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Research Article

EVALUATION OF STUDENTS' DIGITAL LITERACY SKILLS THROUGH THE USE OF A LEARNING MANAGEMENT SYSTEM

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Abstract
Digital literacy is an important competency that students must possess in facing learning and academic life in the digital era. Student digital literacy is inseparable from the use of a learning management system. This study aims to measure students' digital literacy abilities in terms of four main components: digital ethics, digital culture, digital skills, and digital security after participating in learning with a learning management system. This study uses a survey research type with a descriptive analysis design. Data were processed using the statistical application SPSS 20. The population in this study were all active students of the Faculty of Teacher Training and Education in the odd semester of 2025/2026 and the sample consisted of 75 students who had participated in learning using an online learning management system. The results showed that the overall level of student digital literacy was in the very high category (96%) and high: 4%. Each digital literacy variable was measured by six statements. Currently, there are many learning management systems circulating as a result of technological developments with various learning process features provided digitally, so that universities massively organize online learning but neglect to evaluate students' digital literacy abilities after participating in learning with a digital learning management system. This study recommends the importance of evaluating digital literacy skills as an impact of the use of technology in the learning process in higher education.

Keywords: Digital Literacy, Learning Management System, Skills

INTRODUCTION

Digital literacy is a person's ability to use, understand, and participate effectively in the digital world, accessing, evaluating, analyzing, and utilizing information found online. This involves understanding and using digital technology, including hardware and software, such as computers, mobile phones, and laptops, as well as the applications and software needed to access, manage, and store information. Digital literacy also encompasses an understanding of online privacy and security, digital ethics, evaluating the validity and relevance of information found online, the ability to communicate and collaborate through digital media, and the ability to manage and filter information found online. Based on the Indonesian Digital Literacy Index conducted by the Ministry of Communication and Informatics (Kemkominfo) in collaboration with the Katadata Insight Center (KIC) in 2020, Indonesia's digital

literacy index was at 3.46 points. Then in 2021, it rose to 3.49 points (an increase of 0.03 points). In 2022, Indonesia's digital literacy index successfully increased from 3.49 to 3.54 points (an increase of 0.05 points) with a rating scale of 0-5. This increase indicates progress in the understanding and use of digital technology in Indonesia. The level of digital literacy in Indonesia is still categorized as low, especially in educational institutions.

This low level of access is due to the technological infrastructure gap, where not all schools and students have access to fast internet and adequate computer equipment, especially in underdeveloped, frontier, and outermost (3T) areas (Yeyendra et al., 2025b), (Wedayanti & Santi, 2024), (Saputra A.I. et al., 2024), (Subroto et al., 2023). The technological infrastructure gap leads to unequal access to information, learning materials, and educational quality between students in urban and remote areas. Limited internet access and digital devices hinder interactive learning, reduce digital literacy levels, and lead to lower academic performance (Harahap & Napitupulu, 2023). Furthermore, the misuse of technology, such as the irresponsible use of technology (e.g., ChatGPT or AI writing services), has led to an increase in cases of plagiarism and academic dishonesty, such as copying digital work, using illegal content, and exploiting technology to complete assignments without their own efforts (Arifin, 2021; Evangelista et al., 2021).

The low digital literacy of students is also caused by limited critical thinking skills, where students have difficulty distinguishing true (valid) information from hoaxes, and are less skilled at evaluating the digital content they consume, (Falahhuddin1 et al., 2024; Mayasari et al., 2025; Andrianto & Romandi, 2025). Limited critical thinking makes students vulnerable to the spread of disinformation, especially because hoax creators often use verified usernames or convincing formats and are inconsistent in verifying information and tend to only check the truth of information that suits their interests or needs. Improving digital literacy through strengthening critical thinking, such as verifying sources (checking data, analyzing arguments), is crucial for students to face the current information conditions.

Students need to understand the four main components of digital literacy: digital ethics, digital culture, digital skills, and digital security. Therefore, a comprehensive mapping of students' digital literacy levels is crucial as a basis for formulating policies and strategies to strengthen digital literacy in higher education. An analysis of digital literacy, including digital ethics, digital culture, digital skills, and digital security, is expected to provide an empirical picture of students' readiness to face learning and academic life in the digital era (Scherer et al., 2021; Siddiq et al., 2015; Siddiq et al., 2015). Students' readiness to learn and learn in the digital age is improved by using digital learning management systems.

Digital literacy is a multidimensional competency encompassing technical, cognitive, and social aspects (Spante et al., 2018; Laara et al., 2020). Several studies indicate that students are relatively superior in basic technology aspects, but remain weak in information literacy, particularly in assessing the accuracy and validity of digital sources (Koltay's, 2019; McGrew, 2021; Reddy et al., 2020). Furthermore, recent research has highlighted students' low digital security awareness despite their high level of digital technology use (Park & Jang, 2021; Zhao et al., 2022; Yeyendra et al., 2025a).

In Indonesia, research on student digital literacy is generally descriptive and has not specifically integrated the four main components of digital literacy: digital ethics, digital culture, digital skills, and digital security into a single, coherent analytical framework (Sutrisno & Arifin, 2022; Pratama et al., 2025). Therefore, this study offers a novel approach by presenting an integrated analysis of students' digital literacy levels based on these four main dimensions, relevant to the challenges of digital transformation in higher education.

In today's digital era, information and communication technology has become an essential part of human life, including in education (Siringoringo, 2024). Students, as a generation growing up and developing amidst technological advancements, are expected to possess adequate digital literacy skills to support their learning and self-development. Digital literacy encompasses not only the ability to use technological devices but also the ability to search, evaluate, and utilize information effectively, ethically, and safely (Umayah & Mawan, 2020). Digital literacy also refers to how an individual manages, analyzes, and evaluates information, leading to the formation of new knowledge (Su et al., 2023).

The need for digital literacy has become increasingly important due to changes in learning patterns that adopt technology, such as online learning, hybrid learning, and the use of digital-based learning resources (Rizqi, 2023). Digital platforms, such as e-learning, social media, and online forums, provide extensive access to various sources of information and learning materials, enabling students to learn flexibly and independently. In addition, the development of social media and the internet has also

given rise to new challenges, such as the spread of false information (hoaxes), personal data security, and digital ethics (Lubis et al., 2023).

In this context, students need to have the skills to filter information, understand the impact of technology use, and use it responsibly (Pratama et al., 2025). Students must possess critical thinking skills in using technology and develop social awareness, including an understanding of how and when digital technology can be used effectively and safely (Mahmud et al., 2021; Arfani et al., 2023). As technology usage increases in the professional world, digital skills become even more important. Digital literacy is crucial for employability (Gallardo-Echenique & Marqués-Molias, 2015; Anthonysamy, 2021). This is due to the challenges of a world of work that is increasingly dependent on technology.

A well-known technology for increasing learning effectiveness and playing a significant role in educational transformation is the digital learning management system. A digital learning management system is software designed to create, distribute, and manage the delivery of online learning content (Alia, 2022). The key factors that make LMSs popular in educational settings are flexibility and cost savings (Juarez Brenda Santiiago et al., 2020). Digital learning management systems facilitate student learning, enhance student interaction, and enable more effective monitoring of student progress (Nikhil et al., 2021). LMS applications have a positive effect on improving learning access, quality, and efficiency (Hidayat et al., 2023).

RESEARCH METHOD

This research is a quantitative descriptive study, as the researcher aims to obtain an overview of students' digital literacy skills after participating in learning using a digital learning management system. The population in this study were active students of the Faculty of Teacher Training and Education in the odd semester of 2025/2026. The sample was taken using a simple random sampling technique of 75 students. The data collection instrument used was a Likert scale questionnaire grouped into four main components: digital ethics, digital culture, digital skills, and digital security. Data were processed using SPSS statistical applications and Microsoft Excel

Table 1. Statement Variables for Measuring Digital Literacy Skills

No	Variable	Statement Items
1	Digital Ethics	1, 2, 3, 4, 5
2	Digital Culture	6, 7, 8, 9, 10, 11
3	Digital Digital Skills	12, 13, 14, 15, 16,
4	Digital Digital Security	17, 18, 19, 20, 21, 22

Table 1 shows that the total number of statements to measure students' digital literacy skills is 22.

Table 2. Validity and Reliability of the Learning Management System.

No	Variabel	Jumlah item
1	Usability Quality	8
2	Information Quality	7
3	Service Interaction Quality	7
4	Website Service Quality (Overall)	1
5	User Satisfaction	2
6	Intention to Use	2
7	Net Benefit	3

Table 2. Shows that to measure the validity and reliability of the digital learning management system used are 31 items. The formula to determine the categorization used

Table 2. Categorization of Digital Literacy Ability Scores

Skor	Category
≤ 12	Low
$12 < s \leq 24$	High
>24	Very High

RESULTS AND DISCUSSION

The research results are based on data processing of responses from 75 active students who have participated in learning using a valid and reliable digital learning management system. Data collection from the questionnaire used a Likert scale: 5 = Strongly Agree, 4 = Agree, 3 = Somewhat Agree, 2 = Disagree, and 1 = Strongly Disagree.

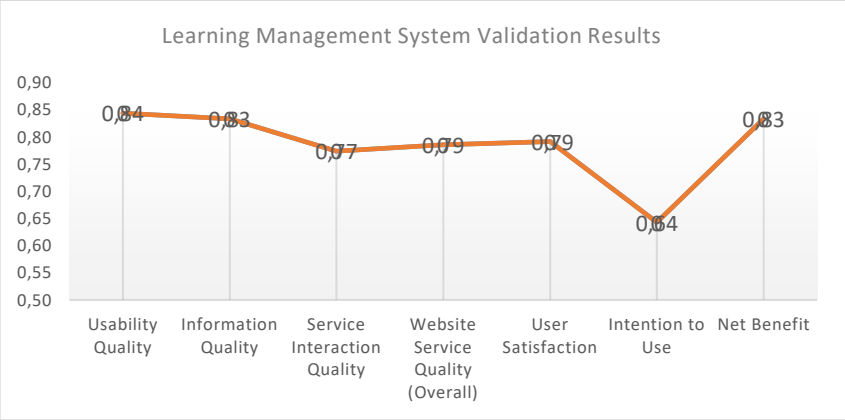

Figure 1 shows that the learning management system, according to the expert validator, is suitable for use and has an Aikens'v coefficient of >0.60.

Table 3. Validity and Reliability Results of the Digital Literacy Skills Questionnaire (n=75)

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
P1 ED	,316	,736
P2 ED	,346	,739
P3 ED	,337	,738
P4 ED	,500	,735
P5 ED	,664	,725
P6 ED	,684	,723
P7 BD	,635	,733
P8 BD	,483	,735
P9 BD	,465	,736
P10 BD	,349	,737
P11 BD	,520	,731
P12 BD	,346	,739
P13 KD	,337	,738
P14 KD	,500	,735
P15 KD	,500	,735
P16 KD	,635	,733
P17 KD	,500	,735
P18 KD	,635	,733
P19 AD	,664	,725
P20 AD	,684	,723
P21 AD	,635	,733
P22 AD	,500	,735
P23 AD	,635	,733
P24 AD	,483	,735

Table 3 shows that all items have a calculated r value > 0.227, thus concluding that all items in the questionnaire are valid.

Table 4. Reliability of the Student Digital Literacy Skills Questionnaire

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,743	,911	25

Table 4 shows the reliability value using the Cronbach's Alpha method, with a value of 0.750 > 0.70. Therefore, it can be concluded that all statements in the questionnaire are reliable as a data collection tool and can be used for further analysis.

Digital Ethics Skills

Table 5. Digital Ethics Skills Score Categories

Category	Frequency	Percent
High	14	18,7
Very high	61	81,3
Total	75	

Table 5 shows that 81.3% of students already have very high digital ethics skills, while 18.7% of students have high digital ethics skills.

Digital Culture Competencies

Table 6. Digital Culture Competencies Score Categories

Category	Frequency	Percent
High	19	25,3
Very high	56	74,7
Total	75	

Table 6 shows that 74.7% of students already have very high digital culture skills, while 25.3% of students still have high digital culture skills.

Digital Skills

Table 7. Digital Skills Score Categories

Category	Frequency	Percent
High	20	26,7
Very high	55	73,3
Total	75	

Table 7 shows that 64% of students already have very high digital skills, while 36% of students still have high digital skills.

Digital Security Capability

Table 8. Digital Security Capability Score Categories

Category	Frequency	Percent
High	17	22,7
Very high	58	77,3
Total	75	

Table 8 shows that 77.3% of students already have very high digital security skills while 22.7% of students have high digital security skills

Digital Ethics

Digital ethics is a set of values, norms, and moral principles that guide responsible behavior when using technology and the internet. The results of this study indicate that students already possess digital ethics skills, with 81,3% categorized as very high and 18,7% categorized as high. This indicates that students already possess the skills to develop a set of moral principles and norms for digital behavior, namely, a guide to values, rules, and standards of behavior that govern how individuals interact, share information, and use technology responsibly, politely, and safely (Muhammad Syahru Romadhon, 2025), (Pramanda et al., 2018), and (Yafithufail & Ashabul Kahfi, 2025).

Digital ethics encompasses respect for privacy, the use of appropriate language, and honesty. Specifically, digital ethics includes not spreading hoaxes, avoiding cyberbullying (Nuryanto et al., 2023), respecting the work of others, and using appropriate language, using polite language when sending messages, and avoiding using all capital letters (shouting).

Avoiding cyberbullying, not sharing other people's phone numbers, addresses, or photos without permission, and using secure passwords, disseminating accurate and responsible information (Khoirulloh et al., 2023), (Mukaddam & Cahyadi, 2025). Digital ethics also includes the ability to cite sources or links when taking other people's writing/photos and not plagiarizing, using digital devices for positive things (Nofrizal, 2026), (Wahyuni, 2018), (Luthfiyah et al., 2025).

Digital Culture

Digital culture is a pattern of behavior, values, and practices that develops as a result of the use of digital technology and the internet in everyday life, or a behavioral shift in how people think, behave, and interact in cyberspace (Suherwin et al., 2025). This culture is changing the way students interact, work, and learn. Research shows that 74,7% of students already have a very high level of digital culture, and 25,3% have a high level. Students communicate and interact using instant messaging (WhatsApp), video conferencing (Zoom/Meet), and the use of memes, hashtags, and emojis on social media to express themselves. Learning management systems enable students to create, share, and collaborate online, rather than simply being consumers of information.

Research shows that students already have the skills to create content on TikTok/YouTube, contribute to Wikipedia, work collaboratively using Google Docs, or build communities on Discord. Digital culture also includes daily consumption habits that are digital-based, efficient, and convenient, such as online shopping on e-commerce (Shopee, Tokopedia), using e-wallets (GoPay, OVO), and subscribing to streaming services (Netflix, Spotify).

Digital Skills

Digital skills are an individual's ability to understand, use, manage, and create content using information and communication technology (ICT) wisely, intelligently, and productively. These skills are one of the main pillars of digital literacy. Research shows that students' digital skills have increased, with 73,3% categorized as very high and 26,7% categorized as high.

Digital skills encompass basic skills in operating technological hardware and software such as computers, laptops, and smartphones (Eynil, 2025). The ability to use productivity applications such as Microsoft Office or Google Docs/Sheets, install and update software, search, locate, evaluate, and manage information from various digital sources are integral parts of digital skills. Using search engines like Google to accurately find information, and storing and categorizing data in cloud storage like Google Drive (Nurdin et al., 2023) are essential components of digital skills.

The ability to communicate and collaborate using digital platforms effectively and safely, edit photos or videos using applications (Canva, CapCut), write blogs, articles, or social media content, create attractive visual presentations (Rosanti et al., 2023), (Nehe et al., 2023).

Digital Security

Digital security is all efforts, technologies, and practices designed to protect devices, networks, and personal data from unauthorized access, theft, or damage. Components of digital security include data, network, device, and identity protection to prevent unauthorized access, including encryption, authentication (2FA), firewall/antivirus, access control, and data backup. The results of this study indicate that students' digital security skills have increased, with 77,3% categorized as very high, and 22,7% categorized as high.

These percentages indicate that students are now capable of verifying their identity using strong passwords, Two-Factor Authentication (2FA/OTP), and biometric authentication (fingerprint/facial) (Andria et al., 2024), (Muhammad et al., 2025), and (Ayu Rahma et al., 2024). The capabilities of digital security components also mean being able to change data into random code so that it cannot be read without a special key, such as limiting access to sensitive data, storing copies of data to anticipate loss, automatically backing up data to cloud storage (Google Drive, iCloud) (Nurjanah & Destya, 2022), (Rizky Julianty et al., 2025).

CONCLUSION

Based on the research results and discussions that have been conducted, it can be concluded that students' digital literacy skills can be improved by using a learning management system. Digital literacy skills with 4 components, namely digital ethics, digital culture, digital skills and digital security, are a complete unit and not separate parts that are applied in a learning management system. Twenty-six items in the questionnaire prove that digital literacy skills have increased after using a digital learning management system. The findings show that digital literacy skills are in the very high and high categories for the four main components of digital literacy. Obstacles found in improving digital literacy skills are the lack of digital facilities and infrastructure such as signals, electrical currents, data packages, which are categorized as external factors of the learning management system. This study emphasizes the importance of efforts to improve digital literacy in higher education based on a systematically designed learning management system.

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AUTHOR CONTRIBUTIONS

All authors contributed to the research design, data collection, analysis, and writing of the manuscript. Each author has approved the final version of the paper.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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