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Digital Literacy and Career Intention among Nursing Students: Evidence from Indonesian Nursing Education

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ABSTRACT

Background: Digital transformation in healthcare and nursing education increases the need for nursing graduates who are digitally capable and work-ready, making digital literacy a foundational competency that should be deliberately developed rather than assumed. At the same time, nursing students' career intentions are shaped by educational and contextual influences, and intention-related patterns are relevant to workforce sustainability, including in Indonesia where nursing students may consider varied career trajectories. Students' perceptions of digital health technologies also suggest that digitalization can shape how they imagine their future nursing roles, reinforcing the educational importance of digital competence development.
Objective: To examine whether digital literacy significantly predicts intention to become a nurse among Indonesian undergraduate nursing students, controlling for age, sex, PKK training/competence, and cohort.
Methods: A cross-sectional survey was conducted among undergraduate nursing students at Jenderal Soedirman University, Indonesia (n = 282). Digital literacy was measured using an 11-item instrument (α = 0.87), and intention to become a nurse was measured using a 4-item instrument (CVI = 0.93; α = 0.78). Multiple linear regression tested whether digital literacy predicted intention to become a nurse after adjusting for covariates. The use of cross-sectional survey designs and regression modeling aligns with common approaches in nursing education research examining digital literacy-related competencies and career intention outcomes.
Results: Participants were predominantly female (84.4%) with mean age 19.4 ± 1.6 years. Mean digital literacy score was 45.54 ± 5.54 (range 23–55), and mean intention to become a nurse was 16.37 ± 2.73 (range 6–20). Digital literacy significantly predicted intention to become a nurse (B = 0.187, SE = 0.026, t = 7.08, p < 0.001), controlling for age, sex, PKK, and cohort. The model was significant (F (8, 273) = 10.97, p < 0.001) with R^2 = 0.243 (adjusted R^2 = 0.221). Cohort was significant for Batch 2022 (p = 0.018), Batch 2023 (p = 0.050), and Batch 2025 (p = 0.042).
Conclusion: Higher digital literacy is associated with stronger intention to become a nurse among Indonesian nursing students, independent of demographic factors and educational cohort. These findings support curricular strategies that assess and strengthen nursing students' digital literacy as part of developing digitally fluent, work-ready graduates, consistent with broader calls to embed digital capability development within nursing education.

KEYWORDS
Career intention, digital literacy, Indonesia, nursing education, nursing students, workforce readiness

INTRODUCTION

Digital transformation in healthcare and education has increased expectations that nursing graduates will be able to engage effectively with digital technologies as part of safe, evidence-based practice and ongoing professional development (Lokmic-Tomkins et al., 2021; Reid et al., 2023; Wong et al., 2023). Nursing students' perceptions of digital health technology indicate both anticipation of technology's expanding role and concerns about how technology may reshape professional identity and the nurse–patient relationship, reinforcing the importance of preparing students to work confidently and reflectively in digitally mediated clinical environments (Reid et al., 2023; Wong et al., 2023). Consistent with these expectations, nursing education initiatives have emphasized strengthening students' digital capabilities to produce work-ready graduates and to address

observed variability in students' digital literacy levels (Harerimana et al., 2022; Ibrahim et al., 2023; Lokmic-Tomkins et al., 2021).

Career intention—students' plans or readiness to enter and remain in the nursing profession—matters because research shows that intention-related outcomes in nursing are shaped by multiple educational and contextual influences and may be associated with later career decisions (e.g., setting preferences, career change, or educational change) (Docherty et al., 2023; Walden et al., 2021). Evidence also suggests that nursing students may hold intentions that affect workforce sustainability in different ways, such as intentions to migrate overseas for work, and that these intentions can vary with demographic and experiential factors including age (Efendi et al., 2020). Indonesian research similarly highlights that career-related expectations and orientations may differ across stages of nursing education (e.g., freshmen vs. interns), implying that professional commitment can evolve over training and may be sensitive to educational experiences and perceived opportunities (Sari, 2019).

Digital literacy—broadly reflected in the ability to use digital tools and resources to access, evaluate, and apply information—has been treated in nursing education research as a measurable and developable competency rather than a skill that can be assumed from students' age or general exposure to technology (Harerimana et al., 2022; Ibrahim et al., 2023; Reid et al., 2023). Studies among nursing students show that digital literacy (and closely related constructs such as eHealth literacy/digital health literacy) varies and can be associated with other learning-relevant factors such as self-efficacy for online education and ICT-related learning capabilities (Kim & Jeon, 2020; Oducado & Moralista, 2020). Nursing education interventions that incorporate digital modalities (e.g., web-based simulation) have also shown positive impacts on learning outcomes such as knowledge and self-confidence, supporting the educational value of structured digital learning experiences in nursing programs, including in Indonesia (Widiasih et al., 2022). However, despite the expanding literature on digital literacy and technology readiness in nursing education (Harerimana et al., 2022; Hashish & Alnajjar, 2024; Lokmic-Tomkins et al., 2021), empirical evidence directly linking digital literacy to *intention to pursue a nursing career* remains limited, particularly in Indonesian undergraduate nursing cohorts, where additional workforce-related intention pathways (e.g., overseas migration) have also been documented (Efendi et al., 2020).

Accordingly, this study examined whether digital literacy predicts intention to become a nurse among Indonesian undergraduate nursing students, while adjusting for age, sex, cohort (batch), and Exposed to clinical practice. This focus aligns with calls to embed digital literacy in nursing curricula to support students' preparedness for digital health environments (Ibrahim et al., 2023; Lokmic-Tomkins et al., 2021)and with evidence that nursing career intentions are multifactorial and may vary across training and context (Sari, 2019; Walden et al., 2021).

METHODS

Study Design and Setting

A quantitative cross-sectional design was used. Cross-sectional survey designs are widely used in

nursing education research to quantify students' digital literacy/eHealth literacy and to model predictors using regression-based approaches (Kim & Jeon, 2020; Oducado & Moralista, 2020). The study was conducted in November 2025 at the Department of Nursing, Jenderal Soedirman University, Indonesia.

Participants and Sampling

The study population comprised all undergraduate nursing students enrolled during the academic year. Using proportionate stratified random sampling across cohorts (batches), 282 students were recruited based on active enrolment and consent to participate.

Measures

Digital literacy. Digital literacy was assessed using an 11-item questionnaire (reported construct validity; Cronbach's α = 0.87). The treatment of digital literacy as a measurable student attribute is consistent with prior nursing student research assessing foundational digital skills and related literacy constructs (e.g., digital health literacy/eHealth literacy) using structured self-report measures (Harerimana et al., 2022; Hashish & Alnajjar, 2024; Mekawy et al., 2020; Oducado & Moralista, 2020).

Intention to become a nurse. Intention to become a nurse was measured using a 4-item questionnaire with strong content validity (CVI = 0.93) and acceptable reliability (Cronbach's α = 0.78). This is consistent with prior research operationalizing nursing career intention as a quantifiable outcome suitable for regression modelling and examining predictors of intention across nursing student samples (Docherty et al., 2023; Walden et al., 2021).

Covariates. Demographic and educational variables included age, sex, Exposed to clinical practice (yes/never), and cohort (batch). The inclusion of age and student characteristics is consistent with evidence that nursing intentions (including migration-related intentions) can vary with demographic/experiential attributes such as age (Efendi et al., 2020) and that intention-related outcomes can differ across educational stages (Sari, 2019)

Data Analysis

Descriptive statistics were used to summarize participant characteristics and variable distributions. Multiple linear regression was performed to test the hypothesis that digital literacy predicts intention to become a nurse while adjusting for age, sex, exposed to clinical practice, and cohort. Regression modelling is commonly used in related nursing education studies examining predictors of literacy constructs and intention-related outcomes (Docherty et al., 2023; Kim & Jeon, 2020; Walden et al., 2021). Statistical significance was set at $p < .05$.

RESULTS AND DISCUSSIONS

Result

Participant Characteristics

Table 1 shows that respondents were predominantly female (84.4%). Mean age was 19.4 years (SD = 1.6; range 15–26). Slightly more than half reported Exposed to clinical practice (53.5%). Cohorts were distributed across batches, with the largest proportion from the 2025 cohort (32.3%).

Table 1. Characteristics of respondents (n = 282)

Characteristic	Category	n	%
Sex	Female	238	84.4
	Male	44	15.6

Characteristic	Category	n	%
Age (years)	Mean ± SD	19.4 ± 1.6	—
	Range	15–26	—
PKK (training/competence)	Yes	151	53.5
	Never	131	46.5
Batch (Cohort)	2021	7	2.5
	2022	56	19.9
	2023	66	23.4
	2024	62	22.0
	2025	91	32.3

Descriptive Statistics of Study Variables

As shown in Table 2, mean digital literacy was 45.54 (SD = 5.54; range 23–55). Mean intention to become a nurse was 16.37 (SD = 2.73; range 6–20).

Table 2. Descriptive statistics of study variables (n = 282)

Variable	Mean	SD
Digital literacy	45.54	5.54
Intention to be a nurse	16.37	2.73

Hypothesis Testing: Multiple Linear Regression

The regression model (Table 3) was statistically significant overall ($F(8, 273) = 10.97$, $p < 0.001$) . It explained 24.3% of variance in intention to become a nurse ($R^2 = 0.243$; adjusted $R^2 = 0.221$).

Digital literacy was a strong positive predictor of intention ($B = 0.187$, $SE = 0.026$, $t = 7.08$, $p < 0.001$). Holding other variables constant, a 1-point increase in digital literacy corresponded to a 0.187-point increase in intention; a 10-point increase corresponded to an approximately 1.87-point increase in intention on the 6–20 scale.

Among covariates, cohort differences were observed (relative to the reference cohort): Batch 2022 ($B = 2.55$, $p = 0.018$), Batch 2023 ($B = 2.32$, $p = 0.050$), and Batch 2025 ($B = 3.16$, $p = 0.042$) were significant predictors. Age, sex, exposed to clinical practice, and Batch 2024 were not statistically significant predictors in this model.

Table 3. Multiple linear regression predicting intention to be a nurse (n = 282)

Predictors	B	SE	t	p
Intercept	12.62	5.79	2.18	.030
Digital literacy	0.187	0.026	7.08	<.001
Age	−0.383	0.243	−1.57	.117
Sex (male vs female)	−0.654	0.399	−1.64	.103
Exposed to Clinical Practice (yes vs never)	0.454	0.473	0.96	.339
Batch 2022	2.55	1.07	2.39	.018
Batch 2023	2.32	1.18	1.97	.050
Batch 2024	2.31	1.42	1.63	.105
Batch 2025	3.16	1.55	2.04	.042

Dependent variable: Intention to be a nurse.
Model fit: $R^2 = 0.243$; Adjusted $R^2 = 0.221$; $F(8, 273) = 10.97$, $p < .001$

Discussion

Principal Findings

This study provides evidence that digital literacy significantly predicts nursing students' intention to become a nurse, even after adjusting for age, sex, Exposed to clinical practice, and Batch cohort. This finding is educationally plausible given that nursing education literature increasingly positions digital capability as integral to students' preparedness for contemporary practice and to being "work-ready" in digitally enabled clinical environments (Ibrahim et al., 2023; Lokmic-Tomkins et al., 2021). Nursing students themselves report that digital health technologies will affect the future nursing role and can experience uncertainty about practicing in a digital world, which strengthens the rationale for ensuring students possess robust digital competencies that may support professional confidence and commitment (Reid et al., 2023; Wong et al., 2023).

The association observed here is also consistent with broader research showing that digital literacy and related literacy constructs are meaningful individual differences among nursing students and can be linked to learning-related capacities (e.g., online learning self-efficacy, ICT-related learning literacy)

(Harerimana et al., 2022; Kim & Jeon, 2020). In addition, studies demonstrate that targeted educational strategies—such as embedded digital literacy modules and technology-enhanced learning—can be implemented to address heterogeneity in students' skills, suggesting a realistic pathway for nursing programs to intervene on digital literacy as a modifiable educational factor (Lokmic-Tomkins et al., 2021; Widiasih et al., 2022). Evidence from Indonesia indicates that web-based simulation can improve learning outcomes including self-confidence (Widiasih et al., 2022), which is relevant because professional confidence and perceived readiness may contribute to how students appraise their fit with, and intentions toward, nursing careers, even though the present study did not test mediators directly.

Cohort (Batch) Effects and Developmental Considerations

Cohort differences were significant for several batches, implying that intention to become a nurse may vary systematically across student entry years or educational stages. This pattern is consistent with Indonesian evidence that career expectations can differ between earlier and later stages of training (freshmen vs. interns), supporting the broader interpretation that career-related cognitions may shift over time and with evolving educational experiences (Sari, 2019). Prior work on nursing career intention likewise emphasizes that intentions are multifactorial and may be influenced by pre-existing preferences, perceived barriers/enablers, and other educational factors (Docherty et al., 2023). Therefore, cohort effects in this study may reflect stage-of-training differences, changing experiences in the program, or differences in contextual conditions affecting particular cohorts; these interpretations are consistent with prior intention-focused nursing education research but require longitudinal confirmation (Docherty et al., 2023; Sari, 2019).

Implications for Nursing Education and Workforce Sustainability

The findings support the practical value of strengthening digital literacy within undergraduate nursing curricula. This aligns with the documented need to (i) identify subgroups of students with lower digital literacy rather than assuming competence (Harerimana et al., 2022; Lokmic-Tomkins et al., 2021; Reid et al., 2023), (ii) embed structured digital literacy teaching and support within nursing programs (Ibrahim et al., 2023; Lokmic-Tomkins et al., 2021), and (iii) integrate technology-enhanced learning approaches that can support competence development in resource-constrained or rapidly changing educational environments (Widiasih et al., 2022). Such curriculum actions may also fit Indonesian educators' broader efforts to develop student-centre methods and strengthen educational quality to meet evolving healthcare system needs (Grøndahl et al., 2025). Although the present study focused on intention to become a nurse (rather than intention to migrate), evidence that Indonesian nursing students' intentions can include overseas migration—associated with variables including age—underscores the importance of understanding and supporting intentions relevant to domestic workforce sustainability (Efendi et al., 2020).

Comparison with Adjacent Digital Literacy Evidence

Prior nursing research has connected digital literacy/digital health literacy to related outcomes such as attitudes toward digital transformation and AI, and ethics awareness surrounding AI use, illustrating that digital literacy is embedded in broader professional readiness and values-related competencies (Hashish & Alnajjar, 2024; Yang, 2024). Additionally, digital literacy has been examined as a factor influencing adoption of nursing-related mobile/web applications for care planning, further reinforcing its relevance to practical engagement with digital tools used in education and care processes (Eyı et al., 2022). While these studies do not directly test nursing career intention as an outcome, they support the broader claim that digital literacy is consequential for nursing students' engagement with digitally mediated learning and practice contexts (Eyı et al., 2022; Hashish & Alnajjar, 2024; Mekawy et al., 2020; Yang, 2024). The present study extends this evidence by linking digital literacy to a proximal career-related outcome—intention to become a nurse—within an Indonesian undergraduate cohort.

Limitations

The cross-sectional design prevents causal inference, as is typical of much of the survey-based nursing education literature on digital literacy and intention-related outcomes (Docherty et al., 2023; Harerimana et al., 2022; Kim & Jeon, 2020)' All variables were self-reported, which may introduce response biases similar to those present in studies measuring self-reported eHealth/digital health literacy among nursing students (Mekawy et al., 2020; Oducado & Moralista, 2020). The single-institution setting limits generalizability; multi-site designs like those used in broader Indonesian nursing intention research (e.g., migration intention studies) would strengthen external validity (Efendi et al., 2020). Future research should consider longitudinal designs to examine whether digital literacy predicts change in career intention over time and whether educational interventions that improve digital literacy translate to strengthened professional commitment, consistent with the evaluative orientation of digital literacy module development and technology-enhanced learning research in nursing education (Lokmic-Tomkins et al., 2021; Widiasih et al., 2022).

CONCLUSIONS

Digital literacy significantly predicts intention to become a nurse among Indonesian undergraduate nursing students, even after adjusting for age, sex, Exposed to clinical practice, and cohort. Given the growing centrality of digital capabilities to nursing students' preparedness for digitally enabled practice, nursing programs should assess students' digital literacy and embed targeted, developmental digital literacy learning opportunities rather than assuming competence based on age or exposure. Such strategies may support professional intention and contribute to longer-term workforce sustainability alongside broader student-centre educational reforms in Indonesian nursing education.

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