Dialogues in Humanities and Social Sciences
2026, VOL. 4, NO. 2, 135-145
ISSN (P): 3078-8838; ISSN (O): 3078-8846
https://doi.org/10.71261/dhss/4.2.135

Digital Technology Use and Life Skills among Eighth-Grade Students: Examining the Role of Purpose and Patterns of Digital Engagement

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ABSTRACT

Digital technologies are increasingly embedded in adolescents' learning, communication, and leisure. Yet their developmental significance may depend not only on duration of use but also on what students do with digital technologies and how they regulate their use. This study examined the relationship between patterns of digital technology use and life skills among eighth-grade students, focusing on study-oriented, communication-oriented, entertainment-oriented, and balanced digital use. A quantitative cross-sectional design was demonstrated using a synthetic dataset of 238 eighth-grade students. Life skills were operationalised across four domains: emotion regulation and self-management, communication and interpersonal skills, problem-solving and decision-making, and empathy and self-awareness. Descriptive statistics, reliability analysis, exploratory factor analysis, one-way analysis of variance, and multiple linear regression were applied. The simulated data showed acceptable internal consistency across the four life-skills domains, while the proposed four-domain structure accounted for a substantial proportion of variance. Purpose-specific digital-use patterns also showed differentiated associations with overall life skills. The findings support a conceptualisation of digital engagement as a developmental context rather than merely a measure of screen exposure. Because the dataset is simulated, the statistical findings are methodological demonstrations and should not be interpreted as empirical evidence concerning Vietnamese students.

ARTICLE HISTORY
Received 27 July 2026
Revised 15 September 2026
Accepted 16 September 2026
Published 17 September 2026

KEYWORDS
Adolescents, digital technology use, life skills, social and emotional skills, lower secondary education, digital transformation, Vietnam.

Introduction

Digital transformation has become an important feature of contemporary educational change. Digital devices, online learning platforms, social media, search engines, artificial intelligence, and digitally mediated communication are increasingly integrated into adolescents' everyday learning and social environments. Consequently, students are required to develop not only academic knowledge and technical competencies but also the psychosocial capacities necessary to regulate behaviour, communicate effectively, solve problems, make decisions, and maintain healthy interpersonal relationships.

These capacities are particularly important during adolescence. The World Health Organization (WHO) conceptualises life skills as psychosocial abilities that enable individuals to deal effectively with the demands and challenges of everyday life. The framework includes decision-making, problem-solving, critical and creative thinking, communication, interpersonal relationships, self-awareness, empathy, and coping with emotions and stress (World Health Organization [WHO], 1994, 1999). Thus, life skills encompass cognitive, emotional, and social capacities rather than technical abilities alone.

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Recent educational research has increasingly connected life skills with the broader concept of social and emotional skills. The OECD Survey on Social and Emotional Skills identifies dimensions such as emotional regulation, self-control, task performance, sociability, empathy, and collaboration as important competencies associated with students' educational and broader life outcomes (OECD, 2024). A systematic review by Kirchhoff and Keller (2021) similarly demonstrated that school-based life-skills programmes for adolescents address multiple behavioural, cognitive, emotional, and social competencies.

At the same time, digital technology use among adolescents has expanded substantially. Research has frequently examined screen time as an indicator of digital exposure; however, this approach may obscure important differences in what adolescents actually do online. Learning, searching for information, communicating with peers, playing games, creating content, and passive entertainment represent qualitatively different forms of digital engagement. A systematic review by Santos et al. (2023) showed considerable heterogeneity in associations between screen exposure and adolescent mental health, suggesting that the meaning and type of screen activity deserve greater attention.

Research focusing specifically on social media also indicates that digital experiences are not uniformly associated with adolescent development. Piccerillo and Digennaro (2025), in a systematic review of adolescent social-media use and emotional intelligence, reported differentiated relationships involving emotion regulation, self-esteem, and empathy. These findings suggest that digital technology should not be treated as a homogeneous exposure.

The issue is particularly relevant in Vietnam because educational policy increasingly emphasises competency development alongside knowledge acquisition. The General Education Curriculum promulgated through Circular 32/2018/TT-BGDĐT identifies the development of students' qualities and competencies as central educational goals (Ministry of Education and Training [MOET], 2018). More recently, Circular 02/2025/TT-BGDĐT established the Digital Competence Framework for learners, providing a national policy framework for digital competence development (MOET, 2025).

Vietnamese educational research has also demonstrated the relevance of non-cognitive competencies among lower-secondary students. Choi et al. (2022) reported significant relationships between lesson-study implementation and selected non-cognitive skills among lower-secondary students in Vietnam. Nguyen et al. (2021) examined a school-based health-education intervention and reported effects involving adolescents' non-cognitive skills, life satisfaction, aspirations, and health-related quality of life.

Despite these developments, an important research gap remains. Existing studies commonly examine either adolescent digital technology use or life skills as separate educational issues. When digital exposure is examined, duration or frequency is often used as the principal indicator, potentially overlooking differences in purpose and behavioural patterns. Evidence directly examining the relationship between purpose-specific digital engagement and multidimensional life skills among Vietnamese lower-secondary students remains limited.

The present study therefore proposes a framework that conceptualises digital technology use as a multidimensional behavioural context and examines its association with life skills among eighth-grade students. Four dimensions of digital engagement are considered: study-oriented use, communication-oriented use, entertainment-oriented use, and balanced/self-regulated use.

Literature Review

Life Skills during Adolescence

Life skills are multidimensional psychosocial competencies that enable individuals to respond effectively to everyday demands and challenges. The WHO framework includes decision-making, problem-solving, critical and creative thinking, communication, interpersonal relationships, self-awareness, empathy, and coping with emotions and stress (WHO, 1994, 1999).

The developmental importance of these competencies is particularly evident during adolescence. Young people increasingly make decisions independently, manage peer relationships, regulate emotions, respond to academic demands, and negotiate social environments. Consequently, the development of life skills can be viewed as an important component of adolescent education and health promotion.

Kirchhoff and Keller (2021) found that school-based life-skills education commonly combines cognitive, emotional, behavioural, and interpersonal components. Similarly, the OECD framework identifies emotional regulation, self-control, empathy, sociability, and collaboration as important social and emotional competencies (OECD, 2024).

Building on these perspectives, the present study conceptualises life skills through four domains:

1. Emotion regulation and self-management;
2. Communication and interpersonal skills;
3. Problem-solving and decision-making; and
4. Empathy and self-awareness.

This structure retains the multidimensional character of the WHO framework while providing a parsimonious measurement model for quantitative analysis.

Digital Technology Use as a Multidimensional Behaviour

Digital technology use is frequently assessed through the amount of time adolescents spend using devices. Although duration is useful as a descriptive indicator, it does not adequately capture the purpose or quality of digital engagement.

For example, two students may both spend three hours per day using digital devices. One may spend most of that time attending online lessons, searching for academic information, communicating with classmates, and creating educational products. The other may spend the same amount of time watching entertainment videos or playing games. Treating these experiences as equivalent may conceal potentially important differences in cognitive, emotional, and interpersonal processes.

Santos et al. (2023) demonstrated considerable heterogeneity in research examining screen time and adolescent mental health. Similarly, Piccerillo and Digennaro (2025) found that social-media use had different relationships with dimensions of emotional intelligence. These findings support a shift from a purely quantitative approach toward a more contextual examination of digital engagement.

Accordingly, the present study distinguishes four patterns:

- study-oriented digital use;
- communication-oriented digital use;
- entertainment-oriented digital use; and
- balanced/self-regulated digital use.

Daily duration remains a descriptive variable rather than the sole indicator of digital engagement.

Research Gap and Conceptual Framework

The literature indicates three principal gaps.

First, life skills and digital technology use are frequently examined in separate research traditions. Second, studies examining adolescents' technology use often rely heavily on duration or frequency, potentially overlooking the purpose of use. Third, there remains limited empirical evidence concerning the relationship between different forms of digital engagement and multidimensional life skills among Vietnamese lower-secondary students.

The conceptual framework of the present study integrates the WHO life-skills framework with contemporary social and emotional skills research and Vietnam's emerging digital-competence policy.

The framework proposes that digital engagement patterns are associated with life skills, while recognising that the relationship is potentially complex and non-causal in a cross-sectional design.

Research Hypotheses

H1: Study-oriented digital technology use is positively associated with overall life skills.

H2: Communication-oriented digital technology use is positively associated with overall life skills.

H3: Entertainment-oriented digital technology use is negatively associated with overall life skills.

H4: Balanced/self-regulated digital technology use is positively associated with overall life skills.

H5: Overall life skills differ significantly across groups defined by primary digital-use purpose.

Methodology

Research Design

A quantitative cross-sectional research design was specified. For the purposes of methodological demonstration, a synthetic dataset containing 238 eighth-grade students was generated.

The dataset does not represent observations collected from real students. Therefore, all statistical results reported below are simulations designed to demonstrate how the proposed empirical study could be analysed.

Study Area and Population

The substantive target population is eighth-grade students enrolled in Vietnamese lower-secondary schools.

Because the present dataset is simulated and no actual field site was used, a specific school, district, or province is not claimed. In an empirical replication, the study area should be clearly specified together with school characteristics and the institutional context.

Sampling Technique and Sample Size

The simulated sample consisted of 238 eighth-grade students.

For an empirical study, school selection, class selection, inclusion criteria, exclusion criteria, and response rate should be explicitly documented. A sample of 238 is sufficient for demonstrating basic reliability, factor analysis, correlation, and regression procedures, but it should not be interpreted as representative of Vietnamese eighth-grade students nationally.

Data Collection

The proposed questionnaire is designed for student self-administration.

Digital-use questions assess typical daily duration and the frequency of activities related to learning, communication, entertainment, and self-regulation. Life-skills items use a five-point Likert response scale ranging from 1 = strongly disagree to 5 = strongly agree.

For an actual study, data collection should be conducted only after appropriate institutional approval, parental/guardian consent, and student assent.

Research Instrument

The life-skills instrument consists of 20 items distributed across four dimensions:

Dimension	Items	Description
Emotion regulation and self-management	5	Managing emotions, impulses, stress and personal behaviour
Communication and interpersonal skills	5	Expressing ideas, listening, cooperation and relationship management
Problem-solving and decision-making	5	Identifying problems, considering alternatives and making appropriate decisions
Empathy and self-awareness	5	Understanding oneself and recognising others' feelings and perspectives

Digital-use measures include daily duration and four purpose/pattern indicators.

The content domains were derived from the WHO life-skills framework and contemporary social and emotional skills literature. However, the 20-item instrument should be regarded as a research-development instrument, rather than an already validated scale. An empirical study should establish content validity, cognitive validity, reliability, construct validity, convergent validity, and discriminant validity.

Reliability and Validity

Internal consistency was evaluated using Cronbach's alpha.

Exploratory factor analysis was used to examine whether the observed items were consistent with the proposed four-domain structure.

For an empirical publication, the analysis should additionally report KMO, Bartlett's test of sphericity, communalities, factor loadings, cross-loadings, explained variance, and preferably confirmatory factor analysis using an independent sample.

Ethical Considerations

Because the dataset is synthetic, no real human participants were involved in generating the numerical results presented in this manuscript.

For a subsequent empirical study, ethical approval or institutional review, informed parental consent, student assent, voluntary participation, confidentiality, secure data storage, and the right to withdraw should be documented.

Data Analysis

The simulated data were analysed using:

- descriptive statistics;
- Cronbach's alpha;
- principal-component analysis;
- one-way ANOVA; and

- multiple linear regression.

Statistical significance was set at α = .05.

Results

Descriptive Statistics

Table 1. Descriptive statistics of the principal variables

Variable	M	SD
Daily digital-device use (hours)	3.1	1.25
Study-oriented use	3.06	1.37
Communication-oriented use	3.11	1.4
Entertainment-oriented use	3.11	1.41
Balanced/self-regulated use	2.99	1.41
Emotion regulation/self-management	3.12	1.11
Communication/interpersonal skills	3.13	1.07
Problem-solving/decision-making	3.16	1.03
Empathy/self-awareness	3.13	1.02
Overall life skills	3.13	0.61

Source: Synthetic dataset generated for methodological demonstration.

The simulated students reported an average of 3.10 hours of daily digital-device use. The mean overall life-skills score was 3.13. Among the four life-skills domains, problem-solving and decision-making showed the highest mean score (M = 3.16, SD = 1.03).

Reliability

Table 2. Internal consistency of the life-skills scale

Scale	Items	Cronbach's α
Emotion regulation/self-management	5	0.84
Communication/interpersonal skills	5	0.808

Problem-solving/decision-making	5	0.799
Empathy/self-awareness	5	0.793
Overall life-skills scale	20	0.776

Source: Synthetic dataset generated for methodological demonstration.

Cronbach's alpha coefficients ranged from .793 to .840 across the four domains. The overall 20-item scale yielded α = .776. These values indicate acceptable internal consistency for an exploratory instrument.

Exploratory Factor Structure

The simulated principal-component analysis produced four components with approximate eigenvalues of 3.94, 2.83, 2.46, and 2.36. Together, these components explained approximately 57.7% of total variance.

The pattern was broadly consistent with the proposed four-domain conceptualisation of life skills.

However, because the data are simulated, this analysis should not be interpreted as psychometric validation of the instrument.

Differences by Primary Digital-Use Purpose

Table 3. One-way ANOVA of overall life skills by primary digital-use purpose

Comparison	F	p
Primary-use groups	14.51	< .001

Source: Synthetic dataset generated for methodological demonstration.

The simulated ANOVA indicated statistically significant differences in overall life-skills scores across primary digital-use groups, $F = 14.51$, $p < .001$.

The descriptive pattern suggested higher life-skills scores among students whose dominant digital use was study-oriented or communication-oriented than among students whose dominant use was entertainment-oriented.

Because the dataset is synthetic, this result should not be interpreted as evidence of a population difference.

Multiple Regression

Table 4. Multiple regression predicting overall life skills

Predictor	B	Direction
Study-oriented use	0.18	Positive
Communication-oriented use	0.136	Positive
Entertainment-oriented use	−.027	Weak negative
Balanced/self-regulated use	0.122	Positive

Source: Synthetic dataset generated for methodological demonstration.

The simulated regression model explained approximately 33.0% of the variance in overall life skills ($R^2 = .330$).

Study-oriented digital use showed the largest positive coefficient, followed by communication-oriented and balanced/self-regulated use. Entertainment-oriented use showed a small negative coefficient.
These coefficients are illustrative and should not be interpreted as causal effects.

Discussion

The present study was designed around the proposition that the developmental significance of digital technology use cannot be adequately understood through screen duration alone. Instead, the purpose and pattern of digital engagement may be relevant to adolescents' psychosocial development.

The simulated findings were broadly consistent with this conceptual proposition. The four-domain life-skills instrument demonstrated acceptable internal consistency, while the preliminary factor structure corresponded with the proposed domains of emotion regulation and self-management, communication and interpersonal skills, problem-solving and decision-making, and empathy and self-awareness.

This multidimensional structure is consistent with the WHO conceptualisation of life skills and with contemporary social and emotional skills frameworks (WHO, 1994, 1999; OECD, 2024). Kirchhoff and Keller (2021) similarly demonstrated that adolescent life-skills programmes commonly integrate cognitive, emotional, behavioural, and interpersonal competencies rather than focusing on a single skill.

A second important finding concerns the purpose of digital use. The simulated regression results indicated positive coefficients for study-oriented and communication-oriented use, whereas entertainment-oriented use showed a weak negative coefficient. Although these results cannot be interpreted empirically, they illustrate why the measurement of digital engagement should move beyond total screen time.

This conceptual distinction is consistent with previous literature. Santos et al. (2023) reported considerable heterogeneity in associations between screen exposure and adolescent mental health. Similarly, Piccerillo and Digennaro (2025) found differentiated associations between social-media use and emotional-intelligence dimensions. These findings collectively suggest that the developmental meaning of digital technology may depend partly on the activity undertaken rather than simply on the number of hours spent online.

The positive coefficient associated with balanced/self-regulated use is also theoretically meaningful. Self-regulation is itself an important component of life skills and social and emotional competence. The ability to plan digital activity, control impulses, maintain appropriate boundaries, and balance online and offline activities may therefore be conceptually related to broader self-management capacities.

Nevertheless, the direction of this relationship should not be assumed to be causal. Students who already possess stronger self-regulation may simply be more capable of maintaining balanced digital use. Longitudinal studies would therefore be needed to determine whether digital self-regulation contributes to life-skills development, whether life skills influence digital behaviour, or whether both processes occur simultaneously.

The Vietnamese policy environment further strengthens the relevance of this research direction. The General Education Curriculum emphasises the development of student qualities and competencies (MOET, 2018), while the Digital Competence Framework introduced through Circular 02/2025/TT-BGDĐT provides a formal national framework for digital competence (MOET, 2025).

This policy development suggests that digital education should not be reduced to technical skills. Digital competence intersects with communication, responsible behaviour, information use, safety, and self-regulation. These areas overlap conceptually with life skills and social and emotional skills.

Vietnamese empirical research also supports the importance of non-cognitive competencies. Choi et al. (2022) demonstrated relationships between lesson study and selected non-cognitive skills among lower-secondary students. Nguyen et al. (2021) examined a school-based health-education intervention and its relationships with adolescents' non-cognitive skills and broader developmental outcomes. However, the existing Vietnamese evidence does not directly establish whether specific patterns of digital technology use are associated with multidimensional life skills.

The present framework therefore contributes primarily at the conceptual level by connecting three areas that are often studied separately: adolescent life skills, digital technology use, and lower-secondary education.

Theoretical Implications

The first theoretical implication is that digital technology should be conceptualised as a developmental context rather than simply an exposure variable.

Second, the framework provides a conceptual bridge between the WHO life-skills tradition and contemporary social and emotional skills research.

Third, the framework creates a basis for examining digital competence and life skills together within the Vietnamese lower-secondary education context.

Practical Implications

The findings suggest several areas for educational practice.

First, schools should distinguish among learning, communication, information searching, creative production, and entertainment rather than treating all screen exposure as equivalent.

Second, digital education may be strengthened by incorporating emotion regulation, respectful communication, empathy, problem-solving, decision-making, and responsible online behaviour.

Third, students should be supported in developing digital self-regulation, including planning device use, maintaining appropriate boundaries, and balancing online and offline activities.

Finally, families and schools should develop complementary expectations regarding digital-device use, online communication, privacy, safety, and healthy digital routines.

Limitations and Future Research

The most important limitation is that the present dataset is synthetic. Consequently, the numerical findings cannot be interpreted as evidence concerning Vietnamese students.

Second, a cross-sectional design cannot establish causal relationships.

Third, self-report instruments may be affected by recall bias and social-desirability bias.

Fourth, the proposed life-skills instrument requires formal psychometric validation using empirical data.

Future research should therefore employ actual student samples, validate the measurement model through EFA and CFA, examine convergent and discriminant validity, and consider longitudinal or intervention designs. Research should also investigate potential differences according to gender, socioeconomic background, device access, school characteristics, and family digital-use rules.

Conclusion

This study developed a quantitative framework for examining the relationship between digital technology use and life skills among eighth-grade students. The framework distinguishes digital engagement according to purpose and pattern and conceptualises life skills through four domains: emotion regulation and self-management, communication and interpersonal skills, problem-solving and decision-making, and empathy and self-awareness.

The simulated analysis demonstrated how reliability, factor analysis, ANOVA, and regression could be applied to investigate the proposed framework. The results also illustrate the importance of distinguishing between different forms of digital engagement rather than relying exclusively on total screen time.

The principal conceptual contribution is therefore the integration of adolescent life skills with purpose-specific digital technology use. In the context of Vietnam's ongoing educational and digital transformation, this framework provides a basis for future empirical research examining how students' digital environments interact with their psychosocial development.

Because the current dataset is simulated, however, the reported numerical findings should not be interpreted as empirical evidence. Actual field research is required to validate the proposed relationships and measurement model.

Recommendations

Future empirical research should:

First, employ validated or rigorously developed scales to measure life skills and the level of engagement in the digital environment.

Second, measure digital activities based on specific purposes, in addition to total daily usage duration.

Third, conduct cognitive interviews and pilot surveys prior to the main survey; simultaneously, utilize Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to determine the measurement structure.

Fourth, consider potential mediating or moderating variables—such as self-regulation capabilities, family rules regarding digital device usage, peer relationships, and the school environment—and employ longitudinal or intervention research designs to examine temporal and causal relationships.

Fifth, conduct research across multiple secondary schools in Vietnam to enhance the generalizability (external validity) of the findings

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The author declares no conflict of interest.

Author Contributions

Conceptualization, methodology, data curation, analysis, writing, and revision: First Author.

Data Availability Statement

The dataset used in this manuscript is synthetic and was generated for methodological demonstration. It does not contain observations collected from human participants.

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