The Importance of Digital Literacy in Facing the Impact of Information Technology on Student Character

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Article Info	Abstract
	The development of information and communication technology (ICT) has brought significant changes to the world of education and has influenced the character development of students. The use of digital technology provides opportunities to improve the quality of learning, but also raises various problems, such as declining ethics, low social empathy, plagiarism, and misuse of digital media. This shows that the ability to use technology technically is not necessarily accompanied by wise and characterful attitudes. Therefore, digital literacy is a crucial aspect in addressing the impact of technological developments on students' character. This study aims to examine the role of digital literacy in shaping and strengthening students' character in the digital era. The method used is a Systematic Literature Review (SLR) by examining relevant scientific articles, books, and policy documents published in the period 2015–2025. Data were obtained from Google Scholar, Scopus, and ResearchGate, then analyzed qualitatively through thematic selection and synthesis. The results of the study indicate that digital literacy encompasses cognitive, social, and ethical aspects that play an important role in the development of students' character, such as honesty, responsibility, independence, and digital ethics. Furthermore, information technology has both positive and negative impacts on student character, which is heavily influenced by digital literacy levels and the role of educators and educational institutions. This study recommends integrating digital literacy into the curriculum and strengthening the role of educators so that the use of technology in education focuses not only on technological mastery but also on character development in students.

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1. INTRODUCTION

The development of information and communication technology (ICT) over the past two decades has brought fundamental changes to social life, including education. Today's students are growing up in a digital environment characterized by widespread access to the internet, social media, smart devices, and various digital platforms.(Oh et al., 2021)This phenomenon has given rise to a generation of digital natives who interact intensively with technology from an early age. Information technology not only serves as a learning tool but also shapes students' mindsets, behaviors, values, and character in their daily lives.(Khairunisa & Sundawa, 2023).

Globally, UNESCO and UNICEF data show that more than 70% of school-age children and adolescents actively use the internet daily, both for learning and entertainment. In Indonesia, a report from the Indonesian Internet Service Providers Association (APJII)

noted that internet penetration among the 5–18 age group continues to increase and has exceeded 80%. This massive access to technology presents significant opportunities for improving the quality of learning, creativity, and information literacy.(Lukmantoro et al., 2024)However, on the other hand, the use of technology that is not balanced with adequate digital literacy skills has the potential to negatively impact students' character development.

Various social phenomena show that uncontrolled use of information technology can influence the character of students, such as a decline in communication ethics, low social empathy, increased consumer behavior, and a tendency towards addiction to gadgets and social media.(Lukmantoro et al., 2024)Case studies in various educational institutions in Indonesia show increasing cases of cyberbullying, the spread of hoaxes among students, academic plagiarism, and the misuse of digital media for content inconsistent with educational values. This situation indicates that technical mastery of technology does not necessarily align with the ability to use it wisely, responsibly, and with character.(Murtadho et al., 2023).

Previous research confirms this phenomenon. Several studies have shown that intense digital media use without adequate guidance and literacy is correlated with decreased learning discipline, weakened self-control, and a degradation of character values such as honesty, responsibility, and cooperation.(Budiman & Syafrony, 2023)Other studies have also found that students with low digital literacy levels are more likely to be exposed to misinformation, hate speech, and negative content that influences their attitudes and behavior. Conversely, research emphasizing strengthening digital literacy shows that students with good digital literacy have higher critical thinking skills, digital ethics, and moral awareness in utilizing technology.(Amaliah & Oktaria, 2024).

Digital literacy is not only defined as the ability to operate technological devices, but also includes the ability to understand, evaluate, and use digital information critically, ethically, and responsibly.(Saleh & Solihin, 2023)In the context of character education, digital literacy is a strategic instrument for equipping students to face the impacts of information technology without losing their human values. Through digital literacy, students are expected to develop positive character traits such as responsibility, honesty, empathy, and independence in both the digital space and real life.(Nikou et al., 2022)However, various studies show that the implementation of digital literacy in education in Indonesia still faces a number of challenges, such as limited understanding among educators, the lack of systematic integration of digital literacy into the curriculum, and the lack of approaches linking digital literacy to the formation of student character.(Khan et al., 2022)Therefore, academic research on the importance of digital literacy in addressing the impact of information technology on student character is highly relevant and urgent. This research is expected to provide conceptual and practical contributions to strengthening the role of digital literacy as a foundation for student character development in the digital age.

On the other hand, the increasing intensity of student interaction with information technology demands an educational framework that is not only adaptive to technological developments, but also oriented towards strengthening character.(Barrot et al., 2021)Without an adequate digital literacy foundation, technology has the potential to weaken the social, moral, and cultural values that are the primary goals of education. Therefore, digital literacy needs to be positioned as an integral part of character education, not as an optional additional competency. Based on these conditions, it is important to conduct this research through a Systematic Literature Review (SLR) approach to comprehensively examine the facts, phenomena, and trends in digital education issues,

particularly those related to the impact of information technology on student character. Through a critical synthesis of previous research results, this study is expected to identify patterns of relationships between digital literacy and character formation, while simultaneously formulating a relevant conceptual framework for the development of educational policies and practices.

Conceptually, the results of this study are expected to enrich the scientific body of knowledge in the field of education and digital literacy by placing character as the primary focus of technology utilization. Practically, the findings of this study are expected to serve as a reference for educators, education administrators, and policymakers in designing strategies to strengthen digital literacy oriented toward character development in students. Thus, digital education is not only directed at achieving technological competence but also at strengthening human values relevant to the challenges of the digital era.

2. MATERIALS AND METHODS

This research uses a literature review method with a Systematic Literature Review (SLR) approach to comprehensively examine the transformation of human and technology relations from a Human Computer Interaction (HCI) perspective.(Hanelt et al., 2021)This approach was chosen because it provides a systematic framework for exploring, evaluating, and synthesizing relevant scientific works to address research problems. Furthermore, the SLR method allows researchers to identify patterns, development trends, and research gaps within the field of HCI. The literature review approach is considered effective in understanding the conceptual and empirical dynamics of a scientific field, especially when the research topic is multidisciplinary and continuously evolving, such as the relationship between humans and technology.(Ferreira & Reis, 2023).

The research process began with a literature search through several credible scientific databases relevant to the fields of computer science and HCI, namely Google Scholar, Scopus, and ResearchGate. The selection of these databases was based on their broad publication coverage, encompassing reputable international journals as well as relevant national research. The search was conducted using a combination of keywords such as philosophy of computer science, human- computer interaction, human-centered computing, and philosophy of technology. These keywords were chosen to capture literature that discusses the transformation of human-technology relations not only from a technical perspective, but also from a conceptual and philosophical perspective.

Articles obtained from the search process then underwent a selection and screening phase to ensure their alignment with the research focus. At this stage, the titles, abstracts, and keywords were reviewed to assess the relevance of the theme, research objectives, and their relevance to human- technology relations issues within the HCI framework. Articles that focused solely on the technical aspects of computing systems without examining the dimensions of human interaction, user experience, or philosophical perspectives were excluded from the review.

To maintain the quality and consistency of the analyzed literature, this study established inclusion and exclusion criteria. Inclusion criteria included articles written in English or Indonesian, published within the last ten years (2015–2025), excluding classic works that have significantly influenced HCI and philosophy of technology studies, and articles that explicitly discuss philosophical, conceptual, or relational aspects between humans and technology. Popular opinion articles, non-academic reports, and publications that have not undergone a peer-reviewed process were excluded from the study.

Literature that met the criteria was then analyzed qualitatively through in-depth reading to identify key themes, key concepts, and patterns of transformation of human-

technology relations in the context of HCI. The synthesis process was carried out by grouping findings based on the focus of the study, such as the paradigm shift in human-computer interaction, the role of artificial intelligence in interactive systems, the application of the human-centered design approach, and issues of ethics, trust, and transparency in computing systems. This stage aims to build a comprehensive understanding of the dynamics and implications of human-technology relations in the development of HCI.

In its implementation, this research utilizes five primary articles from internationally and nationally indexed journals as core references, supported by a number of additional literature in the form of books and conceptual articles in the fields of philosophy of technology and human-computer interaction. This combination of sources is used to strengthen the analysis and ensure that the study is not only empirical but also has a strong theoretical foundation and is relevant to current scientific developments.

3. RESULTS AND DISCUSSION

No	Author & Year	Article/Book Title	Context / Field	Research methods	Key Findings
1.	Gilster (1997)	*Digital Literacy*	Digital Literacy	Conceptual	Digital literacy includes not only technical skills, but also the ability to think critically and evaluatively about digital information.
2.	Buckingham (2015)	*Defining Digital Literacy*	Education & Media	Conceptual	Digital literacy is closely related to the formation of critical, ethical, and responsible attitudes in the use of digital media.
3	Hobbs (2017)	*Create to Learn*	Digital Education	Literature & Empirical	Integrated digital literacy education can strengthen students' character through creativity, reflection, and digital ethics.
4	Ribble (2011)	*Digital Citizenship in Education*	Digital Citizenship	Conceptual	Digital literacy plays an important role in shaping the character of responsibility, ethics, and social awareness of students in the digital space.
5	Livingstone et al. (2018)	*Children, Internet and Risk*	Children & Technology	Empirical Review	Low digital literacy increases the risk of exposure to negative content that impacts children's attitudes and behavior.

6	Prensky (2001)	*Digital Natives, Digital Immigrants*	Education & Technology	Conceptual	Digital generation students need a literacy approach that balances technology mastery and character building.
7	UNESCO (2018)	*Global Framework of Digital Literacy Skills*	Global Education	Policy Framework	Digital literacy includes ethical, social, and cultural aspects as the foundation for character building in the digital era.
8	OECD (2021)	*Students, Computers and Learning*	Digital Education	Data analysis	Utilizing technology without adequate digital literacy does not automatically improve the quality of learning and character of students.
9	Suryadi et al. (2020)	Digital Literacy and Student Character	Indonesian Education	Empirical Study	There is a significant relationship between digital literacy and students' attitudes

					of responsibility and learning ethics.
10	Nasrullah et al. (2017)	*Digital Literacy Support Materials*	National Education	Conceptual Study	Digital literacy serves as an instrument for strengthening character and literacy culture in schools.
11	Rahmawati & Huda (2021)	Digital Literacy and Character Education	Secondary Education	Case study	Implementation of digital literacy can reduce negative behavior such as plagiarism and misuse of social media.
12	Ministry of Education, Culture, Research and Technology (2022)	Digital Literacy in the Pancasila Student Profile	Education Policy	Policy Document	Digital literacy is positioned as a strategic element in character formation in accordance with Pancasila values.

1) Digital Literacy as a Foundation for Character Building in Students

Literature synthesis shows that digital literacy cannot be reduced to the technical skills aspect of using technological devices alone, but must be understood as a multidimensional construct that includes cognitive, affective, social, and ethical

dimensions. (Rahmatullah et al., 2022) emphasizes that digital literacy is closely related to critical thinking skills in selecting, evaluating, and utilizing digital information responsibly. This view was further enhanced by Buckingham (2015), who positioned digital literacy as a reflective process of social, cultural, and ideological practices in the digital space. In the context of character education, digital literacy serves as the foundation for the formation of students' moral values, such as academic honesty, responsibility, independent learning, and a critical attitude towards information. Students with good digital literacy tend to be able to distinguish between valid and invalid information, avoid plagiarism, and use technology as a means of self-development, not merely for passive entertainment consumption. Thus, digital literacy plays a crucial role in shaping the character of autonomous and ethical learners in the digital era. UNESCO (2018) and the OECD (2021) explicitly position digital literacy as part of 21st-century competencies that are inseparable from character development. Digital literacy is positioned as a protective and transformative mechanism, namely protecting students from the risks of disinformation, digital radicalism, and gadget addiction, as well as transforming technology into a medium for strengthening humanitarian values and global citizenship.(Rusydiyah et al., 2020).

2) **The Impact of Information Technology on Student Character**

The results of the literature review indicate that information technology has an ambivalent or dual impact on student character formation. On the one hand, information technology opens up vast space for collaborative learning, the development of creativity, and independent learning through unlimited access to knowledge.(Jones & Hafner, 2021)The digital environment allows students to learn flexibly, participate in online learning communities, and develop 21st-century competencies such as communication and collaboration. However, on the other hand, the literature also notes various negative implications of technology use that is not balanced with adequate digital literacy.(Audrin & Audrin, 2022)Studies have shown that high levels of digital media use without supervision can trigger deviant behavior, such as cyberbullying, decreased social empathy, and the degradation of ethical values. A study in the Indonesian context (Rahmawati & Huda, 2021) also revealed that weak digital literacy correlates with increased plagiarism and social media abuse among students. These findings reinforce Prensky's (2001) critique of the assumption that digital natives automatically possess digital skills and maturity. In reality, familiarity with technology does not always equate to reflective and ethical use. Therefore, systematic educational interventions through digital literacy are urgently needed to ensure that technological developments do not erode students' character values.

3) **Digital Literacy as an Instrument for Strengthening Character Education**

The analyzed literature consistently shows that digital literacy can function as a strategic instrument in strengthening character education.(Reddy et al., 2023)The concept of digital citizenship emphasizes that digital literacy must encompass ethical awareness, responsibility, rights and obligations, and active participation in the digital space. This concept positions students not merely as technology users but as responsible digital citizens. Integrating digital literacy into learning encourages the internalization of character values through contextual learning experiences.(Wang et al., 2023)For example, digital project-based learning can foster discipline, cooperation, and responsibility, while critical discussions of digital content can develop intellectual honesty and a reflective attitude. Thus, digital literacy serves as a pedagogical medium for connecting the cognitive dimension of learning with the affective and moral

dimensions. Empirical studies in Indonesia (Nasrullah et al., 2017; Suryadi et al., 2020) show a positive correlation between students' digital literacy levels and their discipline, responsibility, and learning ethics. These findings confirm that digital literacy is not simply an additional skill, but an effective means of strengthening character education in the context of technology-based learning.

4) The Role of Educators and Educational Institutions in Digital Literacy

The SLR results confirm that the success of digital literacy in shaping students' character is highly dependent on the strategic role of educators and educational institutions.(Neumeyer et al., 2020)emphasizes that technology has no significant pedagogical impact without values-oriented and reflective learning design. Therefore, educators must not only master technology but also be able to design learning that integrates digital literacy with character-building goals. Educational institutions have a responsibility to create a conducive digital literacy ecosystem through policies, curricula, and school culture. The Ministry of Education, Culture, Research, and Technology's (2022) policy linking digital literacy to the Pancasila Student Profile demonstrates a national commitment to integrating character values, such as mutual cooperation, independence, and integrity, into digital learning practices. This approach emphasizes that digital literacy must be developed holistically, encompassing cognitive, social, emotional, and moral dimensions.

5) Synthesis and Theoretical Implications

Based on a literature synthesis, digital literacy can be understood as a conceptual bridge between the use of information technology and the development of student character. Without adequate digital literacy, technology has the potential to weaken character values; conversely, strong digital literacy enables technology to function as an instrument for internalizing ethical values, responsibility, and digital citizenship.(Firat, 2023)Theoretically, these findings reinforce the human-centered education paradigm, which positions technology as a tool to support human development, not the ultimate goal of education. Thus, digital literacy is no longer positioned as an additional competency, but rather as an integral element within the framework of character education in the digital age.

6) Practical Implications and Recommendations

The practical implications of this study's findings underscore the need for systematic and sustainable integration of digital literacy into educational curricula. Digital literacy programs should be designed comprehensively, balancing mastery of technical skills, critical thinking development, and internalization of character values and digital ethics. Furthermore, ongoing training for educators is a key prerequisite for the pedagogical and contextual implementation of digital literacy. Institutional policy support, collaboration with parents, and strengthening of a values-based school culture are also necessary to minimize the negative impact of information technology on student character. With this approach, information technology can be optimized as a strategic tool in supporting national education goals oriented toward developing individuals with character in the digital era.

4. CONCLUSION

Based on the results of the Systematic Literature Review (SLR), it can be concluded that digital literacy plays a strategic and fundamental role in addressing the impact of information technology on student character development. Digital literacy cannot be understood solely as the technical ability to operate technological devices, but rather as a multidimensional competency encompassing cognitive, affective, social, and ethical

aspects. This competency serves as a crucial foundation for students to use technology critically, wisely, and responsibly.

The results of the literature synthesis indicate that information technology has a dual impact on student character. On the one hand, technology opens up significant opportunities for the development of creativity, collaboration, and independent learning. However, on the other hand, without adequate digital literacy, technology has the potential to trigger various character problems, such as declining communication ethics, low social empathy, increased academic plagiarism, cyberbullying, and digital media addiction. These findings confirm that the intensity of technology use does not automatically correlate with digital maturity and positive character development. This study also confirms that digital literacy serves as an effective instrument in strengthening character education. The integration of digital literacy into the learning process encourages the internalization of character values such as honesty, responsibility, discipline, independence, and awareness of digital ethics and citizenship. The concept of digital citizenship and the human-centered education approach strengthen the argument that technology should be positioned as a tool to support human development, rather than the ultimate goal of education.

Furthermore, the success of digital literacy implementation is largely determined by the role of educators and educational institutions. Educators are required not only to master technology but also to be able to design learning that integrates digital literacy with the goal of character building. Educational institutions need to build a conducive digital literacy ecosystem through policies, curricula, and a values-oriented school culture. National policies such as the Pancasila Student Profile demonstrate the strategic direction that digital literacy must be developed holistically and sustainably. Overall, this study confirms that digital literacy is a conceptual bridge between the use of information technology and the character building of students in the digital era. Digital literacy is no longer optional or additional, but rather an integral element of character education. With systematic and values-oriented strengthening of digital literacy, information technology can be optimized as a strategic tool to support the national education goal of developing digitally competent students with strong character.

5. ACKNOWLEDGMENTS

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