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Students in the Digital Era: Assessing Technology Awareness and Proficiency

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Abstract **Original Research**

This study investigates the awareness and proficiency of digital technology among third-year Bachelor in Technology and Livelihood Education students at Quirino State University Maddela Campus, focusing on their use of digital tools for academic learning. The integration of digital technologies, such as video conferencing, online collaboration platforms, and simulation software, has significantly transformed education by fostering personalized, interactive, and efficient learning environments. However, the effectiveness of these technologies is closely linked to students' digital proficiency. Despite the high levels of awareness and proficiency in basic tools, students face challenges in utilizing more specialized technologies due to varying proficiency levels and limited support. This study uses purposive quota sampling and descriptive and inferential statistics to assess these variables, revealing a positive correlation between awareness and proficiency. Based on the findings, the study recommends implementing a "Digital Technology to Enhance Learning" intervention program, including digital skills training, workshops, and peer-assisted learning, to address gaps in digital literacy. The study calls for future research to explore the integration of digital technologies in curricula and their impact on learning outcomes.

Keywords: *digital technology, awareness, proficiency, education, digital literacy*.

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INTRODUCTION

The rapid digital transformation of higher education has fundamentally reshaped teaching and learning processes, with learning management systems, artificial intelligence–supported platforms, collaborative applications, and mobile technologies expanding access to knowledge and redefining student engagement (OECD, 2021; UNESCO, 2023). In state universities, where students come from diverse socio-economic backgrounds and experience varying levels of digital access, the effective integration of technology is critical to ensuring equitable learning opportunities and sustaining academic quality (Co, 2020). Beyond mere access, students are increasingly expected to demonstrate both awareness and competence in the meaningful use of digital tools for academic purposes.

This study is anchored in the Digital Competence Framework (DigComp 2.2), which conceptualizes digital competence across key domains such as information literacy, communication, content creation, safety, and problem-solving (Vuorikari et al., 2022). Within this framework, awareness refers to students' knowledge of digital tools and their academic applications, while proficiency denotes their ability to effectively utilize these tools in learning contexts. Complementing this perspective, the Technology Acceptance Model (TAM) posits that technology adoption is influenced by perceived usefulness and ease of use, both of which are shaped by users' awareness and skill levels (Al-Emran & Granić, 2021). Together, these frameworks emphasize that successful engagement in digital learning environments requires both cognitive understanding and operational competence.

Despite the recognized importance of digital competence in enhancing academic performance, self-regulated learning, and adaptability (Lucas et al., 2022; Zhao et al., 2023), significant disparities persist due to differences in device access, prior exposure, institutional support, and socio-economic conditions (UNESCO, 2023). Moreover, existing studies tend to focus on faculty practices, institutional readiness, or technological infrastructure, with limited attention given to students' awareness and proficiency as distinct yet interrelated constructs. This gap limits the development of targeted interventions that address specific learner needs.

To address these gaps, the present study examines the levels of awareness and proficiency in using digital technologies for learning among students in a state university. By analyzing differences across demographic profiles and exploring the relationship between awareness and proficiency, the study provides empirical evidence to inform the design of responsive digital literacy programs, curriculum enhancements, and policy interventions. Ultimately, the findings aim to support capacity-building initiatives that promote equitable digital learning and ensure that students are equipped with the competencies necessary for academic success in a digitally driven global society.

METHODOLOGY

This study employed a descriptive research design to examine students' awareness and proficiency in using digital technology for learning. The approach enabled a systematic and accurate description of participants' characteristics, behaviors, and digital engagement. The study was conducted at Quirino State University – Maddela Campus, involving 77 third-year Bachelor of Technology and Livelihood Education (BTLED) students during the first semester of Academic Year 2024–2025. Participants were selected using purposive quota sampling to ensure representation across sections and specializations.

Data were collected via a structured survey questionnaire adapted from validated instruments, covering demographics, awareness, and proficiency in digital technology use, with responses measured on a five-point Likert scale. Institutional approval and informed consent were obtained before data collection. Data were analyzed using frequency counts, percentages, weighted means, Kruskal-Wallis, Mann-Whitney U, and Spearman's rank-order correlation to examine levels, differences, and relationships. Ethical standards were strictly followed, ensuring voluntary participation, confidentiality, and adherence to data privacy regulations.

RESULTS AND DISCUSSION

This section presents the findings and analysis of the results of the study after appropriate statistical procedures have been applied.

RQ 1. What is the demographic profile of the respondents in terms of age, sex, and specialization?

Table 1. Profile of Respondents

Profile Variable	Categories	Frequency	Percentage
Age Group	19 years old and below	6	7.8%
	20 to 29 years old	66	85.7%
	30 years old and above	5	6.5%
Sex	Male	26	33.8%
	Female	51	66.2%
Specialization	Home Economics	52	67.5%
	Industrial Arts	25	32.5%
TOTAL		**77**	**100.0**

The table presents the demographic characteristics of the 77 respondents in terms of age, sex, and specialization. The majority (85.7%) are aged 20–29 years, indicating that most participants belong to the traditional college-age group. This age cohort is generally considered digitally immersed, having grown up in technology-rich environments, which may positively influence their familiarity and confidence in using digital tools for learning (OECD, 2021). Only small proportions fall below 19 years (7.8%) or are 30 years and above (6.5%), suggesting limited representation of younger entrants and mature learners, which may affect age-based comparisons.

In terms of sex, females comprise 66.2% of the sample, while males account for 33.8%. Gender differences in digital engagement and confidence have been noted in higher education research, making this imbalance important when interpreting awareness and proficiency outcomes (UNESCO, 2023).

Regarding specialization, Home Economics students represent 67.5%, compared to 32.5% from Industrial Arts. Since technology integration may vary across academic disciplines, specialization may influence students' exposure to and application of digital tools (Zhao et al., 2023). Overall, the demographic profile suggests findings largely reflect young, female Home Economics students.

RQ2. What is the level of awareness of students in using digital technologies in learning within a state university?

Table 2. Respondents' level of awareness of using digital technology in learning.

Statement Indicators	Mean	SD	Qualitative Description	Descriptive Rating
1. I contribute to another blog as part of their course requirements.	3.45	1.262	Sometimes	Moderate

2.	I use the Web to share digital files related to their course (e.g., sharing photos, audio files, movies, digital documents, websites,etc.).	3.57	1.229	Often	High
3.	I use Web-conferencing or video chat to communicate/collaborate with other students in the course.	3.43	1.261	Sometimes	Moderate
4.	I receive alerts about course information (e.g. timetable changes, the release of new learning resources, changes in assessment) via RSS feeds on the Web.	3.47	1.231	Sometimes	Moderate
5.	I receive alerts about course information (e.g. timetable changes, the release of new learning resources, changes in assessment) via text message on their mobile phone.	3.51	1.177	Often	High
6.	I contribute with other students to the development of a wiki as part of their course requirements.	3.52	1.659	Often	High
7.	I receive grades/marks from their lecturer via text message on their mobile phone.	3.22	1.084	Sometimes	Moderate
8.	I receive pre-class discussion questions from their lecturer via text message on their mobile phone.	3.49	1.059	Sometimes	Moderate
9.	I use a personal dashboard on the university intranet to access all their academic information related to courses, grades, etc.	3.43	1.105	Sometimes	Moderate
10.	Students use an ePortfolio system to record their achievements for future use beyond the course of their studies.	3.34	1.131	Sometimes	Moderate
11.	I design and build Web pages as part of their course.	3.43	1.197	Sometimes	Moderate
12.	I create and present multimedia, audio/video shows as part of their course requirements (e.g., PowerPoint).	3.61	1.216	Sometimes	High
13.	I can download or access online audio/video recordings of lectures they could not attend.	3.55	1.220	Often	High
14.	I can download or access online audio/video recordings to revise the content of lectures they have already attended.	3.51	1.108	Often	High
15.	I use the Web to access university base service (e.g., enrolment and paying fees).	3.60	1.127	Often	High
MEAN		**3.49**	**.989**	**Often**	**High**

Legend:1.00-1.49: Very Low; 1.55-2.49: Low; 2.50-3.49: Moderate; 3:.50-4.49: High; 4.50-5.00: Very High

Table 2 presents the respondents' level of awareness in using digital technology for learning. The overall mean of 3.49 (SD = .989) indicates a high level of awareness, suggesting that students are generally familiar with various digital tools and platforms used in academic contexts. This aligns with findings that contemporary university students demonstrate considerable exposure to digital learning environments (Enriques, 2025; OECD, 2021). High awareness is particularly evident in accessing university-based services online (M = 3.60), creating multimedia presentations (M = 3.61), downloading recorded lectures for missed classes (M = 3.55), and sharing digital files via the Web (M = 3.57). These results reflect strong familiarity with practical and frequently used digital functions that support flexible and blended learning (UNESCO, 2023).

However, several indicators fall within the moderate range, including contributing to blogs (M = 3.45), participating in web conferencing (M = 3.43), using e-portfolios (M = 3.34), and designing web pages (M = 3.43). These tools often require higher-order digital engagement and content creation skills, which may explain their relatively lower awareness levels (Norouzi et al., 2025; Vuorikari et al., 2022). The standard deviations, generally around 1.0–1.6, suggest moderate variability in responses, indicating differences in students' exposure and experience. Overall, the findings suggest strong operational awareness but highlight opportunities to enhance engagement with more advanced digital learning applications (Aydmlar et al., 2024).

RQ 3. What is the level of proficiency of students using digital technologies in learning within a state university?

Table 3. Respondents' level of proficiency in using digital technology in learning.

Statement Indicators	*Mean*	*SD*	*Qualitative Description*	*Descriptive Rating*
1. I can search for and access information in digital environments.	4.26	.696	Agree	Above Average
2. I can search for information that I need on the Internet.	4.34	.681	Agree	Above Average
3. I can use different tools to store and manage information	4.21	.732	Agree	Above Average
4. I have apps that keep me up to date with news.	4.05	.809	Agree	Above Average
5. 1 can understand the information I get from the Internet.	4.05	.809	Agree	Above Average
6. 1 skillfully use digital software to complete learning tasks.	3.97	.827	Agree	Above Average
7. 1 am willing to help other people in digital environments.	4.03	.888	Agree	Above Average

8. I can consider the opinion of others in digital environments.	4.05	.793	Agree	Above Average
9. I respect other people in digital environments	4.18	.854	Agree	Above Average
10. I can put myself in other people's shoes in digital environments.	3.99	.966	Agree	Above Average
11. I can get informed before commenting on a topic.	4.06	.922	Agree	Above Average
12. I can use digital means to solve problems encountered in my study.	4.01	.953	Agree	Above Average
13. I can create and edit digital content with higher standards according to the requirements of work or study.	4.04	.880	Agree	Above Average
14. I can use digital means to detect plagiarism in content that I created.	3.96	.924	Agree	Above Average
15. When sharing digital information, students can protect my privacy and security.	4.13	.978	Agree	Above Average
MEAN	**4.09**	**.660**	**Proficient**	**Above Average**

Legend:1.00-1.49: Below Proficient; 1.55-2.49: Slightly Proficient;2.50-3.49: Average; 3:.50-4.49: Above Average;4.50-5.00: Highly Proficient

Table 3 presents the respondents' level of proficiency in using digital technology for learning. The overall mean of 4.09 (SD = .660) indicates that students are proficient, with an "Above Average" rating across all indicators. This suggests that respondents possess strong functional and applied digital skills necessary for academic tasks. High means are observed in searching for information online (M = 4.34) and accessing digital information (M = 4.26), reflecting well-developed information and data literacy skills. These competencies are central components of digital competence frameworks and are essential for academic success in technology-enhanced learning environments (Vuorikari et al., 2022). Students also demonstrate proficiency in managing information (M = 4.21), respecting others in digital environments (M = 4.18), and protecting privacy when sharing information (M = 4.13). These findings highlight not only technical ability but also responsible and ethical digital behavior, aligning with global expectations for safe and responsible technology use in higher education (Zakir et al., 2025; UNESCO, 2023).

Although slightly lower, indicators such as detecting plagiarism (M = 3.96) and skillfully using digital software for learning tasks (M = 3.97) remain within the "Above Average" range, suggesting room for further enhancement in advanced digital applications (Soeprijanto et al., 2022). The relatively low standard deviations indicate consistent responses among participants. Overall, the findings suggest that students possess strong digital proficiency, supporting effective engagement in blended and online learning contexts (OECD, 2021).

RQ 4. Is there a significant difference in the level of awareness and level of proficiency of the respondents in using digital technology in learning when grouped according to profile?

Table 4. *Kruskal-Wallis test results comparing the assessment on the level of awareness and proficiency in using digital technology in learning when grouped by age.*

Variables	Age Groups	N	Mean Rank	X^2	Sig.	Decision
Level of Awareness	≤ 19	6	46.08	.800^{ns}	.670	Failed to reject Ho
	20 – 29	66	38.12			
	≥ 30	5	42.10			
Level of Proficiency	≤ 19	6	26.67	2.536^{ns}	.281	Failed to reject Ho
	20 – 29	66	39.50			
	≥ 30	5	47.20			

Legend: N = 77, degrees of freedom = 2
ns = not significant at the 0.05 level of significance (p > 0.05).

Table 4 presents the results of the Kruskal–Wallis test examining differences in students' levels of awareness and proficiency in using digital technology when grouped by age. The findings indicate no statistically significant differences across age groups for both awareness (χ^2 = .800, p = .670) and proficiency (χ^2 = 2.536, p = .281) at the 0.05 level of significance. Since the p-values are greater than .05, the null hypothesis was not rejected, suggesting that age does not significantly influence students' awareness or proficiency in digital technology use for learning.

Although mean rank differences are observed—such as slightly higher awareness among students aged ≤19 (Mean Rank = 46.08) and higher proficiency among those aged ≥30 (Mean Rank = 47.20)—these variations are not statistically meaningful. This implies that digital competence is relatively consistent across age groups within the sample. The findings align with recent literature suggesting that exposure to digital environments in higher education may reduce generational gaps in digital skills (OECD, 2021). Furthermore, contemporary digital competence frameworks emphasize that proficiency is shaped more by access, training, and engagement rather than age alone (Vuorikari et al., 2022). Overall, the results suggest that students, regardless of age, demonstrate comparable levels of awareness and proficiency, indicating equitable digital readiness within the group studied Paul & Roy, 2023).

Table 5. *Mann-Whitney test results comparing males and females in the assessment of the level of awareness and proficiency using digital technology in learning.*

Variables	Sex	N	Mean Rank	Sum of Ranks	*Z*	Sig.	Decision
Level of Awareness	M	26	36.71	954.50	-.641^{ns}	.521	Failed to reject Ho
	F	51	40.17	2048.50			
Level of Proficiency	M	26	32.52	845.50	-1.818^{ns}	.069	Failed to reject Ho
	F	51	42.30	2157.50			

Legend: ns = not significant at the 0.05 level of significance (p > 0.05).

Table 5 presents the Mann–Whitney U test results comparing male and female respondents in terms of their level of awareness and proficiency in using digital technology for learning. The findings reveal **no** statistically significant differences between males and females in both awareness ($Z = -0.641$, $p = .521$) and proficiency ($Z = -1.818$, $p = .069$) at the 0.05 level of significance. Since the p-values are greater than .05, the null hypothesis was failed to be rejected, indicating that sex does not significantly influence students' digital awareness or proficiency.

Although female respondents obtained slightly higher mean ranks in both awareness (40.17) and proficiency (42.30) compared to males (36.71 and 32.52, respectively), these differences are not statistically meaningful. The relatively close mean rank values suggest comparable digital competence levels between male and female students. This supports recent research indicating that gender gaps in digital skills are narrowing in higher education contexts, particularly where access and exposure to technology are similar (OECD, 2021; UNESCO, 2023).

The near-significant value for proficiency ($p = .069$) may suggest a trend worth further exploration, but within this study, both groups demonstrate generally equivalent digital readiness. Overall, the results imply that digital technology engagement in learning is not significantly determined by sex among the respondents (Paul & Roy, 2023).

Table 6. *Mann-Whitney test results comparing HE and IA students in the assessment on the level of awareness and proficiency in using digital technology in learning.*

Variables	Spec	N	Mean Rank	Sum of Ranks	*Z*	Sig.	Decision
Level of awareness	HE	52	39.90	2075.00	$-.512^{ns}$	.609	Failed to reject Ho
	IA	25	37.12	928.00			
Level of Proficiency	HE	52	42.39	2204.50	-1.823^{ns}	.054	Failed to reject Ho
	IA	25	31.94	798.50			

Legend: ns = not significant at the 0.05 level of significance (p > 0.05).

Table 6 presents the Mann–Whitney U test results comparing Home Economics (HE) and Industrial Arts (IA) students in terms of their awareness and proficiency in using digital technology for learning. The findings show no statistically significant differences between the two specializations for both awareness ($Z = -0.512$, $p = .609$) and proficiency ($Z = -1.823$, $p = .054$) at the 0.05 level of significance. Since the p-values exceed .05, the null hypothesis was not rejected, indicating that specialization does not significantly influence students' digital awareness or proficiency levels.

Although HE students obtained slightly higher mean ranks in both awareness (39.90) and proficiency (42.39) compared to IA students (37.12 and 31.94, respectively), these differences are not statistically meaningful. The near-significant p-value for proficiency ($p = .054$) suggests a possible emerging difference that may warrant further investigation with a larger sample size. These findings imply that digital competence is relatively consistent across specializations, possibly due to shared exposure to institutional digital platforms and similar academic technology requirements (Ndibalema, 2025). Contemporary digital competence frameworks emphasize that digital skills development is influenced more by institutional access and training rather than disciplinary background alone (Vuorikari et al., 2022; UNESCO, 2023). Overall, both groups demonstrate comparable levels of digital readiness for academic learning.

RQ 5. Is there a significant relationship between the level of awareness and proficiency level in using digital technology in academic learning?

Table 7. Spearman's rho correlation between the level of awareness and proficiency of students in using digital technology in learning.

Variables	r_s	df	Sig.	Decision
Level of awareness Level of Proficiency	$.143^{ns}$	75	.214	Failed to Reject Ho

ns - correlation is not significant at the .05 level (two-tailed).
N = 77

Table 7 presents the Spearman's rank-order correlation between students' level of awareness and their proficiency in using digital technology for learning. The correlation coefficient (rs = 0.143, p = .214) indicates a positive but weak relationship between awareness and proficiency. However, the p-value exceeds the 0.05 significance level, leading to a failed rejection of the null hypothesis. This implies that the relationship between awareness and proficiency is not statistically significant within the sample.

The weak and non-significant correlation suggests that while students may be aware of digital tools and resources, this awareness does not necessarily translate into higher proficiency in using them effectively for learning (Holm, 2025). This finding aligns with studies highlighting that knowledge of digital technologies does not automatically guarantee skillful application, as proficiency depends on practical experience, training, and confidence in digital environments (OECD, 2021; Vuorikari et al., 2022).

Therefore, the results underscore the importance of structured interventions, such as workshops, guided practice, and digital literacy programs, to bridge the gap between awareness and applied competence (Raphael et al., 2024). According to Emelogu et al. (2022), developing proficiency may require more than familiarity; it involves deliberate practice and support to ensure that students can effectively utilize digital tools to enhance their learning outcomes.

6. What intervention program can be proposed to improve the proficiency of students in digital technology?

In today's rapidly evolving educational landscape, digital technology plays a crucial role in enhancing the learning experience (Georgopoulou et al., 2025). However, findings from the study on students' proficiency in using digital tools reveal gaps in essential skills that hinder effective learning (Holm, 2025). To address this issue, this intervention plan aims to improve students' digital proficiency by providing targeted training, interactive workshops, and hands-on practice with key digital tools. By equipping students with the necessary technological skills, this plan seeks to foster a more engaging, efficient, and independent learning environment, ultimately enhancing academic performance and digital literacy (Ndibalema, 2025).

Title: DIGITAL TECHNOLOGY TO ENHANCE LEARNING

Objectives: *To enhance learning by integrating technology effectively into the classroom, improving student engagement, comprehension, and participation.*

I. Key Areas of Focus

1. *Student Training and Development*

   ** Equip students with the skills to effectively use technology.*

2. *Student Engagement and Digital Literacy*

   ** Foster responsible and effective use of technology.*

3. *Evaluation and Continuous Improvement*

   ** Assess effectiveness and refine strategies.*

II. Proposed Action Plan

KEY AREAS ACTION	*STEPS/ACTIVITIES*	*PERSON INVOLVED*	*TIMELINE*	*EXPECTED OUTCOME*
1. Student Training and Development	*Conduct workshops on using interactive tools (e.g., Google Classroom, Kahoot, Canva, Edmodo). Provide mentoring and peer coaching. Create an online resource hub for teachers.*	*Students, IT experts, Student Leaders, Teachers, and Instructional Designers*	*Monthly Sessions*	*Students effectively integrate technology into lessons.*
2. Student Engagement and Digital Literacy	*Introduce responsible digital citizenship training. Implement gamified learning activities and online discussions. Encourage student-led tech projects.*	*Students, Student Leaders, Teachers, IT Department.*	*Every semester*	*Students develop tech skills and engage more actively in learning.*
3. Evaluation and Continuous Improvement	*Conduct feedback surveys for students and teachers. Analyze data on student performance and engagement. Adjust strategies based on feedback.*	*Students, Teachers, Admin, Research Team.*	*Every Semester*	*Continuous improvement of tech integration strategies.*

III. Success Indicators

- ✓ *Increased students' adoption of technology in lesson planning and instruction.*
- ✓ *Higher student engagement and participation in tech-enhanced learning activities.*
- ✓ *Improved academic performance due to interactive and diverse instructional methods.*
- ✓ *Positive feedback from students and teachers on the use of technology in classrooms.*

Based on the findings, students demonstrate a high level of awareness of basic digital tools, such as online learning platforms and collaboration software, but this awareness does not always translate into effective usage of more advanced technologies. Proficiency, however, is generally above average, indicating that students can effectively apply digital tools in learning activities. Awareness and proficiency do not significantly vary by age, sex, or specialization, and the correlation

between them is weak. To address gaps, an intervention program titled **"Digital Technology to Enhance Learning"** is proposed, including digital skills training, hands-on workshops, and peer-assisted learning to strengthen students' competencies.

Future studies should explore strategies to enhance both digital awareness and proficiency among students and educators. Universities are encouraged to assess digital skills regularly and implement targeted digital literacy programs, including workshops, hands-on training, and peer-assisted learning. Faculty should integrate essential digital tools into curricula while engaging in continuous professional development to stay updated on emerging technologies. Students should actively participate in practical training on academic tools, research databases, and time management to strengthen their competencies. Researchers and curriculum developers are advised to design technology-integrated instructional frameworks that improve learning outcomes and prepare students for the demands of a digitalized academic and professional environment.

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