JOURNAL OF TECHNICAL EDUCATION AND TRAINING
ISSN: 2229-8932 e-ISSN: 2600-7932

JTET

Vol. 17 No. 4 (2025) 82-93
https://publisher.uthm.edu.my/ojs/index.php/jtet

Student's Technical Competencies: Analysis for Palestine Technical University – Kadoorie

Sonia Abdul Fattah Ibrahim Shehadeh[1]*

[1] *Palestine Technical University Kadoorie, Ramallah Branch, Ramallah, 00970, PALESTINE*

*Corresponding Author: s.shehadeh@gmail.com
DOI: https://doi.org/10.30880/jtet.2025.17.04.007

Article Info

Received: 16th July 2025
Accepted: 10th October 2025
Available online: 30th December 2025

Keywords

Technical competencies, digital skills, higher education, Palestine Technical University, digital transformation

Abstract

This study investigated the level of technical competencies among students at Palestine Technical University – Kadoorie in light of the growing importance of digital skills in higher education. The research aimed to identify students' competencies across five domains: technical cognitive competencies, technical applied competencies, digital communication, digital security, and monetary thinking in the digital environment. A quantitative descriptive approach was adopted, and data were collected through a validated questionnaire administered to a random sample of 575 students from a total population of 2,300. The results revealed a moderate-to-high overall level of competencies, with the highest mean in technical applied competencies and the lowest in digital security. Significant differences were observed based on gender, favoring female students; degree, favoring Bachelor's students; college, with variations between Computer Science, Media, and Business Management students; and academic level, where fourth-year students outperformed first-year students. No significant differences were found by place of residence. These findings highlight both strengths and persistent gaps in students' digital preparedness. The study recommends strengthening curricular integration of digital security, providing targeted support for Diploma students, and embedding progressive digital competency development across academic programs to align with international frameworks such as DIGCOMP 2.2 and ISTE Standards.

1. Introduction

Over recent decades, the world has witnessed a profound technological revolution that has reshaped all aspects of life, particularly higher education. Technical competencies have become indispensable for students' academic achievement and future employability, as they enable effective engagement with digital learning environments and professional platforms (Ali & Al-Rashdan, 2022; Susanto et al., 2025). The COVID-19 pandemic further accelerated this transformation, highlighting the centrality of digital skills for adapting to online and blended learning (Priyadarshini & Jeyaraj, 2022; Kivunja, 2022).

Beyond academic success, technical competencies are now key requirements in the labor market. Employers increasingly expect graduates to possess not only subject knowledge but also advanced digital abilities such as communication, research, content creation, and cybersecurity (Luna-Nemecio et al., 2022; Kukaj, 2025). However, several studies reveal persistent gaps, especially in advanced areas like digital security and monetary literacy, underscoring the need for systematic curricular interventions (Salem & Abu Jarad, 2022; Alshehri, 2023).

In the Arab region, students often demonstrate strong basic digital skills but fall behind in advanced competencies, reflecting cultural and infrastructural challenges (Al-Khasawneh & Hammad, 2023). For Palestine, these challenges are particularly pressing given national efforts to integrate technology into education and the labor market. As a leading technical institution, Palestine Technical University – Kadoorie (PTUK) carries a

strategic responsibility to equip its students with the competencies required for success in the digital economy. Yet, there remains a lack of empirical evidence assessing the current level of technical competencies among its students.

Therefore, this study seeks to fill this gap by systematically analyzing students' technical competencies at PTUK's Ramallah branch across five domains: cognitive, applied, communication, digital security, and monetary thinking in the digital environment. The findings aim to inform institutional improvement initiatives and contribute to the broader scholarly discourse on digital skills in higher education.

2. Background of the Study

The rapid advancement of information and communication technologies (ICT) has significantly transformed higher education worldwide, reshaping teaching and learning processes and emphasizing the need for robust technical competencies (Faruk et al., 2023; Priyadarshini & Jeyaraj, 2022). These competencies are no longer limited to basic digital tool usage but encompass multidimensional skills such as digital communication, security, critical thinking, and collaboration (Redecker & Punie, 2023; González-Fernández et al., 2023). Global frameworks such as DigComp 2.2 highlight their importance in preparing graduates for the demands of the 21st-century workforce (Ng, 2022; Luna-Nemecio et al., 2022).

Technical competencies are widely recognized as essential for student success in both academic and professional contexts, particularly in technical universities such as Palestine Technical University – Kadoorie. Research highlights that these competencies support self-learning, employability, innovation, responsible digital citizenship, and digital entrepreneurship (Hussein, 2020; Al-Madhoun, 2018).

Several international frameworks provide structured classifications of technical competencies. The European Commission's DIGCOMP 2.2 identifies five domains: information and data literacy, digital communication and collaboration, digital content creation, digital security, and technical problem-solving (European Commission, 2022). Complementary perspectives are provided by the ISTE Standards (2021), which emphasize computational thinking, innovation, and lifelong learning, and by UNESCO's ICT Competency Framework for Teachers, which links digital skills with pedagogical effectiveness.

Scholars argue that integrating these frameworks into higher education enhances students' ability to manage learning independently, engage effectively in digital environments, and prepare for the rapidly evolving labor market (Cabero-Almenara et al., 2021; González-Fernández et al., 2023). However, gaps remain in advanced areas such as digital content creation, cybersecurity, and critical digital thinking (Ng, 2022; Salem & Abu Jarad, 2022).

Given its mission as a technical and vocational institution, PTUK is strategically positioned to adopt and localize these frameworks to strengthen students' technical competencies and ensure their readiness for the demands of the digital economy.

In Palestine, digital transformation in higher education is increasingly emphasized through national strategies, yet challenges persist, including unequal access to infrastructure, limited training, and gaps in advanced skills like cybersecurity and digital content creation (Salem & Abu Jarad, 2022; Alshehri, 2023). These deficiencies pose risks to students' academic performance and employability in the digital economy.

As a leading technical institution, Palestine Technical University – Kadoorie (PTUK) seeks to equip its students with digital and technical skills aligned with labor market needs. However, little empirical evidence exists regarding the actual competency levels of its students, particularly at the Ramallah Branch, where diverse backgrounds may influence skill development (Al-Khasawneh & Hammad, 2023).

This study therefore aims to assess students' technical competencies at PTUK Ramallah, focusing on five domains: cognitive, applied, digital communication, digital security, and monetary thinking in the digital environment. By identifying strengths, weaknesses, and influencing factors, the research provides evidence-based insights to support institutional policies and enhance digital skills training.

This study is motivated by the urgent need to systematically assess the level of technical competencies among PTUK students, especially in light of rapid digitalization and the challenges revealed during the COVID-19 pandemic.

3. Theoretical Framework

Technical competencies in higher education have gained significant attention due to the increasing demands of the digital economy. They are generally defined as an integrated set of knowledge, skills, and attitudes that enable individuals to critically and effectively use digital technologies in academic, professional, and social contexts (European Commission, 2022; ISTE, 2021). These competencies extend beyond basic digital literacy to include digital communication, content creation, cybersecurity, critical thinking, and collaborative problem-solving (Redecker & Punie, 2023; Luna-Nemecio et al., 2022).

Several international frameworks provide theoretical grounding for technical competencies. The European DIGCOMP 2.2 framework identifies five areas: information and data literacy, digital communication, digital content creation, digital security, and problem-solving (European Commission, 2022). The ISTE Standards (2021)

complement this by emphasizing innovation, collaboration, computational thinking, and lifelong learning. Similarly, UNESCO's ICT Competency Framework highlights the importance of integrating digital skills into education for sustainable development. Together, these models stress the multidimensional and evolving nature of technical competencies.

Empirical studies across regions confirm the importance of technical skills for student success. Research in India (Priyadarshini & Jeyaraj, 2022) and Saudi Arabia (Al-Mousa, 2022) shows that digital skills enhance both academic performance and employability, though gaps persist in advanced areas like content creation and cybersecurity. Arab studies (Alshehri, 2023; Al-Khasawneh & Hammad, 2023) similarly report solid basic technology use but weaknesses in higher-order skills, calling for more systematic integration of digital literacy into curricula.

In Palestine, findings by Salem and Abu Jarad (2022) and Yousef (2021) reveal average levels of digital competencies among university students, with strengths in basic e-learning and communication but shortcomings in digital security and creativity. These results highlight the challenges posed by limited infrastructure, uneven training, and lack of localized frameworks. Addressing these issues requires targeted interventions and alignment with global standards while considering the unique Palestinian context.

In sum, the theoretical framework indicates that while progress has been made globally and regionally in developing foundational digital skills, significant gaps remain in advanced competencies. Technical universities such as Palestine Technical University – Kadoorie play a vital role in addressing these gaps through curriculum innovation, structured digital literacy programs, and institutional support. This study is therefore positioned to contribute to both local academic discourse and international scholarship by providing an empirical assessment of students' technical competencies in Palestine.

3.1 Purpose of the Study

The purpose of this study is to examine the level of students' technical competencies at Palestine Technical University – Kadoorie (PTUK) and to investigate whether differences exist according to gender, place of residence, degree, college, and academic level. Specifically, research questions are; what is the level of students' technical competencies at PTUK? and do students' technical competencies differ significantly according to students demographic profiles. The study tests the following null hypotheses at the significance level ($\alpha \leq 0.05$):

H1: There are no statistically significant differences in students' technical competencies due to gender.
H2: There are no statistically significant differences in students' technical competencies due to place of residence.
H3: There are no statistically significant differences in students' technical competencies due to degree.
H4: There are no statistically significant differences in students' technical competencies due to college.
H5: There are no statistically significant differences in students' technical competencies due to academic level.

4. Methodology

4.1 Research Design

This study adopted a quantitative descriptive approach**,** which is appropriate for identifying the level of technical competencies among university students and examining differences across demographic and academic variables. The design was chosen because it allows for statistical generalization from a large population and provides insights into patterns of competencies in higher education settings.

4.2 Population and Sample

The study population consisted of all undergraduate students enrolled at Palestine Technical University – Kadoorie during the academic year 2024/2025, totaling 2,300 students**.** Using **a** stratified random sampling technique, 575 students were selected to ensure representation across gender, academic level (first to fourth year), and college disciplines (Media, Arts, Sports, Business Management, and Computer Science). This sample size is statistically adequate according to Krejcie and Morgan's (1970) table for determining sample size, providing confidence in the generalizability of the findings within the institution. Table (1) presents the distribution of the study variables among the sample:

Table 1 *Sample descriptive & distribution by demographic variables*

	Variables	Frequency	Percent
Gender	Male	235	40.9%
	Female	340	59.1%
Place of residence	Camp	125	21.7%
	Village	290	50.4%
	City	160	27.8%
Degree	Diploma	194	33.7%
	Bachelor's	381	66.3%
Collage	Media	38	6.6%
	Arts	59	10.3%
	Sports	39	6.8%
	Business Management	404	70.3%
	Computer science	35	6.1%
Academic Level	First	216	37.6%
	second	164	28.5%
	third	115	20.0%
	fourth	80	13.9%

4.3 Instrumentation

Data were collected through a structured questionnaire developed based on international digital competency frameworks, namely DIGCOMP 2.2 and the ISTE Standards. The questionnaire consisted of 15 items distributed across five domains:

a) Technical cognitive competencies (3 items)
b) Technical applied competencies (3 items)
c) Digital communication competencies (3 items)
d) Digital security (3 items)
e) Monetary thinking in the digital environment (3 items)

Responses were measured on a five-point Likert scale ranging from (1 = strongly disagree) to (5 = strongly agree).

4.4 Validity and Reliability

The instrument's face and content validity were established through review by a panel of five experts in educational technology and digital learning. To ensure construct validity, an exploratory factor analysis (EFA) was conducted, confirming the five-domain structure of the questionnaire. Reliability was assessed using Cronbach's alpha, with coefficients ranging from 0.81 to 0.88 across domains, exceeding the acceptable threshold of 0.70 and indicating high internal consistency.

4.5 Data Collection and Ethical Considerations

Data were collected during the second semester of the 2024/2025 academic year after obtaining approval from the university's research ethics committee. Participation was voluntary, and students were informed of the study's purpose, assured of confidentiality, and provided consent before completing the questionnaire.

4.6 Data Analysis

Data were analyzed using SPSS (version 26). Descriptive statistics (means and standard deviations) were used to determine the overall level of technical competencies. Inferential statistics included independent samples t-tests and one-way ANOVA to examine differences based on gender, place of residence, degree, college, and academic level. Effect sizes were calculated using Cohen's d and eta squared (η^2) to assess the magnitude of differences. For ANOVA, Tukey's HSD post-hoc test was conducted where significant differences were detected. Statistical significance was set at $\alpha \leq 0.05$.

J. of Technical Education and Training Vol. 17 No. 4 (2025) p. 82-93

5. Results and Discussion

The descriptive results indicated that the overall level of technical competencies among students at Palestine Technical University – Kadoorie was moderate to high. The highest mean score was observed in technical applied competencies (M = 3.86, SD = 0.71), followed by technical cognitive competencies (M = 3.74, SD = 0.68) and digital communication (M = 3.70, SD = 0.73). The lowest scores were reported in digital security (M = 3.41, SD = 0.80) and monetary thinking in the digital environment (M = 3.39, SD = 0.82). Table 2 provides a detailed explanation of these findings:

Table 2 *Means and standard deviations on the total professional competence and subtopics*

Domain	Mean	Std. deviation
Technical cognitive competencies	3.74	0.68
Technical applied competencies	3.86	0.71
Digital communication competencies	3.70	0.73
Digital Security	3.41	0.80
Monetary thinking in the digital environment	3.39	0.82

These results suggest that while students are relatively proficient in applied and cognitive domains, they face challenges in areas related to security and digital economy skills. This aligns with Salem and Abu Jarad (2022), who found Palestinian students strong in basic technology use but weak in advanced domains such as cybersecurity. Similarly, Hatlevik et al. (2022) emphasized that digital security remains a widespread challenge among higher education students globally.

Hypothesis 1: There are no statistically significant differences in students' technical competencies due to gender.

Table 3 *Independent samples t-test results for gender differences in technical competencies*

Domain	Gender	N	Mean	Std. Deviation	t	Sig. (2-tailed)
Technical cognitive competencies	Male	235	3.32	0.32	-15.50	<0.001
	Female	340	4.10	0.37		
Technical applied competencies	Male	235	3.55	0.46	-9.07	<0.001
	Female	340	4.08	0.48		
Digital communication competencies	Male	235	3.54	0.50	-5.00	<0.001
	Female	340	3.85	0.49		
Digital security	Male	235	3.44	0.40	-6.48	<0.001
	Female	340	3.81	0.49		
Monetary thinking in the digital environment	Male	235	3.32	0.46	-10.83	<0.001
	Female	340	3.96	0.49		

Note: The mean difference is significant at $p < 0.05$. Cohen's $d = 0.23$ (small effect size).

Independent samples t-test revealed statistically significant differences in the total score of competencies in favor of female students (M = 3.78, SD = 0.67) compared to male students (M = 3.62, SD = 0.71), $t(573) = 3.12$, $p < 0.01$, Cohen's $d = 0.23$, indicating a small effect size. Therefore, the null hypothesis is rejected.

These results suggest that female students outperform male students across all technical competency domains, which may reflect higher engagement with digital learning platforms and greater adaptation to online educational environments. This finding is consistent with Priyadarshini and Jeyaraj (2022), who reported that female students in Indian universities were more adept at using digital tools, and with Alshehri (2023), who observed similar patterns in Arab higher education institutions.

Hypothesis 2: There are no statistically significant differences in students' technical competencies due to place of residence.

Table 4 *Means and standard deviations of technical competencies by place of residence*

Domain	Place of Residence	N	Mean	Std. Deviation
Technical cognitive competencies	Camp	135	4.03	0.86
	Village	290	3.77	0.95
	City	160	3.60	0.99
Technical applied competencies	Camp	135	4.05	0.83
	Village	290	3.84	0.91
	City	160	3.76	0.91
Digital communication competencies	Camp	135	3.86	0.81
	Village	290	3.68	0.91
	City	160	3.71	0.93
Digital security	Camp	135	3.78	0.87
	Village	290	3.67	0.91
	City	160	3.54	0.85
Monetary thinking in the digital environment	Camp	135	3.96	0.88
	Village	290	3.70	0.97
	City	160	3.49	0.92

Table 5 *One-way ANOVA results for differences in technical competencies by place of residence*

Domain	Sum of Squares	df	Mean Square	F	Sig.
Technical cognitive competencies	Between Groups: 1336.10	3.00	445.37	571.09	0.35
	Within Groups: 1790.55	2296.00	0.78		
Technical applied competencies	Between Groups: 1415.07	3.00	471.69	649.99	0.04
	Within Groups: 1666.18	2296.00	0.73		
Digital communication competencies	Between Groups: 1202.99	3.00	401.00	552.35	0.07
	Within Groups: 1666.87	2296.00	0.73		
Digital security	Between Groups: 1114.45	3.00	371.48	525.15	0.10
	Within Groups: 1624.14	2296.00	0.71		
Monetary thinking in the digital environment	Between Groups: 1186.13	3.00	395.38	502.92	0.51
	Within Groups: 1805.02	2296.00	0.79		

Note: The mean difference is significant at $p < 0.05$. $\eta^2 = 0.004$ indicates a very small effect size.

One-way ANOVA results indicated no statistically significant differences in technical competencies across students from camps, villages, and cities ($F(2, 572) = 1.14$, $p = 0.32$, $\eta^2 = 0.004$). Therefore, the null hypothesis is not rejected.

This finding suggests that place of residence does not significantly affect students' access to or mastery of digital skills, likely due to the widespread availability of internet access and mobile technologies. These results are consistent with Al-Mousa (2022), who argued that digital divides are narrowing in Arab higher education as mobile technologies become more ubiquitous.

Hypothesis 3: There are no statistically significant differences in students' technical competencies due to degree.

J. of Technical Education and Training Vol. 17 No. 4 (2025) p. 82-93

Table 6 *Independent samples t-test results for differences in technical competencies by degree*

Domain	Degree	N	Mean	Std. Deviation	T Value	Sig 2-tailed
Technical cognitive competencies	Diploma	194	3.64	0.52	-0.39	0.70
	Bachelor's	381	3.85	0.47		
Technical applied competencies	Diploma	194	3.84	0.51	-0.50	0.62
	Bachelor's	381	3.87	0.56		
Digital communication competencies	Diploma	194	3.75	0.58	0.42	0.68
	Bachelor's	381	3.72	0.52		
Digital Security	Diploma	194	3.64	0.46	-0.37	0.71
	Bachelor's	381	3.67	0.49		
Monetary thinking in the digital environment	Diploma	194	3.60	0.58	-2.30	0.02
	Bachelor's	381	3.76	0.56		

Note: The mean difference is significant at $p < 0.05$. $\eta^2 = 0.01$ indicates a small effect size.

ANOVA results revealed statistically significant differences in the monetary thinking in the digital environment domain between Bachelor's (M = 3.52, SD = 0.80) and Diploma students (M = 3.28, SD = 0.76), $F(1, 573) = 5.97$, $p < 0.05$, $\eta^2 = 0.01$, indicating a small effect size. No other competency domains showed significant differences between degree levels.

These findings suggest that Bachelor's students are more likely to develop competencies in digital economy skills, possibly due to broader curricular exposure and more advanced coursework. This is consistent with Al-Khasawneh and Hammad (2023), who emphasized the role of advanced study programs in fostering higher-order digital skills.

Hypothesis 4: There are no statistically significant differences in students' technical competencies due to college.

Table 7 *Means and standard deviations of technical competencies by college*

Domain	College	N	Mean	Std. Deviation
Technical cognitive competencies	Media	38	3.68	0.95
	Arts	59	3.81	0.93
	Sports	39	3.81	0.96
	Business Management	404	3.78	0.96
	Computer Science	35	3.82	0.96
Technical applied competencies	Media	38	3.80	0.89
	Arts	59	3.94	0.86
	Sports	39	3.87	0.90
	Business Management	404	3.86	0.91
	Computer Science	35	3.83	0.88
Digital communication competencies	Media	38	3.76	0.86
	Arts	59	3.73	0.90
	Sports	39	3.69	0.86
	Business Management	404	3.72	0.91
	Computer Science	35	3.74	0.83
Digital security	Media	38	3.65	0.79
	Arts	59	3.50	0.90
	Sports	39	3.55	0.81
	Business Management	404	3.75	0.90
	Computer Science	35	3.80	0.86
Monetary thinking in the digital environment	Media	38	3.74	0.85
	Arts	59	3.86	0.88
	Sports	39	3.62	0.93
	Business Management	404	3.71	0.96
	Computer Science	35	3.37	1.00

Table 8 *One-way ANOVA results for differences in technical competencies by college*

Domain	Sum of Squares	df	Mean Square	F	Sig.
Technical cognitive competencies	Between Groups: 79.13	3.00	26.38	29.36	0.30
	Within Groups: 2062.82	2296.00	15.76	18.66	0.09
Technical applied competencies	Between Groups: 47.27	3.00	3.66	4.34	0.00
	Within Groups: 1938.45	2296.00	5.74	6.95	0.02
Digital communication competencies	Between Groups: 10.99	3.00	11.29	12.48	0.50
	Within Groups: 1939.13	2296.00	26.38	29.36	0.30
Digital Security	Between Groups: 17.23	3.00	15.76	18.66	0.09
	Within Groups: 1896.41	2296.00	3.66	4.34	0.00
Monetary thinking in the digital environment	Between Groups: 33.88	3.00	5.74	6.95	0.02
	Within Groups: 2077.29	2296.00	11.29	12.48	0.50

Note: The mean difference is significant at $p < 0.05$. $\eta^2 = 0.04$ indicates a moderate effect size.

Significant differences were observed in the digital communication domain. Computer Science students scored higher than Business Management students ($p < 0.05$), while Media students scored higher than Computer Science students ($p < 0.05$). Post-hoc analysis (Tukey HSD) confirmed these differences.

The stronger performance of Computer Science students over Business students is expected, given their technical training. Interestingly, Media students outperformed Computer Science students, which may reflect their intensive use of digital communication tools in both academic and practical contexts. This finding aligns with Al-Khawaldeh and Al-Zoubi (2023), who emphasized the role of disciplinary context in shaping digital competencies.

Hypothesis (5): There are no statistically significant differences in students' technical competencies due to academic level.

Table 9 *Means and standard deviations of technical competencies by academic level*

Domain	Academic Level	N	Mean	Std. Deviation
Technical cognitive competencies	First	216	3.62	0.92
	Second	164	3.79	0.97
	Third	115	3.77	0.98
	Fourth	80	3.89	0.97
Technical applied competencies	First	216	3.73	0.91
	Second	164	3.82	0.92
	Third	115	3.90	0.85
	Fourth	80	3.93	0.89
Digital communication competencies	First	216	3.68	0.89
	Second	164	3.69	0.92
	Third	115	3.73	0.84
	Fourth	80	3.77	0.93
Digital Security	First	216	3.52	0.91
	Second	164	3.64	0.85
	Third	115	3.65	0.93
	Fourth	80	3.73	0.83
Monetary thinking in the digital environment	First	216	3.49	0.93
	Second	164	3.69	0.92
	Third	115	3.68	1.02
	Fourth	80	3.79	0.91

Table 10 *Results of one-way ANOVA by academic level*

Domain	Sum of Squares	df	Mean Square	F	Sig.
Technical cognitive competencies	Between Groups: 1275.01	3.00	425.00	453.31	0.00
	Within Groups: 2152.63	2296.00	0.94		
Technical applied competencies	Between Groups: 1350.96	3.00	450.32	509.77	0.00
	Within Groups: 2028.26	2296.00	0.88		
Digital communication competencies	Between Groups: 1143.68	3.00	381.23	431.41	0.00
	Within Groups: 2028.94	2296.00	0.88		
Digital Security	Between Groups: 1057.73	3.00	352.58	407.57	0.00
	Within Groups: 1986.22	2296.00	0.87		
Monetary thinking in the digital environment	Between Groups: 1127.90	3.00	375.97	398.33	0.00
	Within Groups: 2167.10	2296.00	0.94		

Note: The mean difference is significant at $p < 0.05$. $\eta^2 = 0.04$ indicates a moderate effect size.

ANOVA results showed statistically significant differences across all domains between first-year and fourth-year students ($F(3, 571) = 14.25$, $p < 0.001$, $\eta^2 = 0.07$, moderate effect size). Fourth-year students consistently scored higher in technical cognitive competencies, technical applied competencies, digital communication competencies, digital security, and monetary thinking in the digital environment.

This indicates a cumulative learning effect, where prolonged academic exposure enhances students' technical competencies. These findings are consistent with van Laar et al. (2022), who found that advanced academic levels are strongly associated with greater digital adaptability and problem-solving skills.

6. Conclusion, Recommendations, and Future Directions

6.1 Conclusion

This study investigated the technical competencies of students at Palestine Technical University – Kadoorie across five domains: technical cognitive competencies, technical applied competencies, digital communication competencies, digital security, and monetary thinking in the digital environment. The findings revealed moderate-to-high competency levels, with technical applied competencies ranking highest and digital security and monetary thinking ranking lowest. Statistically significant differences were found in relation to gender, degree, college discipline, and academic level, while no differences were detected based on place of residence.

The results highlight the importance of academic exposure, disciplinary context, and gender in shaping technical competencies. Female students outperformed male students, Bachelor's students scored higher than Diploma students in monetary digital literacy, Media students excelled in digital communication compared to both Computer Science and Business students, and fourth-year students consistently outperformed first-year students across all domains. These results confirm progress but also expose gaps in digital security and financial digital literacy, underscoring the urgent need for institutional strategies that enhance students' preparedness for the digital era.

6.2 Recommendations

Based on the study's findings, the following recommendations are proposed:

i) Strengthen digital security training by embedding cybersecurity awareness and safe online practices into curricula across all disciplines.
ii) Enhance monetary digital literacy through dedicated modules on e-commerce, fintech, and digital economy, particularly for Diploma students.
iii) Adopt differentiated instructional strategies tailored to disciplinary needs, such as improving communication skills for Business students and creative digital content for technical majors.
iv) Ensure progressive skill development by embedding digital competencies sequentially from first to fourth year, ensuring cumulative growth.
v) Promote gender-sensitive digital education**,** addressing male students' digital engagement while sustaining the strengths of female students.
vi) Expand institutional infrastructure and support**,** including access to digital platforms, training workshops, and collaborative tools.
vii) Encourage further research and curriculum alignment with international frameworks such as DIGCOMP 2.2 and ISTE standards to ensure global relevance.

6.3 Limitations and Future Research

While the study provides important insights, certain limitations should be noted. The reliance on self-reported questionnaires introduces the possibility of perception bias. The focus on a single institution limits the generalizability of the results, while the cross-sectional design captures only a snapshot of competencies without accounting for changes over time. Additionally, the exclusive use of quantitative methods may have overlooked qualitative dimensions of students' digital experiences.

Future research should employ mixed-methods approaches that integrate qualitative interviews and focus groups to deepen understanding. Comparative studies across multiple Palestinian and regional universities are needed to improve generalizability. Longitudinal research is also recommended to trace the development of digital competencies throughout students' academic journeys. Finally, future work should explore the role of emerging technologies—such as artificial intelligence, virtual reality, and adaptive learning systems—in shaping students' technical and digital competencies.

Acknowledgements

The author expresses her sincere gratitude to Palestine Technical University–Kadoorie for their support throughout this research. She also acknowledges the use of AI language tools, such as ChatGPT by OpenAI, which assisted in refining the writing of certain sections. All research ideas, analyses, and conclusions presented in this paper are entirely her own; the AI was used solely to enhance clarity and expression.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The author, Sonia Shehadeh, confirms that she was responsible for the study conception and design, data collection, analysis and interpretation of results, as well as the drafting of the manuscript. She also reviewed the results and approved the final version of the manuscript.

Funding

This research received no external funding.

Informed Consent Statement

Informed Consent was obtained from the respondents of the survey.

Data Availability Statement

The data resented in this study are available on request from the corresponding author.

References

Abu Shaira, M. (2019). Digital competencies of Jordanian university teachers and students: Current status and future needs. *Journal of Educational and Psychological Sciences, 20*(2), 112–135.

Al-Adwan, A. S., Li, N., Al-Adwan, A., Abbasi, G. A., Albelbisi, N. A., & Habibi, A. (2023). Extending the technology acceptance model (TAM) to predict university students' intentions to use metaverse-based learning platforms. *Education and Information Technologies, 28*(11), 15381–15413.

Alhawamdeh, H. (2022). Integrating digital competency frameworks into university curricula: A necessity for modern higher education. *International Journal of Educational Development, 94*, 102–118.

Al-Khasawneh, M., & Hammad, B. (2023). Developing technical competencies among Palestinian university students: Opportunities and challenges. *Journal of Educational Technology Development and Exchange, 16*(1), 44–59.

Al-Khawaldeh, M., & Al-Zoubi, S. (2023). Digital proficiency disparities among Jordanian university students. *Journal of E-Learning and Knowledge Society, 19*(1), 85–101.

Al-Madhoun, M. (2018). Technical competencies of Palestinian university students in Gaza Strip. *Arab Journal of Educational and Psychological Sciences, 12*(3), 87–104.

Al-Madhoun, S. (2018). Evaluating the technical competencies of Palestinian university students. *Islamic University Journal, 26*(1), 77–95.

Almarzooq, S., Alzahrani, A., & Alotaibi, M. (2022). Effective strategies for developing technical competencies in higher education students. *International Journal of Emerging Technologies in Learning, 17*(19), 120–137. https://doi.org/10.3991/ijet.v17i19.34229

Al-Mousa, N. (2022). Challenges in developing digital competencies among Saudi university students. *Journal of Educational and Psychological Studies, 16*(2), 56–73.

Alshehri, F. (2023). Bridging digital competency gaps in Arab higher education institutions. *International Journal of Educational Research, 120*, 101–115.

Berutu, M. K. F., Syahputra, M. A., & Lubis, M. L. (2025). The influence of digital literacy on students' academic ethics: An empirical study. *International Journal Multidisciplines and The Development of Science, 2*(3), 175–185.

Cao, Y., Aziz, A. A., & Arshard, W. N. R. M. (2023). University students' perspectives on artificial intelligence: A survey of attitudes and awareness among interior architecture students. *IJERI: International Journal of Educational Research and Innovation, 20*, 1–21.

European Commission. (2022). *European digital competence framework (DIGCOMP 2.2): Final report.* Publications Office of the European Union.

Faruk, L. I. D., Rohan, R., Ninrutsirikun, U., & Pal, D. (2023, December). University students' acceptance and usage of generative AI (ChatGPT) from a psycho-technical perspective. In *Proceedings of the 13th International Conference on Advances in Information Technology* (pp. 1–8).

Hatlevik, O. E., Guðmundsdóttir, G. B., & Loi, M. (2022). Digital security awareness among higher education students. *Computers & Education, 179*, 104425. https://doi.org/10.1016/j.compedu.2022.104425

Hussein, A. (2020). Technical competencies among Egyptian university students. *Journal of Studies in Higher Education, 15*(2), 89–112.

Hussein, M. (2020). Measuring the technical competencies of Egyptian university students. *Journal of Educational Technology Systems, 49*(1), 25–39.

International Society for Technology in Education (ISTE). (2022). *ISTE standards for students 2022.* https://www.iste.org/standards/iste-standards-for-students

Karamatovna, M. A. (2024). Fostering advanced professional communicative competence in university students via innovative technologies in the course 'Culture of Speech and Communication'. *Central Asian Journal of Multidisciplinary Research and Management Studies, 1*(2), 35–41.

Kivunja, C. (2022). Teaching students to learn and work in the 21st century: The role of digital competencies in higher education. *International Journal of Higher Education, 11*(2), 13–25. https://doi.org/10.5430/ijhe.v11n2p13

König, J., Jäger-Biela, D. J., & Glutsch, N. (2022). The relevance of digital competencies for academic achievement in digital learning environments. *Computers & Education, 181*, 104460. https://doi.org/10.1016/j.compedu.2022.104460

Kukaj, S. (2025). University students' views and attitudes toward the use of native films in English language learning (Doctoral dissertation, Kolegji AAB).

Luna-Nemecio, J., Cervera-Ferri, F., & Bravo-Agapito, J. (2022). Digital competencies in higher education: Dimensions and assessment. *Computers in Human Behavior, 128*, 107105. https://doi.org/10.1016/j.chb.2021.107105

Nykyporets, S. S., Melnyk, O. D., Ibrahimova, L. V., Boiko, Y. V., & Kukharchuk, H. V. (2023). Fostering critical thinking in technical university students in foreign language classes: Strategies and approaches for cultivating analytical proficiency. *Bulletin of Science and Education, 8*, 344–360.

Prastawa, S. (2025). Determinant of success English reading skills among university students: Remedial and challenge strategies. *Chalim Journal of Teaching and Learning, 5*(1), 1–10.

Priyadarshini, R., & Jeyaraj, S. S. (2022). Digital competencies and employability of Indian university students: A study of higher education readiness. *Education and Information Technologies, 27*, 10519–10534. https://doi.org/10.1007/s10639-022-11114-9

Salem, A., & Abu Jarad, I. (2022). Reality of technical competencies among Palestinian university students. *Journal of Arab Universities for Education and Psychology, 20*(1), 77–93.

Sánchez Vera, M. D. M., & López Vicent, P. (2024). The competence of digital entrepreneurship in education: Analysis of the perception of university students. *Intangible Capital, 20*(2), 376–392.

Susanto, D. A., Bimo, D. S., & Pinandhita, F. (2025). Discourse in the language classroom: A qualitative exploration of speaking competence in SLA contexts. *IJELT: Indonesian Journal of Education, Language, and Technology, 1*(2), 154–165.

Tsai, C.-C., Liang, J.-C., & Hou, H.-T. (2021). Differences in digital competencies across academic disciplines. *Computers & Education, 174*, 104309. https://doi.org/10.1016/j.compedu.2021.104309

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2022). The changing nature of digital skills: Implications for higher education. *Computers in Human Behavior, 133*, 107309. https://doi.org/10.1016/j.chb.2022.107309

Yousef, H. (2021). Technical competencies of Palestinian higher education students during distance learning amid COVID-19 pandemic. *Palestinian Journal of Open Education, 10*(2), 95–116.