

Digital Transformation and Character Development Among Generation Z Students: Evidence from Indonesian Higher Education

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Abstract

Digital transformation has reshaped higher education, yet intensive digital engagement among Generation Z students does not necessarily translate into academically productive or character-forming practices. This study examined the intersection between digital learning-media use and character development among Generation Z students at an Indonesian university. A mixed-methods approach combined questionnaire data from 356 students selected through stratified random sampling with interviews, focus group discussions, observations, and document analysis involving students and relevant institutional stakeholders. Quantitative data were analyzed descriptively, while qualitative data were analyzed using an interactive model and integrated with documentary evidence. The findings revealed that students' digital engagement was intensive but predominantly oriented toward entertainment and social interaction rather than academic purposes. Qualitative findings identified five character-related practices within digitally mediated learning: discipline and time management, learning autonomy, academic integrity, critical thinking and problem solving, and virtual collaboration. These practices were shaped by interactions among students' digital engagement and curriculum, lecturer guidance, academic norms, and institutional culture. The study therefore proposes a Digital Character Education Framework connecting technological opportunities, pedagogical mediation, institutional values, and student agency. The findings suggest that meaningful digital transformation in higher education requires not only technological access but also pedagogical and institutional conditions that support responsible student agency.

A. Introduction

Digital transformation is no longer simply changing how universities deliver instruction; it is reshaping how students learn, interact, exercise responsibility, and construct academic and social identities (George, 2024; West, 2024). Recent studies show that digital transformation in higher education extends beyond technology adoption to changes in pedagogy, institutional practices, digital competence, and learning environments (Castro Benavides et al., 2020; Farias-Gaytan et al., 2023; Fernández et al., 2023). However, this transformation creates an educational paradox: digital environments expand access, collaboration, and learning opportunities while also exposing students to distraction, problematic social-media use, and academic-integrity concerns (Coe et al., 2023; Habibi, 2022; Riehm et al., 2019). Excessive social-network use, for example, has been associated with poorer academic performance among university students (Salari et al., 2025). The challenge for higher education, therefore, is not simply to integrate digital technology, but to ensure that its use supports both meaningful learning and responsible character development.

This transformation is particularly consequential for Generation Z, whose everyday learning and social interactions have developed alongside digital technologies (Coe et al., 2023; Espejo et al., 2024). Often described as digital natives, these students are highly familiar with technology and tend to prefer visual and interactive forms of learning. Yet technological familiarity does not necessarily translate into mature digital competence or responsible digital behavior (Novrialdy, 2019; Riehm et al., 2019; Wiyono & Puspita, 2024). Evidence from higher education shows that meaningful digital competence requires more than frequent technology use, encompassing critical, communicative, and responsible engagement with digital environments (Zhao et al., 2021). This distinction places universities in a critical position: digital learning must not only facilitate access to knowledge but also cultivate students' capacity to use technology responsibly within academic and social contexts (Coe et al., 2023; Habibi, 2022).

In Indonesia, this challenge has become increasingly relevant as internet use continues to expand. According to the Indonesian Internet Service Providers Association (APJII), internet penetration reached 78.19% in 2023, equivalent to 215.63 million users, with Generation Z among the most intensive user groups. Such extensive digital exposure expands learning opportunities beyond conventional classrooms while simultaneously increasing the importance of digital literacy, self-regulation, academic

integrity, and responsible online participation (Habibi, 2022; Novrialdy, 2019; Riehm et al., 2019). Digital transformation in higher education, however, depends not only on technological infrastructure but also on institutional readiness, pedagogical adaptation, leadership, and appropriate digital competencies (Bisri et al., 2023; Fernández et al., 2023). In Indonesian higher education, the critical question is therefore how intensive digital engagement can be transformed into meaningful learning while supporting students' character development (Novrialdy, 2019; Wiyono & Puspita, 2024).

In higher education, character education extends beyond transmitting moral knowledge to developing students' moral, ethical, and social values. In Indonesia, character development has also become an explicit educational concern, reflected in the character values promoted within national education policy. In digitally mediated learning, this concern grows more important as students are expected to exercise responsibility, integrity, respect, collaboration, and critical judgment across physical and virtual learning spaces (Coe et al., 2023; Habibi, 2022; Riehm et al., 2019). Evidence suggests that technology-enhanced learning can support character development when digital activities are intentionally connected with pedagogical and ethical purposes rather than treated merely as mechanisms for instructional delivery (Triarisanti et al., 2022). Character development in the digital era should therefore be understood through the interaction of technology, pedagogy, students, and the institutional learning environment (Novrialdy, 2019; Wiyono & Puspita, 2024).

Although previous studies have substantially advanced understanding of digital transformation in higher education, their primary emphasis has been on digital competence, technology adoption, institutional readiness, pedagogical innovation, and learning outcomes (Castro Benavides et al., 2020; Zhao et al., 2021; Fernández et al., 2023; Farias-Gaytan et al., 2023; Mukul & Büyüközkan, 2023). These studies demonstrate that meaningful digital transformation depends on the interaction between technology, pedagogy, institutional capacity, and users' digital competencies rather than on technological access alone. However, considerably less is known about how these interactions shape students' character development, particularly among Generation Z students in higher education (Coe et al., 2023; Espejo et al., 2024).

Existing research has also highlighted the educational and behavioral consequences of students' digital engagement (Salari et al., 2025; Habibi, 2022; Novrialdy, 2019; Riehm et al., 2019; Wiyono & Puspita, 2024), while studies of technology-enhanced character education suggest that digital environments can support character formation

when they are intentionally connected to pedagogical and ethical purposes (Triarisanti et al., 2022). Yet these strands of research have rarely been brought together to explain how digital learning, pedagogical practices, lecturer guidance, peer interaction, academic culture, and ethical awareness collectively shape character development. This unresolved relationship is particularly important in Indonesian higher education, where intensive digital engagement increasingly intersects with universities' responsibility to cultivate academically competent, socially responsible, and ethically aware students (Coe et al., 2023; Novrialdy, 2019).

Building on this gap, the present study conceptualizes digital character development not as an automatic outcome of technology use but as a context-dependent socio-pedagogical process shaped by digital learning, lecturer guidance, peer interaction, institutional culture, and students' ethical awareness. By integrating digital learning and character education within a single analytical perspective, the study provides an empirical basis for developing a Digital Character Education Framework. Accordingly, this study examines patterns of digital learning-media use among Generation Z students, analyzes their relationship with character development, and identifies the pedagogical and institutional conditions shaping this relationship in Indonesian higher education. Through this approach, the study seeks to provide an empirical and conceptual basis for digital learning environments that combine technological transformation with responsible character development.

B. Method

This study employed a mixed-methods approach to examine digital learning-media use and its intersection with character development among Generation Z students at Universitas Negeri Medan (UNIMED), North Sumatra, Indonesia (Denzin & Lincoln, 2009; Lewis, 2015; Rich, 2018). Quantitative evidence identified patterns in the types, intensity, frequency, and purposes of digital-media use, while qualitative and documentary evidence explored students' experiences and the pedagogical and institutional contexts of character-oriented digital learning, including curriculum, academic norms, lecturer guidance, and university culture.

The quantitative sample comprised 356 active UNIMED students selected through stratified random sampling across seven faculties. The sample consisted of 68 students from the Faculty of Languages and Arts, 83 from the Faculty of Economics, 55 from the

Faculty of Sport Science, 17 from the Faculty of Education, 7 from the Faculty of Social Sciences, 55 from the Faculty of Mathematics and Natural Sciences, and 71 from the Faculty of Engineering. Qualitative participants were selected purposively and included students, lecturers, university leaders, and education experts with relevant experience in digital learning and character development (Denzin & Lincoln, 2009; Lewis, 2015). Their inclusion provided student, pedagogical, and institutional perspectives on the processes examined in the study.

Data were collected through questionnaires, in-depth interviews, focus group discussions (FGDs), observations, and document analysis (Bradburn et al., 2004; Denzin & Lincoln, 2009). The questionnaire used a five-point Likert scale and generated descriptive information on the types of digital platforms used, intensity and frequency of use, purposes of engagement, and patterns of academic and non-academic use (Bradburn et al., 2004). Interviews and FGDs explored experiences of digital learning, lecturer guidance, student interaction, academic conduct, and character-related practices (Denzin & Lincoln, 2009; Lewis, 2015). Observations provided contextual evidence of digital learning practices, while document analysis covered curriculum materials, academic norms, character-based learning documents, and institutional materials related to digital learning at UNIMED. These multiple sources enabled examination of students' reported digital practices alongside experiential and institutional evidence.

Quantitative data were analyzed descriptively to identify patterns of digital-media use, including intensity, purposes, platform preferences, and user typologies. Qualitative data were analyzed using the interactive model of Miles, Huberman, and Saldaña (2014), involving data condensation, data display, and conclusion drawing and verification. Interview, FGD, observation, and documentary evidence were compared to identify recurring patterns concerning digital learning and character-related practices (Denzin & Lincoln, 2009; Lewis, 2015). The analysis generated themes involving discipline and time management, learning autonomy, academic ethics and integrity, critical thinking and problem solving, and collaboration and virtual communication. Institutional evidence was analyzed in relation to curriculum, academic norms, lecturer guidance, extracurricular practices, and the university's character-building orientation.

Quantitative, qualitative, and documentary evidence was integrated during interpretation by relating patterns of students' digital-media use to the character-related and

institutional themes emerging from the qualitative analysis. Triangulation across questionnaires, interviews, FGDs, observations, documents, and participant groups was used to examine convergence and differences among the evidence (Denzin & Lincoln, 2009). This integration enabled descriptive patterns of digital engagement to be interpreted in relation to students' experiences, lecturer guidance, academic practices, and institutional conditions rather than as isolated indicators of technology use. The mixed-methods approach was grounded in a pragmatic orientation, allowing different forms of evidence to be combined according to their contribution to explaining the research problem.

The study followed established ethical principles for research involving human participants (Denzin & Lincoln, 2009; Shaw, 2008). Participation was voluntary, and participants were informed about the purpose and procedures of the research and their right to withdraw. Informed consent was obtained before data collection, while confidentiality and anonymity were maintained throughout data collection, analysis, and reporting. Participants' information was used solely for research purposes.

C. Results and Discussion

This section presents the empirical findings and discusses their significance for digital learning and character development among Generation Z students at Universitas Negeri Medan. The results are organized around patterns of digital-media use, the character-based curriculum, student character in digital learning environments, and institutional practices that support character development. The subsequent discussion interprets these findings in relation to the broader pedagogical, institutional, and socio-digital contexts of higher education.

1. Results

The findings revealed substantial variation in students' digital-media use and showed that their digital learning practices occurred within a broader curricular, pedagogical, and institutional environment at UNIMED. Quantitative evidence identified patterns in the intensity, purposes, and forms of digital-media use, while qualitative and documentary evidence revealed character-related practices associated with digital learning and the institutional arrangements supporting them. The findings are presented in four areas: students' digital-media use, the character-based curriculum, student character in digital learning environments, and character-based digital learning practices.

a. The Utilization of Digital Media in Educational Settings at Universitas Negeri Medan

Students demonstrated intensive engagement with digital media, although the purposes and forms of use varied considerably. Students spent approximately eight to ten hours per day using digital media, with individual interactions lasting between 30 minutes and one hour. Seventy-five percent reported accessing digital media immediately after waking, while 85% used at least three to four digital platforms concurrently. The highest levels of activity occurred between 10:00–14:00 and 20:00–23:00. These patterns indicate that digital media constituted a substantial component of students' everyday activities.

Differences were also evident in the purposes and platforms of digital-media use. Entertainment accounted for 45% of reported use, followed by social activities at 35%, whereas academic activities represented 20%. Platform distribution showed a similar pattern: social media accounted for 45%, communication platforms 35%, and academic platforms for 20%. Social-media platforms included Instagram, YouTube, TikTok, Facebook, and Twitter; communication platforms included WhatsApp and Telegram; while academic platforms included LMS SIPDA, Google Classroom, Google Scholar, Zoom, LinkedIn, and AI-based learning applications. Table 1 summarizes these patterns.

Table 1. Characteristics of Students' Digital-Media Use

No.	Characteristics	Findings
1	Frequency and intensity	Approximately 8–10 hours per day; 30 minutes–1 hour per interaction; 75% accessed digital media immediately after waking; peak activity at 10:00–14:00 and 20:00–23:00; 85% used 3–4 platforms concurrently
2	Purpose of use	Academic activities: 20%; social activities: 35%; entertainment: 45%
3	Platform distribution	Social media: 45%; communication platforms: 35%; academic platforms: 20%

Source: Research data, 2024

The quantitative data further distinguished three patterns of digital-media users. Moderate users constituted the largest group (45%), followed by passive users (35%) and active users (20%). Active users were characterized by more productive digital-media use, greater digital-literacy awareness, the use of particular platforms for soft-skill development, and information-filtering practices. Moderate users combined productive and consumptive activities but continued to require digital-literacy support, particularly in responding to misinformation and disinformation. Passive users predominantly used digital media for entertainment and demonstrated limited awareness of its potential for self-development.

Table 2. Typology of Digital-Media Users at Universitas Negeri Medan

User Typology	Proportion	Main Characteristics
Active users	20%	Productive digital-media use; greater digital-literacy awareness; platform use for soft-skill development; information filtering
Moderate users	45%	Combination of productive and consumptive use; continued need for digital-literacy support; challenges in responding to misinformation and disinformation
Passive users	35%	Predominantly entertainment-oriented use; limited awareness of digital media for self-development; greater need for digital-literacy support

Source: Research data, 2024

The qualitative evidence further indicated that students used digital media for multiple purposes in their everyday activities, with academic engagement occurring alongside entertainment, social interaction, and communication (*Interview with ST1, 2024*). Students' accounts also reflected differences in their capacity to use digital platforms productively and to evaluate the information they encountered (*Interview with ST2, 2024*). Taken together, the quantitative and qualitative evidence shows that intensive digital-media exposure was accompanied by different patterns of engagement rather than a uniform orientation toward academic or productive use.

b. Character-Based Digital Learning Curriculum at Universitas Negeri Medan

Documentary evidence showed that character development had been incorporated into UNIMED's curriculum and institutional learning framework. Curriculum documents reflected an orientation toward combining academic competence with soft skills and character development through activities such as critical book reports, mini-research projects, and design-thinking assignments. Institutional planning documents, syllabi, course contracts, and course outlines also reflected the university's orientation as a "Character Building University." Documents dating from 2010 incorporated character and soft-skill attributes alongside scientific knowledge.

The institutional documents identified citizenship, fearlessness, respect, responsibility, care, trustworthiness, and thriftiness as character pillars within the university's educational orientation. These values were incorporated into academic norms intended to guide lecturers' and students' conduct. Interview evidence aligned with the documentary findings, indicating that character development was understood as part of the university's academic orientation and was incorporated into learning activities and expectations for

student conduct (*Interview with UL1 & UL2, 2024*). Character formation was therefore represented within both curricular activities and broader institutional expectations.

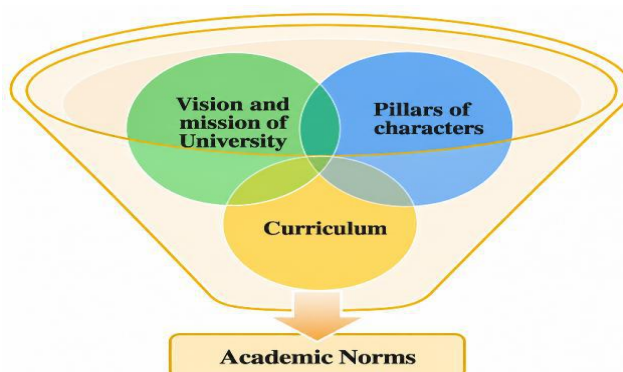


Figure 1. Formulation of Character Pillars into Academic Norms

Figure 1 illustrates the relationship among UNIMED's vision and mission, institutional character pillars, curriculum, and academic norms. Documentary evidence showed that character values were translated into regulations, academic ethics, and behavioral expectations for lecturers and students. Participants similarly described institutional character values as being connected with academic practices and expectations within the university environment (*Interview with UL1 & UL2, 2024*). The findings therefore demonstrate a formal institutional pathway through which abstract character values were incorporated into academic norms and learning practices.

c. Student Character in Digital Learning Environments

The qualitative findings identified five recurring character-related dimensions associated with students' participation in digital learning environments: discipline and time management, learning autonomy, academic ethics and integrity, critical thinking and problem solving, and collaboration and virtual communication. These dimensions appeared in students' engagement with learning activities requiring greater independence, flexibility, use of digital information, and technology-mediated interaction.

Discipline and time management were reflected in students' need to organize their learning activities within flexible digital environments. Learning autonomy was similarly evident in the greater responsibility required to manage learning tasks independently. Student accounts indicated that digitally mediated learning provided greater flexibility in accessing learning activities while simultaneously requiring students to regulate their

schedules and learning responsibilities more independently (*Interview with ST3, 2024*). Discipline and autonomy therefore appeared as closely related practices within students' experiences of digital learning.

Academic ethics and integrity constitute another recurring dimension. The findings indicated that ethical awareness became particularly relevant when students accessed, selected, evaluated, and used information through digital platforms. Interview evidence also indicated the importance of academic guidance in students' use of digitally accessible information and in maintaining appropriate academic conduct (*Interview with LC1, 2024*). Academic integrity therefore appeared in the findings as part of students' everyday engagement with digital information and learning activities rather than as an issue separated from digital learning.

Critical thinking and problem solving were reflected in students' need to assess information and make decisions based on available evidence. Students' experiences indicated that access to abundant digital information required them to select, compare, and evaluate information before using it for academic purposes (*Interview with ST4, 2024*). The findings therefore identified critical engagement with information as another character-related practice associated with digitally mediated learning.

Collaboration and virtual communication also emerged from students' digital learning experiences. Students participated in interactions that differed from conventional face-to-face learning and required communication and collaborative engagement through digital environments. Student accounts indicated that digitally mediated learning involved coordinating tasks, exchanging information, and communicating with others through online platforms (*Interview with ST5, 2024*). Across the five dimensions, the findings show that character-related practices were manifested through students' management of learning responsibilities, use of information, academic conduct, critical engagement, and interaction with others. Digital access alone did not reflect these practices; rather, they appeared in how students participated in digital learning.

d. Character-Based Digital Learning Practices at Universitas Negeri Medan

Qualitative and documentary evidence showed that character development at UNIMED was supported through interconnected curricular, extracurricular, and institutional practices. The institutional approach incorporated four learning orientations: learning to comprehend, learning to act, learning to become, and learning to collaborate.

Character formation was incorporated into semester-based learning and supported through extracurricular activities, while lecturers and instructional practices connected academic activities with expected character attributes.

Lecturer involvement shaped this environment through learning activities, academic guidance, and the link between instructional practices and expected student conduct. Interview evidence indicated that lecturer guidance accompanied students' engagement with learning responsibilities and academic expectations within digital learning environments (*Interview with LC2, 2024*). The findings thus positioned lecturer involvement alongside curriculum and learning activities as part of the pedagogical context in which character-related practices occurred.

Institutional culture provided an additional context for character development through modeling, exemplary conduct, and environmental conditioning. These processes began when students entered the university through compulsory orientation and character-development activities intended to introduce institutional values and expectations concerning personal integrity. Across curricular, extracurricular, and institutional practices, independence, responsibility, trustworthiness, empathy, ethical conduct, and collaboration appeared as recurring character attributes.

Interview evidence further indicated that character formation was understood within a broader institutional environment rather than as the responsibility of an individual course or lecturer alone (*Interview with EE1, 2024*). Across the qualitative and documentary evidence, character-oriented learning involved curriculum, lecturer guidance, student interaction, extracurricular activities, academic norms, and university culture. Digital learning therefore occurred within an existing institutional environment in which technological practices, academic activities, and character-related expectations operated together.

2. Discussion

The predominance of entertainment and social activities over academic use, together with the larger proportion of moderate and passive users, reveals a disparity between the intensity of students' digital engagement and its academic orientation. Although Generation Z students were extensively engaged with digital media, this engagement was not predominantly directed toward academic purposes. This pattern suggests that access to digital technologies and familiarity with their use do not necessarily translate into purposeful academic engagement. The central issue is

therefore not technological access itself, but how students regulate and direct their digital activities toward meaningful learning.

This disparity challenges assumptions that technological familiarity among digital natives necessarily indicates digital competence (Chang & Chang, 2023; Pichler et al., 2021). It also corresponds with research distinguishing multidimensional digital competence from routine technology use (Zhao et al., 2021) and evidence linking problematic social-network use with academic achievement (Salari et al., 2025; Riehm et al., 2019). More broadly, digital-transformation research suggests that technological adoption alone does not ensure educational improvement (Bisri et al., 2023; Fernández et al., 2023; Castro Benavides et al., 2020; Kalolo, 2019). Viewed together, these perspectives help explain why extensive digital participation may coexist with limited academic engagement. The educational significance of digital media depends not simply on students' exposure to technology, but on the purposes, competencies, and learning conditions that shape its use.

The qualitative findings deepen this interpretation by showing that digital learning intersected with discipline and time management, learning autonomy, academic integrity, critical thinking and problem solving, and virtual collaboration. These dimensions should not be interpreted as character outcomes automatically produced by technology. Rather, they represent practices demanded and exercised within digitally mediated learning, where students must organize schedules, manage learning independently, evaluate information, communicate with others, and make decisions concerning appropriate academic conduct (Kasali, 2017). Their significance lies in the responsibilities students encounter when participating in digital learning rather than in the technological platforms themselves. Digital environments thus provide opportunities for character-related practices, but the educational meaning of those practices depends on the learning expectations and pedagogical guidance surrounding them.

These character-related practices correspond with conceptualizations of digital competence that emphasize critical, responsible, and communicative capacities beyond technical proficiency (Zhao et al., 2021; Farias-Gaytan et al., 2023). This interpretation also aligns with evidence that technology-enhanced learning can contribute to character formation when learning activities intentionally incorporate character-oriented purposes (Triarisanti et al., 2022). At UNIMED, these practices are situated within a broader institutional context. The university's pillars—citizenship, fearlessness, respect, responsibility, care, trustworthiness, and thriftiness—provide a

normative orientation reflected in curriculum, academic norms, orientation activities, and institutional culture (Amalia et al., 2025). Meanwhile, discipline, autonomy, integrity, critical thinking, and collaboration emerged as dimensions of students' digitally mediated learning experiences (Kauffman & Pointer, 2022; Salo et al., 2021). The relationship between these two sets of dimensions suggests that character-oriented digital learning involves both institutional expectations and the everyday academic practices through which students engage with technology.

The interaction between institutional values and students' digital practices highlights character development beyond individual technological behavior. Institutional commitments shape academic expectations, lecturer guidance, and learning experiences through which students exercise digital responsibilities. This perspective complements research emphasizing the interaction of technology, pedagogy, organizational capacity, strategy, and human competencies in digital transformation (Castro Benavides et al., 2020; Bisri et al., 2023; Fernández et al., 2023; Mukul & Büyüközkan, 2023; Kalluri, 2023; Suleiman et al., 2022; Vaidya et al., 2018). The UNIMED case extends this understanding by illustrating how institutional values provide a normative context for responsible digital participation. Rather than establishing causality, the findings suggest that institutional values and students' character-related practices should be understood as interconnected dimensions of digital learning.

Lecturer guidance and institutional culture demonstrate that responsible digital conduct extends beyond individual student characteristics. Students exercise agency in managing academic responsibilities, evaluating information, collaborating, and maintaining integrity within institutional expectations. Academic-integrity violations similarly reflect interacting individual, institutional, social, cultural, and technological factors (Moya et al., 2024). Research on digital transformation emphasizes the interdependence of pedagogy, human competence, organizational capacity, and institutional support (Bisri et al., 2023; Fernández et al., 2023; Mukul & Büyüközkan, 2023; Kalolo, 2019). Likewise, critical digital literacy develops within institutional environments (Farias-Gaytan et al., 2023), while digital competence encompasses critical, communicative, and responsible capacities (Zhao et al., 2021). Responsible digital conduct should therefore be understood as an academically situated practice shaped by student agency, pedagogical guidance, and institutional conditions.

Taken together, the quantitative, qualitative, and documentary findings suggest that the relationship between digital learning and character development is conditional rather than technology determined. Digital technologies facilitate communication,

collaboration, creativity, and independent learning, yet students frequently prioritize social and entertainment activities (Chang & Chang, 2023; Amalia et al., 2025). Qualitative and institutional evidence further highlights the academic responsibilities and educational values shaping digital engagement. Extending scholarship on technological adoption, institutional readiness, pedagogy, and digital competence (Castro Benavides et al., 2020; Bisri et al., 2023; Fernández et al., 2023; Mukul & Büyüközkan, 2023), these findings inform a Digital Character Education Framework integrating technological opportunities, pedagogical mediation, institutional values, and student agency. This framework offers a conceptual synthesis of responsible digital participation without assuming that technology independently produces character development.

The presence of AI-based learning applications adds contemporary relevance to these findings, although generative-AI behavior was not directly examined. Generative AI raises concerns about authorship, originality, acceptable assistance, and academic responsibility, particularly when students' perceptions differ from institutional expectations (Johnston et al., 2024). Addressing these challenges requires integrating AI literacy, authentic assessment, institutional policy, and academic integrity (Rasul et al., 2024). These concerns relate to the integrity and critical-judgment dimensions identified at UNIMED without establishing AI as their cause (Moya et al., 2024). Research on digital engagement further underscores the importance of ethical judgment and responsible technology use (Coe et al., 2023; Novrialdy, 2019; Riehm et al., 2019). Thus, the findings illuminate broader responsibilities in digital learning rather than providing direct evidence of students' generative-AI practices.

These findings highlight the need for universities to approach digital transformation beyond technological infrastructure, as responsible educational use also requires attention to pedagogy, assessment, lecturer capacity, academic integrity, and institutional culture (Kalolo, 2019; George, 2024; Kalluri, 2023). Character education should therefore be integrated into digital learning through information evaluation, collaboration, assessment, authorship, communication, and responsible technology use (Triarisanti et al., 2022; Kasali, 2017; Wiyono & Puspita, 2024). This approach aligns with the systemic perspective of Education 4.0 (Mukul & Büyüközkan, 2023) and institutional responses to generative AI (Rasul et al., 2024). Accordingly, the proposed Digital Character Education Framework serves as an integrative principle connecting pedagogical purposes, institutional responsibility, student ethical agency, and technological opportunities, rather than a validated instructional model.

The disparity between students' digital engagement and its academic orientation also raises questions that extend beyond the Indonesian higher education context. As digital technologies become increasingly embedded in university learning environments, their educational value cannot be inferred from technological familiarity or frequency of use alone. International scholarship has emphasized the multidimensional nature of digital competence and the importance of pedagogical and institutional conditions in shaping meaningful digital transformation (Castro Benavides et al., 2020; Zhao et al., 2021; Fernández et al., 2023). Research on self-regulated learning similarly demonstrates the significance of students' ability to organize, monitor, and direct their learning within online and blended educational environments (Xu et al., 2023). Against this wider scholarly background, the UNIMED findings suggest that questions of digital engagement should also be considered alongside the ethical and character-related expectations embedded in university learning practices.

The UNIMED findings bring these perspectives into dialogue by illustrating how discipline, learning autonomy, academic integrity, critical judgment, and collaboration are situated within institutional expectations surrounding digital learning. These dimensions do not establish that digital competence and character development are equivalent, but they indicate areas in which the two may intersect through educational practice. This relationship becomes particularly significant when considered alongside international discussions of digital citizenship and the changing responsibilities of higher education institutions. Digital citizenship research has emphasized competencies, responsible participation, and educational policy (Prasetyo et al., 2021), while studies of digital transformation increasingly recognize the interdependence of technological infrastructure, pedagogical practices, and organizational conditions (Farias-Gaytan et al., 2023; Mukul & Büyüközkan, 2023). The UNIMED experience provides an additional perspective by bringing institutionally articulated values into consideration alongside these technological and pedagogical dimensions.

This perspective invites closer examination of how universities translate their educational commitments into the academic environments in which students engage digitally. At UNIMED, institutional values are reflected in formal educational orientations and academic expectations, while students' character-related practices emerge within digitally mediated learning experiences. Responsibility and integrity, therefore, can be examined not merely as personal attributes but also in relation to the institutional conditions that shape learning participation. For higher education systems operating

within different cultural and institutional traditions, this raises a broader question of how educational values become meaningful in everyday practices of responsible digital engagement. Rather than assuming that institutional values function identically across contexts, the findings suggest the importance of investigating how locally embedded educational commitments interact with increasingly globalized digital learning environments. Such an approach creates opportunities for comparative research without treating the UNIMED experience as universally representative.

The growing presence of generative AI intensifies institutional and ethical challenges in higher education, particularly concerning assessment, authorship, originality, and academic responsibility (Moorhouse et al., 2023; Xia et al., 2024). Multicultural research reveals differing perceptions of AI use, academic dishonesty, and ethical regulation, challenging uniform institutional responses (Yusuf et al., 2024). Students' varying judgments about acceptable AI assistance further underscore the need to align institutional expectations with academic-integrity awareness (Johnston et al., 2024). Although the present study did not directly investigate generative-AI practices, these international developments contextualize the character-related findings at UNIMED. The findings highlight the importance of ethical judgment, academic responsibility, and students' capacity to navigate institutional expectations within evolving digital learning environments, without establishing direct effects of generative AI on character development.

Within this broader context, the Digital Character Education Framework connects technological opportunities, pedagogical mediation, institutional values, and student agency as interdependent dimensions of responsible digital participation. Rather than prescribing a uniform instructional model, it emphasizes how educational purposes and institutional expectations shape students' academic practices. International scholarship similarly highlights assessment, academic integrity, and shared institutional and student responsibilities in responding to generative AI (Moorhouse et al., 2023; Xia et al., 2024). However, these responsibilities may be interpreted differently across cultural and educational contexts (Yusuf et al., 2024). The framework thus offers a conceptual basis for integrating critical judgment, academic responsibility, and ethical technology use across diverse institutional settings. Digital transformation consequently involves not only technological adaptation but also sustaining higher education's ethical and educational purposes amid evolving academic practices.

The study nevertheless has several limitations that define the boundaries of these interpretations. The research was conducted at a single Indonesian university with a distinctive character-building orientation, limiting the transferability of its findings across institutional and cultural settings. The design captures students' digital practices and character-related experiences within the study period but does not establish developmental change or causal relationships between digital learning and character formation. Some quantitative evidence also relies on students' reported practices, while the qualitative findings remain context specific. Moreover, the study did not isolate the effects of individual digital platforms, particular pedagogical interventions, or AI applications. The proposed Digital Character Education Framework should therefore be interpreted as an empirically informed conceptual contribution within these methodological and contextual boundaries.

D. Conclusion

This study shows that intensive digital engagement does not, in itself, constitute academically productive or character-forming engagement. Discipline and time management, learning autonomy, academic integrity, critical thinking and problem solving, and virtual collaboration emerged as character-related practices within digitally mediated learning. These practices were shaped by the interaction of students' digital engagement with curriculum, lecturer guidance, academic norms, and institutional culture. Digital learning therefore provides a context for character development rather than directly determining it.

Conceptually, the study advances a context-dependent understanding of character development in digitally mediated higher education. It proposes the Digital Character Education Framework, connecting technological opportunities, pedagogical mediation, institutional values, and student agency. The framework positions digital transformation as a socio-pedagogical process in which technology's educational and ethical significance depends on how digital practices are pedagogically guided, institutionally embedded, and responsibly enacted by students.

Based on the limitations acknowledged in the Discussion, future research should validate and refine the proposed framework across different institutional and cultural contexts through comparative and longitudinal designs. Observational or behavioral evidence could complement self-reported data, while experimental or quasi-experimental studies could assess specific pedagogical interventions and the roles of particular digital

platforms or AI-supported learning. These approaches would strengthen evidence on how digital learning contributes to character development beyond the contextual and methodological boundaries of this study. Ultimately, meaningful digital transformation requires more than technological engagement; it requires pedagogy, institutional values, and responsible student agency to work together.

Declaration of Competing Interest

The authors declare no competing financial, professional, or personal interests that could have influenced the research, analysis, interpretation, or publication of this article.

Declaration of Generative AI

During the preparation of this manuscript, the authors used QuillBot to assist with language refinement, including improving grammar, sentence clarity, and readability. The tool was not used to generate research data, conduct data analysis, formulate findings, or make scholarly interpretations. All AI-assisted text was reviewed and revised by the authors, who take full responsibility for the accuracy, originality, integrity, and final content of the manuscript.

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