest that while students demonstrate strong engagement with digital tools, there is a need for more structured training in ethical practices and digital proficiency.

CONCLUSION

The study has offered significant insights into the digital literacy attitudes of EFL pre-service teachers in the development of digital learning media. While participants exhibited a keen interest and willingness to incorporate digital tools into their teaching, several challenges were identified, including limited technical proficiency, a lack of structured training, and insufficient awareness of ethical digital practices. These findings underscore the importance of enhancing digital literacy training to ensure that future educators acquire the necessary skills to create and implement digital learning materials effectively.

To bridge this gap, teacher education programs must integrate hands-on workshops with digital tools, modules on copyright, digital ethics, and AI use, and opportunities for peer review and pilot testing of instructional media. By implementing these improvements, pre-service teachers will be better equipped for the dynamic landscape of technology-enhanced education. Strengthening digital literacy competencies will enable them to design and deliver innovative, engaging, and pedagogically effective digital learning experiences, thereby contributing to the advancement of EFL teaching and learning in the digital era.

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